APPENDIX A

INITIAL STUDY

INITIAL STUDY

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

Prepared for

County of Sonoma
Permit Resource Management Department
2550 Ventura Avenue
Santa Rosa, California 95403-2829

February 2008

URS

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Acronyms and Abbreviations

AB	California Assembly Bill
BAAQMD	Bay Area Air Quality Management District
CalAm	California-American Water Company
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CO	carbon monoxide
CTS	California tiger salamander
dBA	A-weighted noise level
EIR	Environmental Impact Report
FEMA	Federal Emergency Management Agency
gpd	gallons per day
gpm	gallons per minute
LAFCO	Sonoma County Local Agency Formation Commission
LBMF	Luther Burbank Memorial Foundation
LC	Limited Commercial
L_{dn}	day/night noise level
LIA	Land Intensive Agriculture
MOB	medical office building
NPDES	National Pollutant Discharge Elimination System
PF	Public Facilities
PG&E	Pacific Gas and Electric Company
PM_{10}	particulate matter less than 10 microns in diameter

PQP	Public/Quasi-Public
project site	50 Mark West Springs Road in the City of Santa Rosa, Sonoma County, California
RVFD	Rincon Valley Fire Protection District
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCWA	Sonoma County Water Agency
SD	Scenic Design
SR	Scenic Resources
SRPCS	Santa Rosa Plains Conservation Strategy
Sutter	Sutter Medical Center of Santa Rosa
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WFC	Wells Fargo Center for the Arts

1.1 INTRODUCTION AND PROJECT LOCATION

This initial study has been prepared in accordance with the State CEQA Guidelines and the County of Sonoma CEQA Guidelines. Sutter Medical Center of Santa Rosa (Sutter) and the Luther Burbank Memorial Foundation (LBMF) propose a Joint Master Plan that would accommodate expansion of LBMF facilities and replacement of two Sutter hospital facilities (proposed project). The Joint Master Plan would describe development of an approximately 79-acre property at 50 Mark West Springs Road in the City of Santa Rosa, Sonoma County, California (project site). The project site is in the southeast quadrant of the U.S. Highway 101/Mark West Springs Road interchange and is bordered to the east by the Old Redwood Highway and residential land uses (Figure 1). LBMF and Sutter currently own the property, which consists of the six legal parcels summarized in Table 1 and shown of Figure 2.

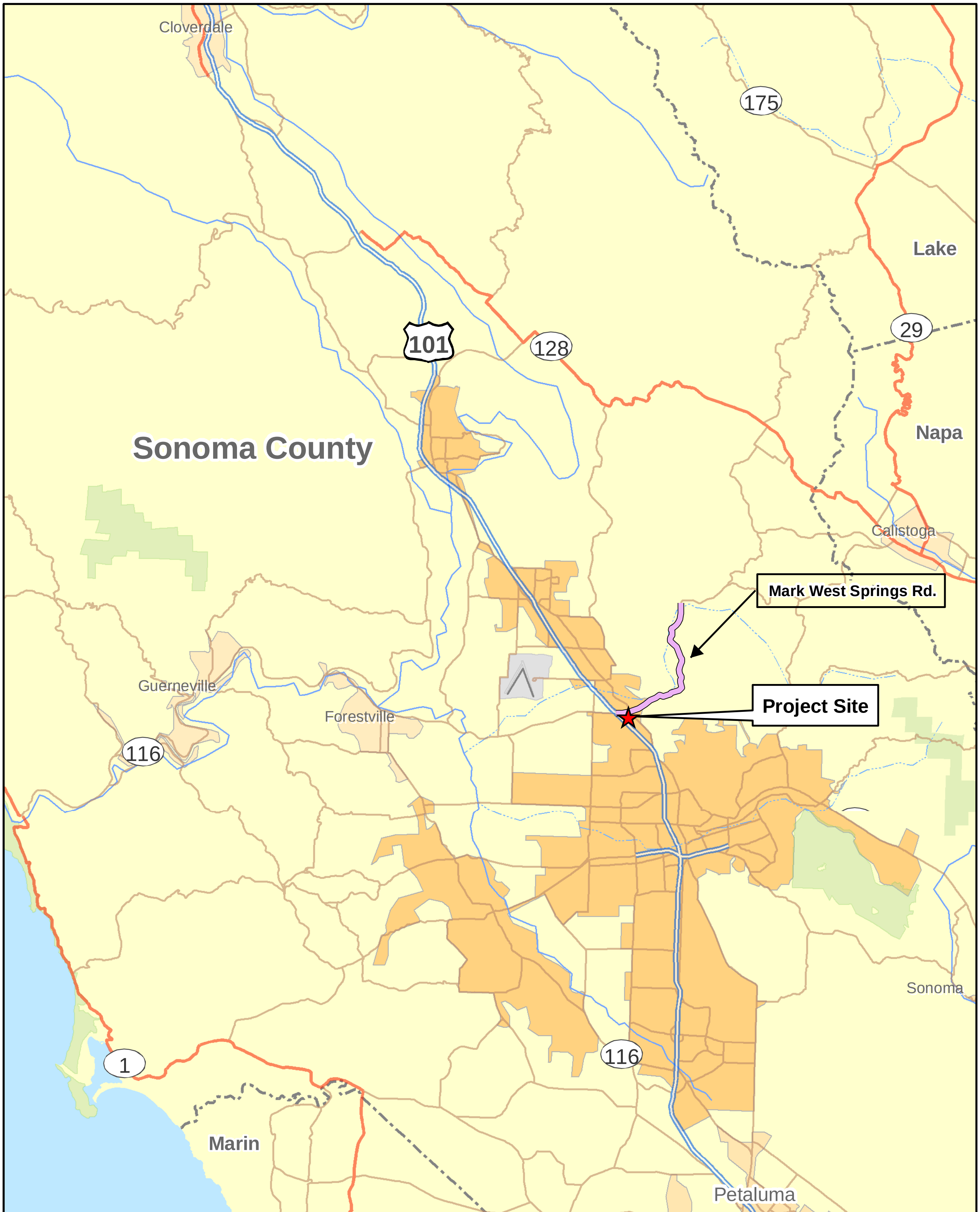
Table 1 Land Use and Zoning of the Project Site

					Area (Acres)
1	58-040-023	LBMF	Limited Commercial	Commercial Office	1.25
2	58-040-058	Sutter	Public/Quasi-Public	Public Facilities Scenic Design; Scenic Resources	15.00
3	58-040-059	Sutter	Public/Quasi-Public	Public Facilities Scenic Design; Scenic Resources	10.00
4	58-040-060	LBMF	Public/Quasi-Public	Public Facilities Scenic Design; Scenic Resources	25.01
5	58-040-061	LBMF	Public/Quasi-Public	Public Facilities	3.01
6	58-040-050	Sutter	Land Intensive Agriculture (20-acre minimum lot size)	Land Intensive Agriculture B6/20 SR	24.36
Total					**78.63**

As shown in Table 1, LBMF owns 29.27 acres of the project site and Sutter owns 49.36 acres.

The LBMF does business on the project site as the Wells Fargo Center for the Arts (WFC), a nonprofit performing arts and cultural center founded in 1981. WFC buildings and facilities occupy most of the LBMF's 29.27 acres; the rest of the LBMF property is vacant. For a number of years, the LBMF has envisioned an expansion of the facilities, which would include the establishment of a compatible facility or facilities.

Sutter operates two medical facilities in Santa Rosa: Warrack Hospital on Summerfield Road and the Main Hospital Campus on Chanate Road. Sutter has determined that replacing both facilities



0 1 2 4 Miles

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Sutter/LBMF Joint Master Plan

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Project Vicinity Map

Figure 1

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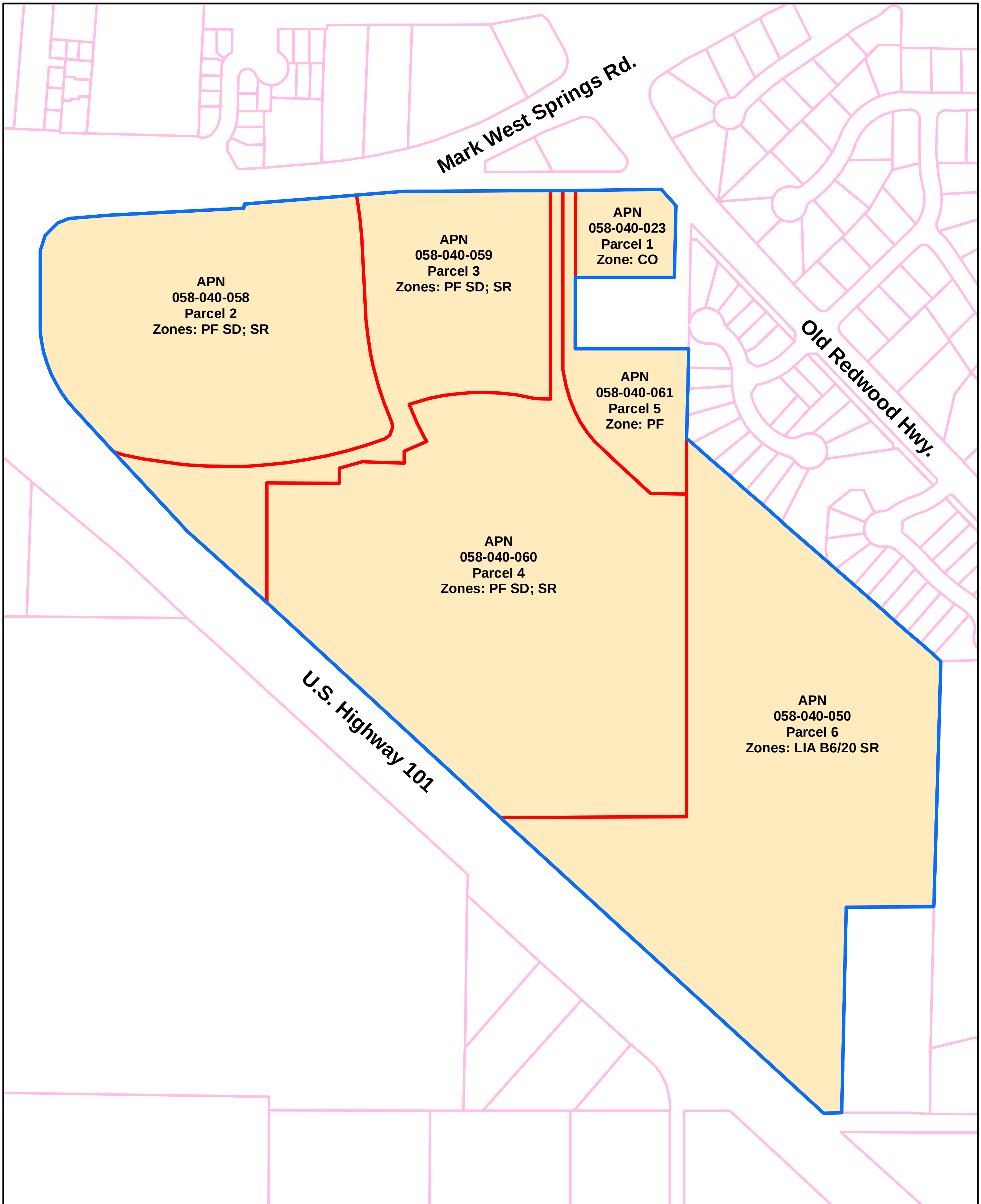

Source: Brelje & Race Consulting Engineers

0 350 700 Feet

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Sutter/LBMF Joint Master Plan

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Parcel Boundaries of the Project Site

Figure 2

October, 2007

URS Corporation: L:\Projects\Sutter_Medical_Center_26815637\Maps\Current Working Documents\Parcel_Boundaries.mxd 101807 cxbente0 is one option for achieving long-range compliance with the Hospital Seismic Safety Act (Senate Bill [SB] 1953). Accordingly, Sutter is proposing to build new hospital facilities on its portion of the project site to replace the two existing facilities.

The Joint Master Plan would accommodate expansion of LBMF facilities on Parcels 1, 4 and 5, and construction of new Sutter hospital facilities on Parcels 2 and 3. Parcel 6, a vineyard, would remain in its current use.

1.2 PROJECT OBJECTIVES

The design and operation of the Sutter/LBMF Joint Master Plan and development seek to achieve the following objectives:

1. Provide a high-quality integrated campus development that will provide sufficient space to accommodate the expansion needs of the Sutter Medical Center of Santa Rosa and the Well Fargo Center for the Arts.
2. Achieve Sutter's primary community objective to maintain continuous provision of health care services to the citizens of Sonoma County.
3. Be located on a site that is easily accessed by persons living within the primary service area of the Sutter Medical Center of Santa Rosa.[1]
4. Construct the hospital and medical office buildings of a sufficient size, design, and connectivity to meet the most modern efficient hospital layouts.
5. Construct buildings of a high visual quality that will promote the recognition of the Sutter Hospital as viewed from US 101 and Mark West Springs Road.
6. Positively impact the local economy through the creation of local job opportunities in medical technology, arts, and entertainment and an increase in the local tax base.
7. Provide an emergency entrance to Sutter as close to US 101 as possible. Most of the emergency traffic is expected to arrive via ambulance exiting off US 101; therefore, vehicular access that facilitates ambulances exiting Mark West Springs Road as quickly as possible defines the layout of the hospital site planning.
8. Continue to honor the Healthcare Access Agreement with Sonoma County that requires Sutter to provide health care to the citizens of Sonoma County.
9. Expand the LBMF's nonprofit mission to enrich, educate, and entertain the community through the arts, and to provide accessible and affordable assembly spaces for other nonprofit arts and community-based organizations by:
    - Using the current site, which:
        - is well-established, well-known, and beloved by audiences throughout the region
        - is highly visible and very accessible from US 101

[1] Defined by the Postal ZIP Code areas that originate 75 to 80 percent of the hospital's patient population.

  - o provides for expansion of the WFC's free parking to accommodate greater use by the community

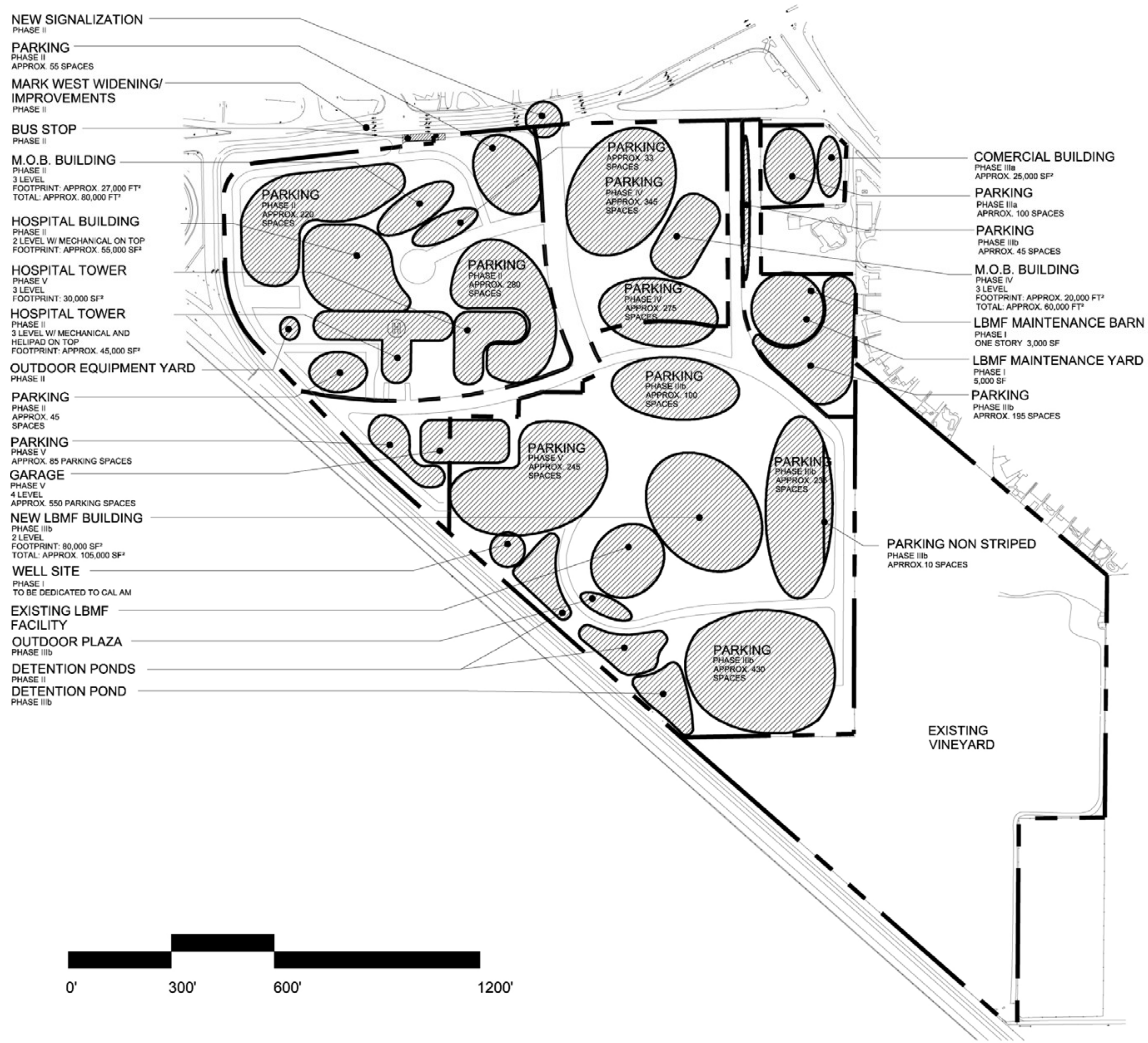
- Developing a multiple-venue, state-of-the-art center for arts, culture, education and community assembly that will:
  - o provide for the most flexibility in staging, for load-in, and for patron comfort and accessibility
  - o accommodate performances currently not possible in other Sonoma County venues, such as touring Broadway, opera and ballet
  - o allow for expansion of the WFC's education-through-the-arts programming to include on-site, hands-on instruction and participation
  - o supply a wider variety of affordable rental spaces for local performing arts companies and visual artists, as well as provide much-needed meeting and special event space for a variety of businesses and organizations throughout the region
  - o provide enough space to continue providing long-term, leased space at below-market rates for educational and other nonprofit organizations

1.3 PROJECT DESCRIPTION

The project would be built over time in several phases, described below. The Sutter facilities would exclusively occupy approximately 15 acres of the project site (Parcel 2). The WCF facilities would exclusively occupy approximately 29 acres of the site (Parcels 1, 4 and 5). Approximately 10 acres (Parcel 3) would be devoted to shared parking facilities for Sutter and WFC facilities. The vineyard on the remaining 24 acres (Parcel 6) would remain in agricultural use. A conceptual site layout is shown on Figure 3.

The California-American Water Company (CalAm) provides potable water to the site, except for the vineyard property, which uses water from an existing on-site well. CalAm would continue to provide water for all domestic and fire suppression purposes for all existing uses and future development proposed by the Joint Master Plan. CalAm has provided a "Will Serve" letter dated June 26, 2006, subject to the development and transmission of additional new on-site water source(s). Water for landscape irrigation would be provided by the existing well in Parcel 6.

Wastewater is currently treated and disposed of on-site, via a private treatment and disposal facility. To ensure the long-term viability of the Joint Master Plan and future facilities, all of the proposed facilities would be connected to Sonoma County's Airport-Larkfield-Wikiup Sanitation Zone wastewater treatment system. Wastewater from the proposed hospital would be stored underground on-site and then pumped to the Sanitation Zone treatment facility during off-peak hours.



Sutter/LBMF Joint Master Plan	Conceptual Site Plan	Figure 3
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1.3.1 Project Phasing

Phase I (2009-2011)—Relocation/Replacement of Utilities/Existing Facilities

Amend Urban Service Area boundary to include project site with the exception of the vineyard property (058-040-050) within the Community Separator.

Phase I(a)

1. Annex parcels 2, 3, 4, and 5 to the Airport-Larkfield-Wikiup Sanitation Zone.
2. Leave in place all existing facilities and site improvements, including 1,605 parking spaces (901 paved and striped spaces, 52 paved but unstriped spaces, and 652 unpaved, unstriped [“overflow”] spaces).

Phase I(b)

1. Connect the existing LBMF facilities to the Airport-Larkfield-Wikiup Sanitation Zone wastewater treatment system.
2. Decommission the existing on-site LBMF sewage treatment facility.
3. Improve and expand the existing connection to CalAm by:
   - Dedicating to CalAm a new groundwater well source with a minimum capacity of 200 gallons per minute
   - Providing piping to pump the raw (untreated) water from the new groundwater well to the closest existing CalAm raw water main, which is located at the intersection of Lavell Road and Mayfield Drive[2]
   - Constructing a new potable water pipe line in Lavell Road to complete a “loop” on the CalAm water system to satisfy fire suppression needs of the proposed Joint Master Plan development
4. Demolish the existing barn (maintenance facility) and residence.
5. Relocate the maintenance activities to a newly constructed Maintenance Facility within Parcel 5, which would include the following.
   - Single-story building, with storage mezzanine, of approximately 3,000 square feet of floor area, connected to water and sewer service to accommodate:
     - Equipment storage, including two small vehicles
     - Chemical storage (gasoline, diesel, cleaning products)
     - Archival storage
     - Workshop

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[2] All new water transmission piping would be located on-site and/or within existing public roadway rights-of-way.

- Offices for Maintenance Supervisor plus up to two employees
- Open yard area with fenced boundary of approximately 5,000 square feet in area to accommodate garden/maintenance staging area

6. Develop approximately 0.5 acre of wetlands on the vineyard property or off-site in an approved wetland bank to mitigate the potential loss of wetlands on-site.
7. Retain all existing LBMF facilities (approximately 140,000 square feet):
   - Person Theatre—1,668 person occupancy, including standing room
   - Carston Cabaret—220 seats/264 maximum room audience capacity
   - Fireside Room (banquet)—200 seats
   - Merlo Theatre/East Wing Theatre—400 seats
   - East Wing Classrooms—300 student capacity
   - Conference Facility—approximately 50,000 square feet
   - Mechanical Structures—approximately 5,000 square feet
   - Lobby and Administration Area—1,200 square feet
   - 1,605 parking spaces
8. Retain the existing athletic fields adjacent to Main and East drives, if feasible. If not feasible, a small athletic field would be developed in the southwestern corner of Parcel 4. Should such field be developed, it would be removed as part of Phase III(b).
9. Maintain South Field (3.5–4 acres) for periodic events that benefit most from freeway exposure. Typical events include merchandise shows and sales such as for RVs or automobiles, bike rallies, fundraising receptions, church barbecues, carnivals, seasonal sales events for pumpkins and Christmas trees, and school graduations. It is anticipated that there would be approximately 6 events per year permitted through a Special Event Zoning permit process on a case-by-case basis. A small restroom facility may be constructed in this area, if required. This field is available year-round and can accommodate a daily attendance of about 3,500 people and about 1,000 vehicles. Event times range from early morning to late evening.
10. East Lawn
    - No large-scale outdoor concerts
    - Other activities will continue to occur as allowed by the current Use Permit , such as:
      - Civic/education/community-based functions
      - Private receptions/events
      - Nonprofit fund raising events
      - Limited amplified sound within General Plan parameters. Amplified sound consists of an arrangement of microphones, electronic signal processors, amplifiers, and loudspeakers that make live or prerecorded sounds—usually

music or speech— louder, or which distributes the sound to a larger or more distant audience.

11. Supersede the existing LBMF use permit. Since Phase I is essentially a site preparation phase, all existing facilities would be retained and there would be no expansion of existing facilities or intensification of current activities or events as allowed by existing Use Permit 10520.

Phase II (2011-2016)—Medical Center Construction

Sutter Facilities

1. Construct a hospital building by 2013 with the following characteristics:
   - Full range of comprehensive inpatient and outpatient treatment and diagnostic services, including all ancillary and support services required
   - 116-bed acute inpatient facility
   - Approximately 240,000 square feet of floor area
   - Approximately 100,000 square foot building footprint
   - Three to four stories plus rooftop mechanical equipment enclosure(s) and helistop to transport patients (approximately 67 to 83 feet overall height) day or night, on a year-round basis
   - Limited commercial kitchen for the preparation of meals for patients, staff, and hospital visitors
2. Construct a medical office building (MOB) with the following characteristics:
   - Approximately 80,000 square feet of floor area, physically connected to the hospital (approximately 27,000 square foot building footprint)
   - Three stories plus rooftop mechanical equipment enclosures (approximately 45 feet overall height)
   - Approximately 50 physician offices, with each office having, on average, four staff persons
   - Medical center administrative activities and operations
3. Construct on-site surface parking: 633 paved, striped spaces[3]

LBMF Facilities

1. No change in buildings or site activities from Phase I.
2. 1,349 parking spaces (861 paved and striped, 19 paved but unstriped, and 469 unpaved, unstriped spaces)**.**
3. Probable removal of one or both of the existing athletic fields.

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[3] Parking numbers used throughout this project description are initial estimates and may vary by 5 percent.

Site Improvements

1. Widen/improve Mark West Springs Road.
2. Signalize entry road/driveway; entry road will be two lanes inbound and three lanes outbound.
3 Construct US 101 off-ramp improvements.
4. To provide new water service off Mark West Springs Road, construct new on-site water supply “loop” that includes fire hydrants, and interconnect new “loop” with existing on-site water mains.
5. Construct new wastewater collection system, including a lift station, to collect and pump wastewater to existing sewers in Mark West Springs Road. Lift station to include underground wastewater detention basins for off-peak pumping when required by Sanitation Zone.
6. Add 475 paved, striped “shared” parking spaces to 27 pre-existing nonpaved spaces (502 total spaces), to be shared with LBMF during evenings and weekends, bringing the total parking available to LBMF to 1,851 (1,349 + 502).
7. Possibly develop the vineyard parcel with walking/jogging/nature trails, managed to protect both the biotic preserve and the vineyards. Picnic areas may be also proposed.
8. Two interconnected detention basins acting as one.

Upon completion of Phase II, there would be a total of 2,484 surface parking spaces on the site.

Phase III (2009 or later)—Arts Center Expansion

Sutter Facilities

No change from Phase II.

LBMF Facilities

Expansion of the LBMF facilities would occur in two sub-phases.

Phase III(a) (2009 or later)

1. Construct an office/commercial building of approximately 25,000–30,000 gross square feet of floor area with on-site parking on Parcel 1. This parcel is currently within the “LC” General Plan land use category within the “Commercial Office” zone district, and is within the General Plan “Urban Service Boundary.” Development of the commercial office building will be consistent with the zoning regulations for the site and would be permitted pursuant to design review approval only.

2. Retain 2,484 on-site Phase II parking spaces.

Phase III(b) (2016 or later)

1. Demolish existing “pods” (east of West Wing performance complex, estimated to reduce the size of the existing facility by 90,000 square feet).
2. Retain existing West Wing performance complex (main WFC building), estimated to retain 65,000 square feet as follows:

a. Person Theater – 1,668 seats

b. Carston Cabaret – 220 seats/264 maximum room audience capacity

c. Fireside Room – 200 person capacity

d. Lobby and Administration area (lobby – 1,200 person capacity)

3. Create new outdoor plaza on west side of exterior with sound wall to attenuate noise from US 101.
4. Construct new building:
   - 30,000 square foot/1,500 person capacity conference facility
   - 7,500 square foot/700 person capacity education facility
   - 7,500 square foot administration facility
   - 2,500-seat theater with lobby and stage (estimated to be 60,000 square feet).
5. Eliminate 9 paved, unstriped and 469 unpaved, unstriped parking spaces; add 484 paved, striped parking spaces.
6. If developed in an earlier phase, remove the athletic field from Parcel 4.
7. Construct a storm water detention basin to attenuate peak storm water runoff. The detention basin will be constructed near the US 101 right-of-way on both Parcels 4 and 6.

Upon completion of Phase III, there would be 2,490 surface parking spaces on the site; 1,857 of the spaces would be available to LBMF (502 of those would be "shared" spaces available during evenings and weekends).

Phase IV (2020 or later)

Sutter Facilities

Develop a second MOB (approximately 60,000 square feet of floor area).

LBMF Facilities

No change from Phase III. No additional expansion of LBMF facilities proposed.

Site Improvements

1. Remove 27 unpaved, unstriped parking spaces; develop approximately 270 paved, striped "shared" surface parking spaces for the MOB that would be available to LBMF during evenings and weekends.
2. Upon completion of Phase IV, there would be 2,733 (2,490 + 270 – 27) surface parking spaces on the site. Approximately 2,100 (1,857 + 270 – 27) of the spaces would be available to LBMF; 745 (502 + 270 – 27) of those would be "shared" spaces available during evenings and weekends).

Phase V (2020 or later)

Sutter Facilities

1. Construct a 60-bed, four-story hospital tower with approximately 100,000 square feet of floor area.

2. Construct a four-level parking structure, approximately 35 feet in height, containing 550 spaces, approximately half of which (275) would be available to LBMF on a shared basis. (Construction of the garage would necessitate the removal of approximately 115 surface spaces.)

LBMF Facilities

No change from Phase III; further expansion of LBMF facilities is proposed.

Upon completion of Phase V, there would be 3,168 parking spaces (not including parking for the commercial building on Parcel 1) on the site (2,618 surface spaces plus 550 parking structure spaces). Approximately 2,260 of the parking spaces would be available to LBMF (approximately 905 [745 – 115 + 275]) of those would be "shared" spaces available during evenings and weekends.

The number of off-street parking spaces proposed by the Joint Master Plan is based on a comprehensive traffic and parking analysis prepared by Dowling Associates and will be further reviewed in the EIR. Actual parking use will be evaluated on an ongoing basis. This evaluation would study the effectiveness of shared parking goals and scheduling events at WFC to minimize parking impacts. If the number of parking spaces provided is found to be excessive, the number developed in subsequent phases may be reduced pursuant to the County of Sonoma Design Review approval process.

1.4 CONSISTENCY WITH GENERAL PLAN, ZONING, AND APPLICABLE LAND USE CONTROLS

The project site is divided into six parcels. Most of the parcels have a Sonoma County land use designation of Public/Quasi-Public (PQP) and are zoned Public Facilities (PF) within Scenic Design (SD) and Scenic Resources (SR) combining districts. Parcel 1 is zoned Commercial Office with a Limited Commercial (LC) land use designation. Parcel 6 is zoned Land Intensive Agriculture (LIA) (B6/20 SR) with a 20-acre minimum lot size LIA land use designation. Table 1 lists the parcels in the project site and their corresponding land use and zoning designations. Figure 2 shows parcels in the project site and corresponding zoning designations.

The bulk of the project would be built on the PQP-designated land, consistent with the General Plan and zoning designations. The LBMF office/commercial building and its associated parking, proposed to be developed in Phase III(a), would be built on Parcel 1, within the LC land use category and Commercial Office zoning district.

The LBMF and Sutter Medical Center will need to acquire the following approvals to proceed with their Joint Master Plan:

1. Certification of the Environmental Impact Report (EIR)
2. Approval from the Sonoma County Local Agency Formation Commission (LAFCO)
3. Annexation of Parcels 2, 3, 4, and 5 to the Airport-Larkfield-Wikiup Sanitation Zone
4. An amendment to the Sonoma County General Plan to include the 53 acres within the Urban Service Boundary

5. A "companion" amendment to the 1984 Larkfield-Wikiup Area Plan to place the project property within the "Ultimate Sewer Service Area" to maintain consistency with the General Plan
6. Use Permits for approval of Phases I and II the *Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan.* Implementation of Phase III(a) is expected to be undertaken pursuant to future Design Review approval, subject to future environmental review. Implementation of Phases III(b) through V is expected to be undertaken pursuant to future Use Permit application(s), also subject to future environmental review.

In addition to the above, a general plan text amendment may be implemented to restrict uses consistent with those of the master plan.

1.5 OTHER REQUIRED APPROVALS

In addition to the land use approvals discussed in Section 1.4, major permits or approvals that will likely be required for the proposed project include:

- National Pollutant Discharge Elimination System (NPDES) Permit from the North Coast Regional Water Quality Control Board (RWQCB)
- Section 401 Water Quality Certification from the North Coast RWQCB
- Section 404 Permit from the U.S. Army Corps of Engineers (USACE)
- Permit to Operate from the Bay Area Air Quality Management District (BAAQMD)
- Approval from the California Department of Transportation (Caltrans)
- Approved SUSMP Requirements and Stormwater Mitigation Plan from North Coast Regional Water Quality Control Board

In addition, consultation will be required with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) regarding potential impacts to federally and state-listed sensitive species.

INITIAL STUDY AND ENVIRONMENTAL CHECKLIST FORM

Project Title:	Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan
Lead Agency's Name and Address:	County of Sonoma Permit Resource Management Department 2550 Ventura Avenue Santa Rosa, California 95403
Lead Agency Contact:	Steve Dee
Project Location:	50 Mark West Springs Road, Santa Rosa, Sonoma County, CA
General Plan Land Use Designation	Limited Commercial, Public/Quasi-Public, Land Intensive Agriculture (20-acre minimum lot size)
Zoning	Commercial Office; Public Facilities Scenic Design; Scenic Resources, Public Facilities; Land Intensive Agriculture B6/20 SR
Description:	See Project Description, Section 1.3
Agencies Whose Approval Is Required: Sonoma County Planning Commission, Sonoma County Board of Supervisors, Sonoma LAFCO, USACE, North Coast RWQCB, BAAQMD, Caltrans	
Surrounding Land Uses: See Introduction and Project Location, Section 1.1	

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☒ Aesthetics	☐ Agricultural Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Geology /Soils
☒ Hazards & Hazardous Materials	☒ Hydrology / Water Quality	☒ Land Use / Planning
☐ Mineral Resources	☒ Noise	☒ Population / Housing
☒ Public Services	☒ Recreation	☒ Transportation/Traffic
☒ Utilities / Service Systems	☒ Mandatory Findings of Significance	

Determination

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier Environmental Impact Report (EIR) or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

3.1 AESTHETICS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?				X
b. Substantially damage scenic resources, including but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c. Substantially degrade the existing visual character or quality of the site and its surroundings?	X			
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	X			

DISCUSSION:

a and b) No Impact

Though the project would have a substantial effect on the current visual character of the area, the project site is not part of a scenic vista and the segment of US 101 flanking the property is not designated as a state scenic highway. Therefore, the project would not have a substantial effect on a scenic vista.

As the project is not near a state scenic highway, it would not impact previously designated scenic resources, including but not limited to trees, rock outcroppings, and historic buildings located within a state scenic highway.

These issues will not be discussed further in the EIR.

c and d) Potentially Significant Impact

The project would significantly alter current visual impressions of the site. The site is visible from two roads, Mark West Springs Road and US 101. Though the site is currently part of the US 101 county-designated scenic corridor, annexation into the Urban Service Area would eliminate the scenic corridor setback requirements that currently apply. Notwithstanding, the hospital facilities would have a substantially larger height and mass than existing structures in the project area. The project's potential effects on the existing visual character or quality of the site and its surroundings will be analyzed in the EIR using Permit & Resource Management Department's Visual Assessment Guidelines.

The vineyard is a scenic resource that is visible from US 101. The vineyard is in the Scenic Resource Combining District, which is intended to preserve the visual character and scenic resources of Sonoma County. No development is proposed on the vineyard site with the exception of a small area of wetlands and potential trails and picnic facilities.

The proposed parking areas, buildings, and helistop and the special events that would take place at the expanded WFC facilities would increase the amount of light and glare from the site. Project construction activities would temporarily increase light and glare. The potential effects of this new source of light and glare will be addressed in the EIR.

3.2 AGRICULTURAL RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and project site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	X			
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X

DISCUSSION:

a) Potentially Significant Impact

The project site includes Prime Farmland in parcels 050-040-023 and 050-040-061 and Unique Farmland in parcel 058-040-050. This issue will be discussed further in the EIR.

b) No Impact

As the vineyard parcel will be retained and will continue in agricultural use, the project does not contain any elements that would conflict with existing zoning for agricultural use or a Williamson Act contract. This issue will not be discussed further in the EIR.

c) No Impact

The project would create approximately 0.5 acre of wetlands and may create paths and picnic areas on the vineyard property in areas that are not under agricultural production. All existing vineyards will remain. No other changes in the existing environment are proposed that, due to their location or nature, could result in conversion of farmland to nonagricultural use. This issue will not be discussed further in the EIR.

3.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a. Conflict with or obstruct implementation of the applicable air quality plan?			X	
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	X			
d. Expose sensitive receptors to substantial pollutant concentrations?	X			
e. Create objectionable odors affecting a substantial number of people?				X

DISCUSSION:

a and b) Less than Significant Impact

The BAAQMD adopted CEQA guidelines to assist local agencies in evaluating the significance of air quality impacts, which rely on planned land use established by local general plans. The BAAQMD's Clean Air Plan contains a list of transportation control measures intended to reduce emissions from vehicle travel, the primary source of air pollution. Among the list are seven measures that the BAAQMD relies on local jurisdictions to implement through General Plan policies. Sonoma County is currently updating the General Plan to include new protections and policies to address regional air quality concerns and Clean Air Plan transportation control measures. This project is anticipated to serve the needs of forecasted population growth in the region. Both current General Plan and zoning allow for the proposed development types and intensity of land use. An amendment to the Sonoma County General plan and zoning is being requested as part of the project to include the site within the Urban Service Boundary. Development of the project site is not anticipated to interfere with population projections used in the Clean Air Plan.

Carbon monoxide (CO) emissions from traffic generated by the project would be the pollutant of greatest concern. The intersection of Mark West Springs Road and Old Redwood Highway would be the most affected by project traffic and would have the highest CO concentrations. In 2004, a worst-case scenario air quality model was developed to analyze the project's impact at this location (Illingworth & Rodkin 2004). The results indicate that CO concentrations would remain below ambient air quality standards. The proposed project is not expected to result in a conflict with an air quality plan or violate any air quality standards. However, this issue will be discussed further in the EIR.

c) Potentially Significant Impact

The Bay Area is in nonattainment of federal and state standards for ground-level ozone and of state standards for particulate matter less than 10 microns in diameter (PM_{10}). The project would increase the release of PM_{10}. The project would also increase the release of ozone precursors into the atmosphere in the form of reactive organic gases and nitrous oxides. These releases would be generated primarily from traffic and facility central plant boilers.

The BAAQMD significance threshold for the ozone precursors and PM_{10} is 80 pounds per day. Emission rates above the threshold are considered to be a considerable net increase. The project's emission rates and potential impacts relative to criteria pollutants will be analyzed in the EIR.

No CEQA thresholds of significance have been established for greenhouse gases (GHG). However, in September 2006, California Assembly Bill (AB) 32 called for the California Air Resources Board (CARB) to adopt regulations requiring the reporting and verification of statewide GHG emissions and that a limit equivalent to the statewide GHG emissions in 1990 be achieved by year 2020. GHG emissions associated with the proposed project are primarily associated with energy consumption for operating the hospital facility and expanded WFC site and motor vehicles traveling to and from the project site. This will result in an increase in the generation of GHG over existing conditions. This issue will be analyzed in the EIR.

d) Potentially Significant Impact

As discussed in Items a and b above, traffic-generated pollutants resulting from the project are not anticipated to increase CO concentrations above ambient air quality standards. However, temporary impacts are expected to result from construction activity. Dust would be generated during demolition, grading, and construction. The amount of dust would depend on size of the area disturbed, amount of activity, soil conditions, and meteorological conditions. Nearby residences and the school could be adversely affected by dust generated during construction activities. These activities are expected to occur over a relatively short period of time; therefore, impacts are considered to be less than significant if reasonable available control measures are applied. This issue will be discussed further in the EIR.

The project includes the installation of an emergency generator powered by diesel fuel. Diesel particulate matter from exhaust could pose a health risk to nearby sensitive receptors (hospital patients, staff, WFC patrons, students, and local residents). The BAAQMD would require permits for the generator system. Under BAAQMD permitting requirements, the applicant must demonstrate that diesel exhaust particulate matter would not cause a significant health risk. This issue will be discussed further in the EIR.

e) No Impact

The project would not generate a significant amount of odiferous compounds that would be released into the atmosphere. Therefore, it is not likely to expose people to objectionable odors. This issue will not be addressed further in the EIR.

3.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	X			
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	X			
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	X			
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	X			
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	X			

DISCUSSION:

a, b, and c) Potentially Significant Impact

The Santa Rosa Plain Conservation Strategy (SRPCS) identifies the project area as being within the area of potential presence of endangered California tiger salamander (CTS) and rare plants. Though the project area is outside of the 1.3-mile range of known breeding sites for CTS, the species is considered to be potentially present.

Botanical surveys were conducted by plant biologist C. Patterson for the project site in 1998, 1999, and 2004. Additionally, Mr. Bill Cox and Mr. Allan Buckmann of the CDFG were consulted regarding the various wildlife species of concern for the greater Santa Rosa region. The results are documented in the *Biological Resources Report for the Sutter Medical and Luther Burbank Center for the Arts* (Patterson 2004). No rare, endangered, or otherwise sensitive plant species were identified at the project site. Moreover, the site lacks suitable habitat for the California red-legged frog or the Pacific freshwater shrimp. There were reported sightings of the CTS within 5 miles of the project boundaries but none reported on or near the project site. The SRPCS requires projects within the area of potential presence to mitigate for loss of habitat by contributing to a species fund. The project area contains 0.46 acre of wetlands and other waters of the U.S. Some portion of these may be considered jurisdictional under Section 404 of the Clean Water Act. Mitigation may be required by the USACE.

Impacts to special-status plant and animal species, as well as wetlands within the project area, will be discussed in further detail in the EIR.

d) Less-Than-Significant Impact

The project site and its surrounding area are characterized by highly developed and altered landscapes that provide poor habitat for wildlife. Because of the developed nature of the project site and area and the presence of the adjacent freeway, wildlife use of the site, especially by large mammals, is minimal. Even the use by transitory birds is limited, due to the scarcity of wetland habitat. Given the extremely small and poor quality of on-site habitats and developed character of the surrounding area, the project would have a less-than-significant impact on movement of migratory species. This issue will be discussed further in the EIR.

e and f) Potentially Significant Impact

The Resource Conservation Element of the Sonoma County General Plan provides County policies for protection of several types of biotic resources. Protection of trees is addressed by policies laid out in the Conservation of Biotic Resources section of the Resource Conservation Element. Moreover, the Sonoma County Code contains two ordinances that would reduce potential impacts to trees. The Sonoma County Tree Ordinance (No. 4044) regulates the removal of certain designated trees. The Sonoma County Heritage Tree ordinance (No. 3651) provides for the identification and protection of designated heritage trees. The project site has a number of oak trees according to the inventory performed in June 2006 by Horticultural Associates. County policy RC-5c makes the preservation of significant native oaks and other native trees a primary consideration in the review of development projects.

3.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less-Than-Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	X			
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section15064.5?		X		
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	X			
d. Disturb any human remains, including those interred outside of formal cemeteries?		X		

DISCUSSION:

a) Potentially Significant Impact

No historical resources were identified during the 2004 cultural resources survey (Tom Origer and Associates 2004). However, one dwelling, a tank house, and a shed were observed and identified as potential historic resources and subsequently recommended for formal evaluation. Qualified architectural historians will evaluate this complex as well as another building that appears to date from the 1950s or earlier. Findings of this survey and impacts to potential historic resources will be discussed in further detail in the EIR.

Parcel 6 (APN 058-040-050) is subject to a conservation easement in favor of the Sonoma County Agricultural and Open Space Preservation District. A 3-acre parcel to the southeast (058-040-051), which is not part of the proposed project site, was set aside exclusively for the preservation of dogbane. Native Americans used dogbane fiber to weave netted bags, fish nets and snares, tumplines, dresses and bowstrings. Members of the Native American community, in conjunction with the Open Space District, continue to work to maintain the site. Potential affects from the proposed project on this resource will be discussed further in the EIR.

b) Less Than Significant With Mitigation Incorporated

No archaeological resources were identified in the 2004 cultural resources survey. In the event archaeological resources are discovered during project construction, work will be halted in the vicinity of the find until a qualified archaeologist can evaluate the find pursuant to CEQA Guidelines Section 15064.5(f). Impacts to potential archaeological resources will be discussed in further detail in the EIR.

c) Potentially Significant Impact

The project area is underlain by alluvial formations dating from the Holocene and Pleistocene periods. As Pleistocene period alluvial deposits have been known to contain paleontological resources, their presence at the project site cannot be ruled out without further research. Accordingly, the potential for encountering paleontological resources during project construction will be discussed in further detail in the EIR.

d) Less Than Significant With Mitigation Incorporated

No human remains were identified during the 2004 survey. In the event human remains are discovered during project construction, work will be halted in the vicinity of the find and the county coroner contacted, pursuant to CEQA Guidelines Section 15064.5(d). If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission who will identify a Most Likely Descendant. The Most Likely Descendant will coordinate with the landowner and make recommendations regarding the appropriate treatment of the remains. Implementation of these measures will reduce any potential impact to a less-than-significant level. This issue will be discussed further in the EIR.

3.6 GEOLOGY AND SOILS

Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Pub. 42.			X	
ii. Strong seismic ground shaking?		X		
iii. Seismic-related ground failure, including liquefaction?			X	
iv. Landslides?				X
b. Result in substantial soil erosion or the loss of topsoil?			X	
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?			X	
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X	
e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X

DISCUSSION:

a.i) Less-Than-Significant Impact

The project site is approximately 0.75 mile to the west of the nearest fault, the Rodgers Creek fault, and does not cross any lines as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist. Moreover, a search for other fault lines in the area confirms that the site is not located on any other fault. As a result, the likelihood that earthquake fault rupture will occur at the site is low. This issue will be discussed further in the EIR.

a.ii) Less Than Significant With Mitigation Incorporated

The active Rodgers Creek fault is located approximately 0.75 mile to the east of the project area, and therefore there is a significant probability that the site will experience strong seismic shaking during the design life of the facilities. This issue will be discussed further in the EIR.

a.iii) Less-Than-Significant Impact

Preliminary geotechnical investigations at the site indicate that, in general, the soils at the site have low liquefaction potential and associated ground deformations, but additional investigations are required to further evaluate liquefaction susceptibility. The proposed hospital facilities (building 1.1 Phase II, building 1.2 Phase II, and building 1.1 Phase V) would be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Office of Statewide Health Planning and Development seismic design requirements. All other structures would be designed and constructed at a minimum to the Uniform Building Code for seismic zone 4. These include building standards to accommodate higher force levels, structural connection details, and design for increased lateral support. Additionally, in order to satisfy the provisions of the California Building Code, these facilities would have to be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Because of these design features, impacts from strong ground shaking and seismic-related ground failure would be less than significant.

This issue will be discussed in further detail in the EIR.

a.iv) No Impact

The project site is on essentially level ground and is surrounded by level ground. Therefore, no landslides will affect the project. This issue will not be discussed further in the EIR.

b) Less-Than-Significant Impact

Exposure of native and engineered soils during construction activities could make them particularly prone to erosion due to rainfall runoff. Erosion and sediment control practices are mandated by the Clean Water Act and require implementation of measures before, during, and after grading activities. These mandated measures will be conducted by the project applicant, which will make these potential impacts less than significant. These potential impacts will be discussed further in the EIR.

c and d) Less-Than-Significant Impact

Preliminary investigations indicate that soils on the project site are not susceptible to subsidence or collapse and that the topography will not produce landslides or lateral spreading. These investigations also indicate that soils at the site have low liquefaction potential and associated ground deformations, but additional investigations are required to further evaluate liquefaction susceptibility.

The preliminary investigations concluded that the near-surface soils at the site have a potential for shrink/swell behavior, and can be therefore classified as expansive. Potential impacts from unstable and/or expansive soils will be discussed in further detail in the EIR.

e) No Impact

Septic systems are not planned for the project. However, two detention basins are proposed in the southern portion of the project near the US 101 right-of-way on either side of the Outdoor Plaza (Phase II). All facilities would be connected to the Airport-Larkfield-Wikiup Sanitation Zone. This issue will not be discussed further in the EIR.

3.7 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	X			
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	X			
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	X			
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.				X
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f. For a project located within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	X			
h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

DISCUSSION:

a and b) Potentially Significant Impact

Construction of the proposed project would involve using some hazardous materials such as petroleum fuels, paints, and welding gases. During operation, the hospital facilities would use medical gases and radioactive materials and would generate biohazardous materials and sharps such as needles. These materials could present potentially significant impacts, if not managed correctly. Potential impacts associated with the transport, use, and disposal of these hazardous materials will be discussed in further detail in the EIR.

c) Potentially Significant Impact

The school at the WFC will continue to operate with the proposed project. Although the project will not necessarily emit hazardous materials, they will be handled at the site on a regular basis; therefore, potential effects of handling these materials in proximity to a school will be addressed in the EIR.

d through f) No Impact

The project site is not included on a list of California Government Code Section 65962.5 hazardous materials sites (Cortese List). The project site is not located within an airport land use plan or within 2 miles of a public airport, or in the vicinity of a private airstrip. The nearest airport is the Charles M. Schulz Sonoma County Airport, which is 3.25 miles from the project site. Although the proposed project is not located within 2 miles of an airport, the project does include a helistop on the roof of the hospital. The project's proposed helistop will require coordination with the Federal Aviation Administration, the California Department of Transportation (Caltrans) Aeronautics Division, and the Charles M. Schulz Sonoma County Airport Control Zone. These issues will be addressed further in the EIR.

g) Potentially Significant Impact

During commute periods, unacceptable delays at several intersections along Mark West Springs Road and River Road could delay emergency vehicle access to the proposed medical facility as well as delay non-project-related emergency vehicle response times along local roadways as well as to/from US 101. These potential impacts will be discussed in further detail in the EIR.

h) No Impact

The project site is located in a substantially altered agricultural and rural residential area; therefore, it would not expose people or structures to risk involving wildland fires. This issue will not be discussed further in the EIR.

3.8 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?			X	
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	X			
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on or off-site?			X	
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off-site?	X			
e. Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	X			
f. Otherwise substantially degrade water quality?	X			
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j. Inundation by seiche, tsunami, or mudflow?				X

DISCUSSION:

a) Less-Than-Significant Impact

During grading and development activities, the loss of vegetative cover may increase erosion and sediment transport to off-site areas, potentially resulting in a violation of water quality standards. Erosion and sediment control practices are mandated by the Clean Water Act and require implementation of measures before, during, and after grading activities. These mandated measures will be conducted by the project applicant, which will make these potential impacts less than significant. These measures will be included as conditions of the applicants' NPDES Permit. These potential impacts will be discussed further in the EIR.

b) Potentially Significant Impact

The proposed project includes development of a new groundwater well source with a minimum capacity of 200 gallons per minute. This new well has the potential to affect groundwater supplies or interfere with groundwater recharge. This issue will be analyzed in the EIR.

c) Less-Than-Significant Impact

Because the site is generally flat, the project will not substantially alter the site's existing drainage pattern and result in substantial erosion or siltation on- or off-site. The site grading plan must be approved by Sonoma County. This issue will be discussed further in the EIR.

d) Potentially Significant Impact

The site generally drains from east to west into three shallow pipe culverts under US 101. The pipe culverts discharge to the west into agricultural lands currently cultivated as vineyards. The project will greatly increase the amount of impervious surface area on the site, consequently increasing the amount and rate of surface water runoff. Increased site runoff could potentially increase flooding on- and off-site. This issue will be analyzed further in the EIR.

e) Potentially Significant Impact

The increase in impervious surface area on the site will increase the amount and rate of surface water runoff. Increased site runoff could potentially exceed the capacity of existing on-site and off-site drainage systems. This issue will be analyzed further in the EIR.

Surface water runoff from the site will be directed to vegetated swales before leaving the site to minimize pollutant runoff. Effectiveness of swales in reducing pollutant load in surface water runoff will be discussed further in the EIR.

f) Potentially Significant Impact

Water quality could potentially be affected during construction (see Item a) and from surface water runoff after project completion (see Item d). These issues will be discussed further in the EIR.

g and h) No Impact

According to the Federal Emergency Management Agency (FEMA) Flood Map for the project area, the project site and its surroundings are not located within or near a 100-year flood hazard area. This issue will not be discussed further in the EIR.

i and j) No Impact

The site is not within a 100-year flood hazard area or within an area subject to flooding from a dam or levee failure. The project site is not at risk of inundation from a seiche, tsunami, or mudflow. These issues will not be discussed further in the EIR.

3.9 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Physically divide an established community?				X
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	X			
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?	X			

DISCUSSION:

a) No Impact

The project site is surrounded by open space and agricultural land to the south, US 101 to the west, and unincorporated residential development to the north and east. Development of the project site would introduce new land uses between US 101 and residential areas to the east. As a result, the project would not divide any existing community. This issue will not be discussed further in the EIR.

b) Potentially Significant Impact

Annexation into the Urban Service Area would be required for the proposed project site to be served by the public sewer system. The project is consistent with the Sonoma County General Plan land use designation of PQP; however, the General Plan would have to be amended to include the 53 acres within the Urban Service Area. In addition, a “companion” amendment to the 1984 Larkfield-Wikiup Area Plan to place the project property within the “Ultimate Sewer Service Area” is required to make the project consistent with the General Plan.

Isolated and irregular noise events resulting from helicopter transport to the medical center may coincide with events at the WFC. These disruptions could compromise attendees’ enjoyment of WFC events. While these potential noise impacts do not conflict with any applicable land use plans, policies, or regulations of an agency with jurisdiction over the project, this issue will be further discussed under the noise element of the EIR.

As stated previous, annexation into the Urban Service Area would eliminate the Scenic Corridor setback requirements due to the project’s proximity to US 101. The vineyard property is also located in the Scenic Resources Combining District. These issues will be discussed further in the EIR.

c) Potentially Significant Impact

The SRPCS identifies the project area as being within the area of potential presence of endangered CTS and rare plants. The project's consistency with the SRPCS will be evaluated in the EIR.

3.10 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				X

DISCUSSION:

a and b) No Impact

According to the Sonoma County General Plan Resource Conservation Element, the project site is not in an area that contains a mineral resource deposit. Therefore, the project would not result in the loss of availability of a known mineral resource of value to the region or residents of the state or result in the loss of availability of a locally important mineral resource recovery site. These issues will not be discussed further in the EIR.

3.11 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	X			
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	X			
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	X			
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f. For a project located within the vicinity or a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

DISCUSSION:

a) Potentially Significant Impact

The entire project site is exposed to noise levels exceeding 60 dBA L_{dn},[4] the Sonoma County General Plan's Noise Element threshold of acceptability for noise-sensitive development. The highest noise levels occur along the US 101 frontage where the existing noise exposure level at the approximate setback of the proposed hospital is approximately 70 dBA L_{dn}. Because the noise exposure levels are approximately 70 dBA L_{dn} at the facade of the proposed hospital building, there is the potential for interior levels to exceed the interior noise limit with windows closed for noise control. Noise resulting from hospital mechanical equipment, including

4 The A-weighted noise level (dBA) is the sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. Day/night noise level (L_{dn}) is the average dBA during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.

emergency generators, if not enclosed or attenuated, could exceed noise limits in the Noise Element of the Sonoma County General Plan at the nearest residential property lines. In addition, noise from helicopter landings, take-offs, and over-flights of neighborhoods as well as noise from ground-transport emergency vehicles will be analyzed further in the EIR. Outdoor events with amplified sound may also conflict with noise standards established in the General Plan.

b) Less-Than-Significant Impact

Construction of proposed facilities may include pile driving. Pile driving can generate perceptible groundborne vibration levels within 50 feet. No sensitive receptors exist within 50 feet of this potential activity. No other groundborne vibration or noise would occur from the project. This impact would be temporary and limited to the construction period. Vibration from pile driving will be discussed further in the EIR.

c) Potentially Significant Impact

Noise from parking and on-site circulation may be annoying or disturbing to residents adjacent to the proposed parking lot along the east property boundary. Noise from helicopter landings, take-offs, and overflights could impact hospital patients, WFC events, and neighboring residents. Operation of the proposed helistop could result in high enough interior noise levels during WFC events and at the proposed hospital to result in a significant disturbance. These potentially significant noise impacts will be analyzed further in the EIR.

d) Potentially Significant Impact

Construction of the proposed facilities will temporarily increase noise levels at nearby residences. Since construction will occur over several years, construction activities will not typically be located adjacent to a particular receptor during the entire construction period. In addition, the noise generated from periodic helicopter flights as well as periodic noise from ambulances accessing the hospital could impact residents. This issue will be discussed further in the EIR.

e and f) No Impact

The project site is not located within an airport land use plan, within 2 miles of a public airport, or in the vicinity of a private airstrip. The closest airport is the Charles M. Schulz Sonoma County Airport, approximately 3.25 miles from the project site. Therefore, the project would not expose people residing or working in the project area to excessive noise levels from these sources. This issue will not be discussed further in the EIR.

3.12 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	X			
b. Displace substantial amounts of existing housing, necessitating the construction of replacement housing elsewhere?			X	
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?			X	

DISCUSSION:

a) Potentially Significant Impact

The project would not create permanent new housing. It would relocate existing hospital facilities within Santa Rosa (Sutter Medical Center at 3325 Chanate Road and Sutter Warrack Hospital at 2449 Summerfield Road) to a new location in Sonoma County (50 Mark West Springs Road) and expand the existing WFC. The project would require a General Plan amendment to include the project site within the Urban Service Boundary; a “companion” amendment to the 1984 Larkfield-Wikiup Area Plan to place the project property within the “Ultimate Sewer Service Area” to maintain consistency with the General Plan; and annexation of Parcels 2, 3, 4, and 5 to the Airport-Larkfield-Wikiup Sanitation Zone. While these actions are requested only for the project site, it is possible that expansion of these boundaries could induce nearby development.

The potential for indirect growth inducement will be discussed in further detail in the EIR.

b and c) Less-Than-Significant Impact

One residence and household will be displaced by the project. This is not a substantial amount of housing or number of people. This would not necessitate the construction of new housing elsewhere. Although this will result in an inconvenience to the current residents, it is not considered a significant environmental impact. This issue will not be addressed further in the EIR.

3.13 PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less-Than-Significant Impact**	**No Impact**
a. Fire Protection?	X			
b. Police Protection?			X	
c. Schools?		X		
d. Parks?			X	
e. Other public facilities?			X	

DISCUSSION:

a) Potentially Significant Impact

The project site is located in the Rincon Valley Fire Protection District (RVFD). The new and expanded project facilities would rely on the RVFD for fire protection services, which could potentially require new or physically altered facilities.

The potential impacts to the RVFD will be discussed in further detail in the EIR.

b) Less-Than-Significant Impact

Both Sutter Hospital and the LBMF employ security forces to police their facilities, and will continue to do so once the proposed facilities are in use. Accordingly, the need for additional police protection services is expected to be minimal and impacts to local police protection, provided by the Sonoma County Sheriff’s Department, are expected to be less than significant.

c) Less Than Significant With Mitigation Incorporated

The existing school at the WFC will continue and expand with the project. School districts have adopted a standard impact fee system. The project’s potential impacts to the Sonoma County School District will be discussed in the EIR.

d) Less-Than-Significant Impact

The nearest park to the project site is Coffey Park, approximately 1.5 miles to the south. It is unlikely that the project would substantially increase the use of existing neighborhood and regional parks or other recreational facilities and require the need for new facilities. Therefore, this issue will not be discussed further in the EIR.

e) Less-Than-Significant Impact

Electricity, gas, and telephone services will be required for the project. These services are available along Mark West Springs Road. Pacific Gas and Electric Company (PG&E) is scheduled to complete a new substation in 2008 to serve the project area, which will relieve service loads on the PG&E Fulton Station. The project applicant will provide proof of available service by PG&E before issuance of a building permit from Sonoma County. This issue will be discussed further in the EIR.

3.14 RECREATION

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facilities would occur or be accelerated?			X	
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	

DISCUSSION:

a) Less-Than-Significant Impact

The project may provide walking/jogging/nature trails on the vineyard parcel as well as picnic areas, which could be used by employees and WFC attendees. However, this project element is uncertain. Other than Coffey Park, approximately 1.5 miles to the south of the project site, no existing neighborhood and regional parks or other recreational facilities are in close proximity to the project area. Therefore, the project would have a less-than-significant impact on the level of use of recreational facilities in the area. These issues will be discussed in further detail in the EIR.

b) Less-Than-Significant Impact

The proposed hospital may provide on-site recreational facilities for staff and clients in the form of outdoor areas as well as hiking trails across the site and in the vineyard parcel. These issues will be discussed in further detail in the EIR.

3.15 TRANSPORTATION/TRAFFIC

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	X			
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	X			
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	X			
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	X			
e. Result in inadequate emergency access?	X			
f. Result in inadequate parking capacity?	X			
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	X			

DISCUSSION:

a, b, c, and d) Potentially Significant Impact

The proposed medical center component of the project will be constructed in phases as identified in Section 1. Phase II of the medical center is projected to generate 7,668 daily two-way trips, with 562 morning peak hour and 660 afternoon/evening peak hour trips on a weekday. Phase V of medical center development is expected to generate 11,124 daily two-way trips with 802 morning peak hour and 906 afternoon/evening peak hour trips. In addition, the adjacent WFC would be expected to generate 310 morning peak hour trips and 203 afternoon/evening peak hour trips on a weekday without any special event in progress. Most intersections close to the project site as well as the US 101 freeway and the Mark West Springs Road/US 101 interchange are projected to experience significant impacts due to project traffic. The project includes improvements to Mark West Springs Road and the northbound US 101/Mark West Springs Road off-ramp. Improvements to the off-ramp must be coordinated with Caltrans. Even after anticipated freeway off-ramp and roadway widening, some freeway and intersection impacts would remain significant and unavoidable.

Many intersections close to the project site as well as some segments of US 101 would exceed Sonoma County and/or Caltrans minimum acceptable operating criteria for year 2020 or year 2030 weekday morning and/or afternoon/evening peak hour commute conditions, even after planned improvements.

These impacts will be discussed further in the EIR.

The Sutter Medical Center will move its current medical emergency helicopter service (now active at its Chanate Road facility) to the proposed Mark West Springs Road campus. Procedures will be developed to coordinate the relocated helicopter flight patterns with the landing and takeoff flight activity at the nearby Charles M. Schulz Sonoma County Airport, about 3.25 miles to the northwest. The new medical facility will be about 50 percent closer to the airport than the Chanate Road operation. These impacts will be discussed in further detail in the EIR.

Increased traffic volumes due to the proposed project could potentially cause a backup on the River Road/Mark West Springs Road overcrossing of US 101 that may result in decreased safety for eastbound traffic if the stopping site distance is deficient over the vertical crest of the overcrossing. This issue will be analyzed further in the EIR.

e, f, and g) Potentially Significant Impact

During commute times, unacceptable delays at several intersections along Mark West Springs Road and River Road could delay emergency vehicle access to the proposed medical facility as well as delay non-project-related emergency vehicle response times along local roadways and to/from US 101. These impacts will be discussed in further detail in the EIR.

Proposed parking will be adequate for project Phase II development, assuming a shared use parking management plan is instituted. However, Phase II proposed parking would not meet Sonoma County code requirements or shared use demand when a major special event is being held at the WFC. These impacts will be discussed in further detail in the EIR.

The applicants' preliminary information indicates a willingness to work with local transit agencies to provide acceptable and safe bus stops. Although internal design plans are still in process, bicycle parking is recommended to meet County code, and some internal roads are recommended to include wide shoulder areas to facilitate bicyclists. However, the project would have potentially significant impacts to bicyclists along local off-site roadways due to the greatly increased traffic volumes. These impacts will be discussed in further detail in the EIR.

3.16 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	X			
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	X			
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	X			
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	X			
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	X			
g. Comply with federal, state, and local statutes and regulations related to solid waste?			X	

DISCUSSION:

a) Potentially Significant Impact

The LBMF currently operates wastewater treatment and disposal ponds on-site. This system will be abandoned and the hospital facilities and expanded WFC will connect to the public sewer system. The project will be annexed into Airport-Larkfield-Wikiup Sanitation Zone operated by the Sonoma County Water Agency (SCWA). Connecting the project to these public sewer facilities could exceed loading capacities in these sewers. The hospital and medical office building are proposed to be connected to holding tanks and a lift station to allow for off-peak pumping as determined necessary by SCWA. This issue will be analyzed further in the EIR.

b) Potentially Significant Impact

The project would include abandoning existing wastewater facilities and connecting the WFC and new hospital facilities to the Airport-Larkfield-Wikiup Sanitation Zone operated by the SCWA. The Airport-Larkfield-Wikiup Sanitation Zone treatment plant has existing capacity to treat 900,000 gallons per day (gpd) of wastewater. The current flow to the plant is 800,000 gpd.

Phase I project activities are anticipated to contribute an additional maximum 13,054 gpd of wastewater to the treatment plant. As a result, no new upgrades to SCWA facilities would be needed. However, upgrades would be needed to accommodate the project through Phase II and beyond.

The SCWA has future plans to upgrade the treatment plant to its full, permitted 1.2 million gpd capacity to serve the region regardless of the proposed project. However, the project could hasten the need to upgrade the system. These upgrades are not currently scheduled. Advance payment of Sanitation Zone connection fees would be needed to help fund the upgrades. In addition, the SCWA would ask for water conservation strategies implemented within the Sanitation Zone to offset future project flows.

The SCWA does not anticipate the need to upgrade its effluent storage and disposal facilities to accommodate the project. The existing capacity of the Airport-Larkfield-Wikiup Sanitation Zone effluent storage is 290 million gallons. The ability of this storage to accommodate the proposed project will be discussed in the EIR.

Further analysis needs to be conducted to determine whether existing sanitary sewer conveyance facilities can accommodate the proposed project. If it is determined that the sanitary sewer conveyance facilities need to be upgraded as a result of the proposed project, then the effects of those construction activities, including disrupting traffic and disturbing soils, will be addressed in the EIR. The potential effects of the project on wastewater conveyance and treatment facilities capacity will be analyzed in the EIR.

c) Potentially Significant Impact

The project would result in the construction of new and possible expansion of existing stormwater drainage facilities. The project would result in a significant area of new impervious surface that would require the collection of stormwater runoff.

Impacts associated with the construction and possible expansion of these facilities will be discussed in further detail in the EIR.

d) Potentially Significant Impact

The project site is currently supplied domestic water by the California-American Water Company (CalAm). CalAm obtains water from four wells that have an approximate capacity of 1,000 gallons per minute (gpm), and from a connection to the SCWA aqueduct. The aqueduct provides CalAm with an additional approximate capacity of 800 gpm.

CalAm is planning to construct a new well and upgrade storage facilities to a total of 400,000 gallons. While the permitting process for these facilities has started, it is uncertain when construction will actually take place.

The project would require up to 77,176 gpd at full buildout, after Phase V. As a result, new water and storage facilities are needed. The proposed project includes construction of a new well. Pumping from the new well can potentially affect the hydraulic gradient of the aquifer and other water supplies associated with the aquifer.

The potential impacts that may result from the construction of additional water service and storage facilities will be discussed further in the EIR.

e) Less-Than-Significant Impact

The Airport-Larkfield-Wikiup Sanitation Zone operated by SCWA has indicated that the wastewater treatment plant has capacity to serve the first phase of the project. Expansion of the wastewater treatment plant would not be required to serve subsequent project phases. The wastewater treatment plant is planned for expansion with or without the project. This issue will be discussed further in the EIR.

f) Potentially Significant Impact

The project would build new hospital facilities and expand the current WCF. These operations would generate substantial amounts of solid waste, including specialized waste such as hazardous medical and radiological waste. Although the new facilities are being built to replace two hospital facilities in the same vicinity, the impacts of project construction and operation on solid waste landfills will be further discussed in the EIR.

g) Less-Than-Significant Impact

The project would be subject to state and local regulations regarding the disposal and treatment of solid waste and would be expected to comply with those regulations, including those for the disposal of medical and other hazardous waste. Waste disposal regulations for the project and how the project is expected to comply with those regulations will be further discussed in the EIR.

3.17 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less-Than-Significant Impact	No Impact
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare or threatened plant or wildlife, or eliminate important examples of the major periods of California history or prehistory?	X			
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	X			
c. Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?		X		

DISCUSSION:

a) Potentially Significant Impact

The SRPCS identifies the project site as being within the area of potential presence of endangered CTS and rare plants. Sightings of CTS were reported within 5 miles of the project boundaries but none were reported on or near the project site. The SRPCS requires projects within the area of potential presence to mitigate for loss of habitat by contributing to a species fund. The project site contains 0.46 acre of wetlands and other waters of the U.S., some portion of which may be considered jurisdictional under Section 404 of the Clean Water Act. Mitigation may be required by the USACE.

The project site has a number of oak trees according to the inventory performed in June 2006 by Horticultural Associates. Sonoma County policy RC-5c makes the preservation of significant native oaks and other native trees a primary consideration in the review of development projects. The Resource Conservation Element of the Sonoma County General Plan sets County policies for protection of several types of biotic resources. Protection of trees is addressed by policies in the Conservation of Biotic Resources section of the Resource Conservation Element. Moreover, the Sonoma County Code contains two ordinances that would reduce potential impacts to trees. The Sonoma County Tree Ordinance (No. 4044) would continue to regulate the removal of certain designated trees. The Sonoma County Heritage Tree ordinance (No. 3651) would continue to provide for the identification and protection of designated heritage trees.

One dwelling, a tank house, and a shed were observed and identified as potential historic resources, and subsequently recommended for formal evaluation. Qualified architectural historians will evaluate this complex as well as another building that appears to date from the 1950s or earlier.

These issues will be addressed in the EIR.

b) Potentially Significant Impact

The Bay Area is in nonattainment for ground-level ozone under both the federal and state standards and is in nonattainment for PM_{10} under state standards. The project would cause an increase in the release of ozone precursors into the atmosphere in the form of reactive organic gases and nitrous oxides and an increase in the release of $PM_{10.}$

No CEQA thresholds of significance have been established for GHG. However, in September 2006, AB 32 called for the California Air Resources Board to adopt regulations requiring the reporting and verification of statewide GHG emissions and that a limit equivalent to the statewide GHG emissions in 1990 be achieved by year 2020. GHG associated with the proposed project are primarily associated with energy consumption for operating the hospital facility and expanded WFC site and with motor vehicles traveling to and from the project site. This will result in an increase in the generation of GHG over existing conditions.

Current commute traffic, especially at morning and afternoon/evening peak hours, is increasing. The proposed project has the potential to increase traffic in the project area and cause further traffic delays. Many intersections close to the project site as well as some segments of US 101 would exceed the County and/or Caltrans minimum acceptable operating criteria for year 2020 or year 2030 weekday morning and/or afternoon/evening peak hour commute conditions (even after planned improvements).

The project will increase the amount of impervious surface area on the site, increasing the amount and rate of surface water runoff. Increased site runoff could potentially increase flooding on- and off-site. Increased site runoff could also potentially exceed the capacity of existing on-site and off-site drainage systems.

These issues will be discussed in the EIR.

c) Less Than Significant With Mitigation Incorporated

The active Rodgers Creek fault is located approximately 0.75 mile to the east of the project area, and therefore there is a significant probability that the site will experience strong seismic shaking during the design life of the facilities. The preliminary geotechnical investigations at the site indicate that, in general, the soils at the site have low liquefaction potential and associated ground deformations, but additional investigations are required to further evaluate liquefaction susceptibility. The proposed hospital facilities (building 1.1 Phase II, building 1.2 Phase II, and building 1.1 Phase V) would be designed and constructed at a minimum to the seismic design requirements for ground shaking specified in the Uniform Building Code for seismic zone 4. All other structures would be designed and constructed at a minimum to the Office of Statewide Health Planning and Development seismic design requirements.

These potential impacts will be discussed in further detail in the EIR.

This Initial Study was prepared by a multidisciplinary team of environmental and engineering specialists.

County of Sonoma

The following individuals were involved in management, oversight, and review of the Initial Study.

County Counsel

Sally McGough	Deputy County Counsel

Permit and Resource Management Department

Jennifer Barrett	Deputy Planning Director
Scott Briggs, Ph.D.	Environmental Review Division Manager
Steve Dee, AICP	Senior Environmental Specialist
Ken Ellison	Supervising Planner
Lisa Newman	Contract Planner
Denise Peter, AICP	Planner III

Transportation and Public Works

Ken Giovannetti	Engineer
John Maitland	Engineer

Consultant Team

The following consultant team members were responsible for the preparation of the IS and its technical reports.

URS Corporation

David Fee	Project Management, Environmental Document Coordination
Anna Davis	Land Use and Planning, Population and Housing
Jason Jones	Aesthetics, Public Services, Recreation, Environmental Document Coordination

Sarah La Belle	Air Quality, Environmental Document Preparation and Review, Land Use
Brian Hatoff	Cultural Resources
Mark Mazzola	Agricultural Resources
Eric Rivero-Montes	Air Quality
Rosemary Laird	Biological Resources
Phillip Meymand	Geology and Soils, Mineral Resources
Joe Morgan	Hazards and Hazardous Materials
Lynn McIntyre	Technical Editing, Document Preparation
Deborah Fournier	Word Processing

Crane Transportation Group

Mark Crane	Transportation/Traffic

Airport-Larkfield-Wikiup Sanitation Zone. 1983.

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BAAQMD. 1999. *BAAQMD CEQA Guidelines.* Bay Area Air Quality Management District. April.

County of Sonoma Zoning Ordinance, June 2005.

Illingworth and Rodkin. 2004 *Environmental Air Quality Assessment Sutter Hospital/Luther Burbank Center.* Sonoma County, CA. Prepared for Sponamore Associates under contract to Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation, Santa Rosa, CA. June 7.

Larkfield-Wikiup Area Plan (Amended 1993), Sonoma County General Plan, 1989

Patterson, Charles A. 2004. *Biological Resources Report Prepared for the Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation, Santa Rosa, CA* December.

Sonoma County. 1989. County of Sonoma General Plan (as amended). Sonoma County Board of Supervisors, March 23, 1989. Revised December 1998.

Sonoma County Heritage or Landmark Tree Ordinance (Ordinance No. 3651).

Tom Origer and Associates. 2004. *A Cultural Resources Survey for the Sutter Medical Center of Santa Rosa/Luther Burbank Center for the Arts Master Plan.* Santa Rosa, Sonoma County, California. Prepared for Sponamore Associates under contract to Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation, Santa Rosa, CA. September.

APPENDIX B

NOTICE OF PREPARATION AND RESPONSES

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-8358

NOTICE OF PREPARATION
OF A DRAFT ENVIRONMENTAL IMPACT REPORT
and
NOTICE OF PUBLIC SCOPING MEETING

Project Title: Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan

Project Applicant: Sutter Medical Center of Santa Rosa and the Luther Burbank Memorial Foundation

The Sonoma County Permit and Resource Management Department has received an application from Sutter Medical Center of Santa Rosa and the Luther Burbank Memorial Foundation for the Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan Project. Sonoma County will be the lead agency and will prepare an Environmental Impact Report (EIR) for the above project. We are asking for your views regarding the scope of environmental issues that should be addressed in the EIR.

The Initial Study, with project description and figures, is contained in the attached materials for your consideration. If you wish to comment on the environmental issues that should be addressed in the EIR, please send written comments to Steve Dee at the address on the letterhead.

If you are a responsible agency, we need to know the views of your agency as to the scope and content of the environmental information, which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by the County when considering your permit or other approval for the project.

Due to the time limits mandated by State Law, your response must be sent at the earliest possible date, but not later than 30 days after receipt of this notice.

Public Scoping Meeting: The Permit and Resource Management Department will hold a public scoping meeting from **7:00 pm to 9:00 pm** on **February 21, 2008.** This meeting will allow an opportunity for the public to express views regarding the scope of the environmental issues to be addressed in the EIR. These comments will be considered by the County during preparation of the EIR. The meeting will be held at the Wells Fargo Center for the Arts, Carston Cabaret, 50 Mark West Springs Road, Santa Rosa.

Date: February 3, 2008

Steve Dee
Senior Environmental Specialist
Telephone (707) 565-8350
Fax (707) 565-8358

Attachments: Initial Study

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375

COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
2550 Ventura Avenue, Santa Rosa, CA 95403-2829
(707) 565-1900 FAX (707) 565-8358

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Steve Dee
Senior Environmental Specialist
Telephone (707) 565-8350
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Attachments: Initial Study

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY 711

Flex your power!
Be energy efficient!

February 29, 2008

SON-101-24.86
SON101919
SCH # 2008022012

Mr. Steve Dee
Sonoma County PRMD
2550 Ventura Avenue
Santa Rosa, CA 95403-2829

Dear Mr. Dee:

Sutter Medical Center of Santa Rosa/ Luther Burbank Memorial Foundation – Notice of Preparation

Thank you for continuing to include the California Department of Transportation (Department) in the environmental review process for the proposed project. Please find our comments on the NOP below:

Traffic Analysis

The Department is primarily concerned with impacts of the proposed project on US 101 and its on- and off-ramps in the vicinity of the project site, here in particular the US 101/MarkWest Springs intersection. Since our April 2005 review of the Use Permit Application and Intial Study for this project (see letter dated April 18, 2005 attached), almost three years have passed and the project scope has been revised. However, several of our comments provided in this letter are still relevant and should be addressed in the updated traffic analysis. Furthermore, the traffic impact study to be prepared should include but not be limited to the information detailed below:

1. Information on the project's traffic impacts in terms of trip generation, distribution, and assignment. The assumptions and methodologies used in compiling this information should be addressed. The study should clearly show the percentage of project trips assigned to US 101 and its on- and off-ramps.

2. Current (2006) Average Daily Traffic (ADT) and AM and PM peak hour volumes on all significantly affected streets, highway segments and intersections.

3. Schematic illustration and level of service (LOS) analysis for the following scenarios: 1) existing, 2) existing plus project, 3) cumulative and 4) cumulative plus project for the roadways and intersections in the project area.

4. Calculation of cumulative traffic volumes should consider all traffic-generating developments, both existing and future, that would affect the State highway facilities being evaluated.

5. The procedures contained in the 2000 update of the Highway Capacity Manual should be used as a guide for the analysis. We also recommend using the Department's *"Guide for the Preparation of Traffic Impact Studies";* it is available on the following web site: http://www.dot.ca.gov/hq/traffops/developserv/operationalsystems/reports/tisguide.pdf .

6. Mitigation measures should be identified where plan implementation is expected to have a significant impact. Mitigation measures proposed should be fully discussed, including financing, scheduling, implementation responsibilities, and lead agency monitoring.

7. Mitigation measures should consider highway and non-highway improvements and services. Special attention should be given to the development of alternate solutions to circulation problems that do not rely on increased highway construction, such as:
   - Implementing bicycle- and pedestrian-friendly design solutions;
   - Planning for transit service improvements and expansion.

We look forward to reviewing the traffic study, technical appendices and Draft EIR for the Sutter Medical Center of Santa Rosa/ Luther Burbank Memorial Foundation project. We do expect to receive a copy from the State Clearinghouse, but in order to expedite our review please send two copies in advance to:

Ina Gerhard
Office of Transit and Community Planning
Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Please be aware that before the Department will issue an encroachment permit for the proposed work within State right-of-way, the applicant and City must adequately address all of the comments and concerns contained in this letter.

Encroachment Permit

Please be advised that any work or traffic control that encroaches on State ROW requires an encroachment permit issued by the Department. Further information is available on the following website: http://www.dot.ca.gov/hq/traffops/developserv//permits/. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the following address:

Julie Hsu, Branch Chief
Office of Permits
California DOT, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Should you require further information or have any questions regarding this letter, please call or email Ina Gerhard of my staff at (510) 286-5737 or ina_gerhard@dot.ca.gov .

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

Attachment: Our letter dated April 18, 2005

c: State Clearinghouse

DEPARTMENT OF TRANSPORTATION
111 GRAND AVENUE
P. O. BOX 23660
OAKLAND, CA 94623-0660
PHONE (510) 286-5505
FAX (510) 286-5559
TTY (800) 735-2929

Flex your power!
Be energy efficient!

April 18, 2005

SON-101-24.86
SON101919

Mr. Ken Ellison
Sonoma County
Permit and Resource Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403

Dear Mr. Ellison:

PLP05-0002, Sutter Medical Center of Santa Rosa/ Luther Burbank Center of the Arts - Use Permit Application & Initial Study

Thank you for including the California Department of Transportation (Department) in the environmental review process for the proposed project. We have reviewed the above-referenced documents and have the following comments to offer:

1. Provide a plan showing the interim improvements to the US 101 northbound off-ramp at Mark West Springs Road. Show and label the State right-of-way line, lane and shoulder widths.

2. Describe the timeline and funding for how each of the ultimate transportation improvements will be built. What are the County's plans for the ultimate improvements on Mark West Springs Road? We suggest the County and project sponsor contact Mr. Manny Caluya at (510) 286-4645 to discuss implementing mitigation for impacts to the US 101 off-ramp at Mark West Springs Road. Mr. Caluya provides design oversight for locally funded highway projects for the Department.

3. Traffic operations at the US 101 northbound ramps/ Mark West Springs Road intersection are critical because they will affect operations at the US 101 southbound ramps/River Road intersection to the west. However, "available distance" rows are blank in the Queuing Analysis shown in Table 3 and Table 29 for this intersection. Please provide this information for our review. Mitigation measures should be proposed if operations at the northbound off-ramps would affect operations at the southbound ramps.

4. The US 101 southbound off-ramp at River Road currently operates at level of service (LOS) F according to the Department's traffic study completed for the US 101 High-Occupancy Vehicle (HOV) Lane Widening project. What mitigation measures are proposed for project impacts to this ramp?

5. Page 70 of the traffic study states that the actual predicted volumes for the US 101 northbound off-ramp at River Road are less than 1500 equivalent passenger cars per hour (vph). However, the 2020 Saturday Event PM LOS Computation Report shows that the off-ramp volume will exceed 1500 vph. Please reconcile this difference.

6. Table 24 and Table 26 use 4700 vph as freeway roadway capacities; in our opinion, the 4700 vph capacity is too high for the analysis. Is there any field data to back up this assumption? Theoretically, if the actual freeway capacities are lower than that used in the report (i.e. 4300 vph or lower), a bottleneck would occur in the southbound direction of the freeway. Since "a large portion of traffic (59%) is expected to use US 101" (page 5), and Table 26 shows that traffic significantly increases on the southbound freeway mixed lanes between the Mendocino/Hopper ramps and the River Road ramps with proposed project during 2030 PM peak hour, mitigation measures should be proposed for that bottleneck location.

7. The State right-of-way along US 101 adjacent to the proposed project site has been previously surveyed by the Department and there are no known archaeological sites within the State right-of-way. If ground disturbing activities take place as part of this project within State right-of-way and there is an inadvertent find, all construction within 35 feet of the find shall cease until the Department's Cultural Resource Study Office is alerted and a staff archaeologist can evaluate the finds. The Cultural Resource Study Office contact person is Brian Ramos. He can be reached at (510) 286-5613.

8. At the bottom of page 54 of the traffic study, change the title of Figure 13 to Figure 15.

9. As part of the Department's US 101 HOV Lane Widening project, which is currently in the environmental study phase, the Mark West Creek Structure will be widened.

10. Any widening of Mark West Springs Road may require dedication of right-of-way (in fee) to the State, per the Department's design requirements.

The applicant will need an encroachment permit from the Department to construct the driveway approach onto State Route (SR) 116 and to complete any other required work or traffic control within State right-of-way. To apply for an encroachment permit, the applicant must submit a completed encroachment permit application, environmental documentation, and five (5) sets of plans (in metric units) which clearly indicate State right-of-way to the following address:

Mr. Sean Nozzari, District Office Chief
Office of Permits
California Department of Transportation, District 04
P. O. Box 23660
Oakland, Ca 94623-0660

To request a copy of the Department's right-of-way maps call (510) 286-5257 and leave a message or send an e-mail to **d4rwerec@dot.ca.gov**.

Please be aware that before the Department will issue an encroachment permit for the proposed work within State right-of-way, the applicant and City must adequately address all of the comments and concerns contained in this letter.

Should you require further information or have any questions regarding this letter, please call Maija Cottle of my staff at (510) 286-5737.

Sincerely,

Timothy C. Sable

TIMOTHY C. SABLE
District Branch Chief
IGR/CEQA

bc: TSable/ MCottle/ File/ Chron File, Transit & Community Planning
Manny Caluya, Design North Counties
Jonathan Lee/ Chris Okpalaugo, Design North Counties
Janet Pape, Cultural Resources
Phillip Cox, Forecasting
William Newton, Right-of-Way
Phillipe Van/ Lore Ahmadi, Traffic
Mike Kerns/ Ethan Tzeng, Highway Operations
Valerie Heusinkveld/ Chuck Morton, Environmental Analysis
Julie Hsu, Permits

State of California – The Resources Agency
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
POST OFFICE BOX 47
YOUNTVILLE, CALIFORNIA 94599
(707) 944-5500

ARNOLD SCHWARZENEGGER, Governor

February 21, 2008

RECEIVED
FEB 25 2008
PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT
COUNTY OF SONOMA

Steve Dee
Sonoma County Permit and Resource
Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403-2829

Dear Mr. Dee:

Subject: Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation
Joint Master Plan; SCH# 2008022012, City of Santa Rosa, Sonoma County

The Department of Fish and Game (DFG) has reviewed the documents provided for the subject project, and we have the following comments.

Please provide a complete assessment (including but not limited to type, quantity and locations) of the habitats, flora and fauna within and adjacent to the project area, including endangered, threatened, and locally unique species and sensitive habitats. The assessment should include the reasonably foreseeable direct and indirect changes (temporary and permanent) that may occur with implementation of the project. Rare, threatened and endangered species to be addressed should include all those which meet the California Environmental Quality Act (CEQA) definition (see CEQA Guidelines, Section 15380). DFG recommended survey and monitoring protocols and guidelines are available at
http://www.dfg.ca.gov/wildlife/species/survey_monitor.html.

Please be advised that a California Endangered Species Act (CESA) Permit must be obtained if the project has the potential to result in take of species of plants or animals listed under CESA, either during construction or over the life of the project. Issuance of a CESA Permit is subject to CEQA documentation; therefore, the CEQA document must specify impacts, mitigation measures, and a mitigation monitoring and reporting program. If the project will impact CESA listed species, early consultation is encouraged, as significant modification to the project and mitigation measures may be required in order to obtain a CESA Permit.

If you have any questions, please contact Mr. Patrick Moeszinger, Environmental Scientist, at (707) 944-5596 or Mr. Liam Davis, Habitat Conservation Supervisor, at (707) 944-5529.

Sincerely,

Charles Armor
Regional Manager
Bay Delta Region

cc: State Clearinghouse

Conserving California's Wildlife Since 1870

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

February 11, 2008

RECEIVED

FEB 13 2008

PERMIT AND RESOURCE
MANAGEMENT DEPARTMENT
COUNTY OF SONOMA

Steve Dee
Sonoma County Permit and Resource Management Department
2550 Ventura Avenue
Santa Rosa, CA 95403-2829

RE: SCH# 2008022012 Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan; Sonoma County.

Dear Mr. Dee:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.

✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5-minute quadrangle name, township, range, and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**

✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst

CC: State Clearinghouse

Native American Contacts
Sonoma County
February 11, 2008

The Federated Indians of Graton Rancheria
Gene Buvelot
6400 Redwood Drive, Ste 300
Rohnert Park , CA 94928
coastmiwok@aol.com
(415) 883-9215 Home
Coast Miwok
Southern Pomo

Mishewal-Wappo Tribe of Alexander Valley
Earl Couey, Cultural Resources Manager
P.O. Box 5676
Santa Rosa , CA 95402
ecouey.1@netzero.net
(707) 585-0502
Wappo

Ya-Ka-Ama
6215 Eastside Road
Forestville , CA 95436
yakaama.indian.ed@att.net
(707) 887-1541
Pomo
Coast Miwok
Wappo

Dawn S. Getchell
P.O. Box 53
Jenner , CA 95450
(707) 865-2248
Coast Miwok
Pomo

The Federated Indians of Graton Rancheria
Greg Sarris, Chairperson
6400 Redwood Drive, Ste 300
Rohnert Park , CA 94928
coastmiwok@aol.com
707-566-2288
707-566-2291 - fax
Coast Miwok
Southern Pomo

The Federated Indians of Graton Rancheria
Frank Ross
813 Lamont Ave
Novato , CA 94945
miwokone@yahoo.com
(415) 269-6075
Coast Miwok
Southern Pomo

Kathleen Smith
1778 Sunnyvale Avenue
Walnut Creek , CA 94596
(925) 938-6323
Pomo
Coast Miwok

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2008022012 Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Joint Master Plan; Sonoma County.

KS

March 5, 2008
8575 Eastside Rd.
Healdsburg, Ca. 95448

Steve Dee
Senior Environmental Specialist
2550 Ventura Ave.
Santa Rosa, Ca. 95403-2829

Dear Mr. Dee,

This is to follow up with the conversation we had on February 25 about the Sutter Project on Mark West Springs Road and the Wells Fargo Performing Arts Center. My only concern about this additional growth on the north side of Santa Rosa is the increase in traffic in the area. Our family owns and farms property on Alba Lane which is between the new Kaiser buildings on Old Redwood Highway and Mark West Springs Road running between the Old Redwood Highway and the 101 Freeway. There are only three homes on this little country road however, the residents are in and out at various times of the day and as you know the traffic on that stretch is very heavy during commute and starting as early as 3:00 when the Catholic schools located there are finished with their day. My request is that the County puts in a turn lane on that piece of highway for the people going in and out of Alba Lane and also Angela Drive. It is very dangerous to have to turn left and constantly watch that the traffic coming up behind you is aware of your stopping in that busy area.

Thank you for your consideration in this matter. It would make for safer travel for all those who use the Old Redwood Highway north of Mendocino Avenue.

Sincerely,

Paulette Carroll

Paulette Carroll

①

SIGN-IN SHEET

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP) AND PUBLIC SCOPING MEETING

Thursday, February 21, 2008

Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PRINT CLEARLY

NAME	AFFILIATION	MAILING ADDRESS, ZIPCODE
JIM LONG	PROPERTY OWNER	4033 Coffey Ln S. Rosa 95403
PHIL SITZMAN	"	121 DORCHESTER DR "
JACKIE EGBERT	"	4595 LAMBERT DR.
PAUL + MARY FINN	"	26 OXFORD CT., SR 95403
Nancy Stewart	"	59 Dorchester Dr, SR, 95403
DARLENE SIMI	"	78 DORCHESTER DR SR 95403
[illegible]	Sutter/WFC	2128 Contra Costa Dr SR/05
Lisa Amador	Sutter Medical Center	2449 Summerfield Rd. SR 95405
STEVEN HARRISON	PROPERTY OWNER	306 VINEYARD VIEW DR SR 95403

1

SPEAKER CARD

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP)
AND
PUBLIC SCOPING MEETING

Thursday, February 21, 2008
Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PLEASE PRINT CLEARLY

Name: PHiL SiTZMAN

Mailing Address: 121 DORCHESTER DR 95403

2

SPEAKER CARD

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP)
AND
PUBLIC SCOPING MEETING

Thursday, February 21, 2008
Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PLEASE PRINT CLEARLY

Name: Jim Long

Mailing Address: 4033 Coffey Ln.

③

SPEAKER CARD

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

**ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP)
AND
PUBLIC SCOPING MEETING**

Thursday, February 21, 2008
Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PLEASE PRINT CLEARLY

Name: Jackie Egbert

Mailing Address: 4595 Lambert Dr. SR 95403

④

SPEAKER CARD

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

**ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP)
AND
PUBLIC SCOPING MEETING**

Thursday, February 21, 2008
Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PLEASE PRINT CLEARLY

Name: PAUL FINN

Mailing Address: 26 OXFORD CT.,
SR 95403

5

SPEAKER CARD

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK MEMORIAL FOUNDATION JOINT MASTER PLAN

ENVIRONMENTAL IMPACT REPORT NOTICE OF PREPARATION (NOP) AND PUBLIC SCOPING MEETING

Thursday, February 21, 2008
Wells Fargo Center for the Arts, Carston Cabaret
50 Mark West Springs Road
Santa Rosa, CA

PLEASE PRINT CLEARLY

Name: STEVEN HARRISON

Mailing Address: 306 VINEYARD VIEW DR
SANTA ROSA, CA 95403

APPENDIX C

AIR QUALITY
TECHNICAL REPORTS

Appendix C1

Imported Engineered Fill Sources, Sutter Hospital Santa Rosa

CONSTRUCTION
GHILOTTI
Since • COMPANY • 1914

January 27, 2009

Unger Construction
910 "X" Street
Sacramento, CA 95818

Attention: Ken Harrison

Regarding: Imported Engineered Fill Sources
Sutter Hospital, Santa Rosa

Dear Ken,

As per your request, Ghilotti Construction is please to provide you with a few Import Fill Sources for the Sutter Hospital project on Mark West Springs Road, Santa Rosa:

North of Sutter Hospital:

- Geysers Rd, Cloverdale (35.1 mi) – import fill available 50,000 cy +

West of Sutter Hospital:

- Hwy 116, Forestville (10.1 mi) – import fill available 100,000 cy +

East of Sutter Hospital:

- Porter Creek Rd, Santa Rosa (9.4 mi) – import fill available 100,000 cy +

South of Sutter Hospital:

- Ghilotti Ave, Santa Rosa (9.2 mi) – import fill available 50,000 cy +
- Petaluma Hill Rd, Santa Rosa (7.9 mi) – import fill available 100,000 cy +

As outlined above, the import fill sources to the north are limited – however at any given time, there could be an additional 15,000 – 25,000 cy of fill available within the North 101 corridor (Windsor to Cloverdale). Both of the imported fill sources identified to the east and west are from producing quarries and import fill would always be available in quantities sufficient to meet the needs of your project. The two imported fill sources to the south of your project would generally be able to meet the needs of this project – but both are subject to fluctuations in availability depending on other regional needs.

Because this project is not slated for construction in the immediate future, it is our recommendation that several of the identified import fill sources should be included in your planning of this project. Per your request, we have included haul routes from each of the abovementioned fill sources.

Although any one source could supply the entire import fill needs for the project, for planning purposes, Ghilotti Construction has based its analysis on the following:

Total Import Fill required for the Project = 100,000 cy

Total Truck Trips required for the Project = 8,695 loads

Anticipated Number of days for import = 45 days (185-210 truck trips per day)

Anticipated Number of trucks/cycle time = 24 Double Bottom Trucks with a 53 minute cycle time per load (based on fill source within 8 - 12 mile radius of the Project).

Thank you in advance, for your prompt consideration of this matter. Ghilotti Construction looks forward to providing you any additional pricing and/or engineering constructability issues you may have on this project. If you have any questions with regard to this or any other matter, please do not hesitate to contact the undersigned at (707) 585-1221.

Sincerely,

Bradford D. Simpkins
Vice President
Private & Commercial Construction

w/encl.

Google Maps

Directions to Mark West, California
35.1 mi – about **47 mins**

Geysers Rd, Cloverdale, CA 95425

1.	Head **southwest** on **Geysers Rd** toward **Cloverdale Peak Dr** About 12 mins	go 5.2 mi total 5.2 mi
2.	Slight **left** at **River Rd** About 3 mins	go 1.0 mi total 6.2 mi
3.	Slight **right** at **Crocker Rd** About 2 mins	go 0.6 mi total 6.8 mi
4.	Continue on **E 1st St**	go 0.1 mi total 7.0 mi
5.	Turn **left** at **Asti Rd** About 1 min	go 0.5 mi total 7.5 mi
6.	Turn **right** at **Citrus Fair Dr**	go 0.2 mi total 7.7 mi
101 7.	Turn **left** to merge onto **US-101 S** toward **San Francisco** About 25 mins	go 26.6 mi total 34.3 mi
8.	Take the exit toward **Calistoga**	go 0.2 mi total 34.5 mi
9.	Turn **left** at **Mark W Springs Rd/River Rd** Continue to follow Mark W Springs Rd About 2 mins	go 0.6 mi total 35.1 mi

Mark West, California

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

NORTH OF PROJECT
"HAUL ROUTE"

Google Maps

Directions to Mark West, California
10.1 mi – about 23 mins

A CA-116/Pocket Canyon Rd/Upper Terrace

116	1. Head **east** on **CA-116/Pocket Canyon Rd/Upper Terrace** toward **Hidden Lake Rd** About 1 min	go 0.8 mi total 0.8 mi
	2. Turn **left** at **Covey Rd** About 4 mins	go 1.2 mi total 2.0 mi
	3. Turn **right** at **Trenton Rd**	go 0.2 mi total 2.2 mi
	4. Turn **right** at **River Rd** About 17 mins	go 7.6 mi total 9.8 mi
	5. Continue on **Mark W Springs Rd**	go 0.3 mi total 10.1 mi

B Mark West, California

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

WEST OF PROJECT
"HAUL ROUTE"

Google Maps

Directions to Mark West, California

9.4 mi – about 19 mins

(A) Porter Creek Rd

1. Head **northwest** on **Porter Creek Rd** toward **Wilson Rd** About 9 mins	go 4.4 mi total 4.4 mi
2. Continue on **Mark W Springs Rd** About 10 mins	go 5.0 mi total 9.4 mi

(B) Mark West, California

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

EAST OF PROJECT
"HAUL ROUTE"

Google Maps

Directions to Mark West, California
9.2 mi – about 11 mins

(A) Ghilotti Construction Co
246 Ghillotti Ave, Santa Rosa, CA 95407 - (707) 585-1221

1.	Head **north** on **Ghillotti Ave** toward **Todd Rd**	go 397 ft total 397 ft
2.	Turn **right** at **Todd Rd** About 1 min	go 0.3 mi total 0.4 mi
3.	Turn **right** at **S Moorland Ave**	go 318 ft total 0.4 mi
4.	Turn **left** at **Todd Rd**	go 0.2 mi total 0.6 mi
5.	Turn **left** at **E Todd Rd** (signs for **Eureka/US-101 N**)	go 148 ft total 0.7 mi
6.	Take the ramp onto **US-101 N** About 8 mins	go 8.0 mi total 8.7 mi
7.	Take the **River Rd** exit toward **Guerneville**	go 0.2 mi total 8.8 mi
8.	Keep **right** at the fork, follow signs for **Mark W Springs Rd** and merge onto **Mark W Springs Rd** About 1 min	go 0.4 mi total 9.2 mi

(B) Mark West, California

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

SOUTH OF PROJECT

"HAUL ROUTE"

Google Maps

Directions to Mark West, California
7.9 mi – about **10 mins**

Petaluma Hill Rd

	1. Head **northwest** on **Petaluma Hill Rd** toward **Winterhaven Ave** About 1 min	go 0.6 mi total 0.6 mi
	2. Turn **left** at **Yolanda Ave** About 1 min	go 0.5 mi total 1.1 mi
101	3. Take the ramp onto **US-101 N** About 6 mins	go 6.3 mi total 7.4 mi
	4. Take the **River Rd** exit toward **Guerneville**	go 0.2 mi total 7.5 mi
	5. Keep **right** at the fork, follow signs for **Mark W Springs Rd** and merge onto **Mark W Springs Rd** About 1 min	go 0.4 mi total 7.9 mi

Mark West, California

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

SOUTH OF PROJECT
"HAUL ROUTE"

Appendix C2

Environmental Air Quality Assessment, Sutter Hospital, Sonoma County, California

ENVIRONMENTAL AIR QUALITY ASSESSMENT
SUTTER HOSPITAL
Sonoma County, California

Updated January 30, 2009
Revised April 10, 2009

◆ ◆ ◆

Prepared for:

Nadin Sponamore
Sponamore Associates
1205 McDonald Avenue
Santa Rosa, CA 95404
Fax: (707) 527-0901

Prepared by:

James A. Reyff

ILLINGWORTH & RODKIN, INC.
Acoustics - Air Quality
505 Petaluma Boulevard South
Petaluma, CA 94952
(707) 766-7700

Job No. 04-135rev

Introduction

Sutter Medical Center of Santa Rosa (Sutter) plans to develop a new hospital and medical office on the 77±-acre site at 50 Mark West Springs Road. This report presents the findings of Illingworth &Rodkin Inc.'s (I&R) assessment of potential environmental air quality impacts associated with this proposed project in Sonoma County, California. This air quality analysis was prepared in accordance with the Bay Area Air Quality Management District (BAAQMD) CEQA Guidelines[1].

The site is located along US Route 101, just north of Santa Rosa (in the southeast quadrant of the US 101/Mark West Springs-River Road interchange). The scope of this study encompasses the relocation of the existing Sutter Hospital from its existing site on Chanate Road in the City of Santa Rosa, along with a new medical office building. The existing Chanate Road facilities would be re-used, probably for family medicine, but are not part of this study.

The proposed project includes the following phases:

Phase	Years of Activities	Description
I	2010-2011	Annexation, demolition, import of fill material, and infrastructure improvements
II	2010 to 2013	Medical Center Construction 126 thousand square foot (ksf) hospital (70 beds) 80 ksf medical office building 100 ksf Physicians Medical Center (28 beds)
III	2010 - or later	Medical Center Construction Expansion of hospital by 29 beds Expansion of LBMF (fly loft)

[1] Bay Area Air Quality Management District (BAAQMD). 1999. BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans. December.

SETTING

Air Pollution and Air Quality Standards

The Federal and California Clean Air Acts establish ambient air quality standards for different pollutants. National ambient air quality standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six criteria pollutants. These criteria pollutants include carbon monoxide (CO), ozone (O_3), nitrogen dioxide (NO_2), particulate matter with a diameter less than 10 microns (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). Recently, EPA added fine particulate matter or $PM_{2.5}$ as a criteria pollutant. Air quality studies generally focus on five pollutants that are most commonly measured and regulated: CO, O_3, NO_2, SO_2, and suspended particulate, i.e., PM_{10} and $PM_{2.5}$.

California established ambient air quality standards as early as 1969 through the Mulford-Carrol Act. Pollutants regulated under the California Clean Air Act are similar to those regulated under the Federal Clean Air Act. In many cases, California standards are more stringent than the national ambient air quality standards. Federal and State air quality standards are shown in **Table 1**. Both the national and California ambient air quality standards have been adopted by the BAAQMD.

Criteria Air Pollutants

<u>Carbon Monoxide</u>. CO, a colorless and odorless gas, interferes with the transfer of oxygen to the brain. It can cause dizziness and fatigue, and can impair central nervous system functions. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. Automobile exhaust and residential wood burning in fireplaces and woodstoves emit most of the CO in the Bay Area. CO is a non-reactive air pollutant that dissipates relatively quickly, so ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. The highest CO concentrations measured in the Bay Area are typically recorded during the winter.

<u>Ozone</u>. O_3, a colorless toxic gas, is the chief component of urban smog. O_3 enters the blood stream and interferes with the transfer of oxygen, depriving sensitive tissues in the heart and brain of oxygen. O_3 also damages vegetation by inhibiting growth. Although O_3 is not directly emitted, it forms in the atmosphere through a chemical reaction between reactive organic gas (ROG) and nitrogen oxides (NO_X) under sunlight. ROG and NOx are primarily emitted from automobiles and industrial sources. O_3 is present in relatively high concentrations within portions of the Bay Area. Highest O_3 concentrations occur during summer and early autumn, on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies.

<u>Nitrogen Dioxide</u>. NO_2, a reddish-brown gas, irritates the lungs. Exposure to NO_2 can cause breathing difficulties at high concentrations. Clinical studies suggest that NO_2 exposure to levels near the current standard may worsen the effect of allergens in allergic asthmatics, especially in children. Similar to ozone, NO_2 is not directly emitted, but is formed through a reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x) and are major contributors to ozone formation. NOx is emitted from combustion of fuels, with higher rates at higher combustion temperatures. NO_2 also contributes to the

Table 1: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards [a]	
			Primary [b,c]	Secondary [b,d]
Ozone	8-hour	0.070 ppm	0.075 ppm	—
	1-hour	0.09 ppm	—[e]	Same as primary
Carbon monoxide	8-hour	9.0 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
Nitrogen dioxide	Annual	0.03 ppm	0.053 ppm	Same as primary
	1-hour	0.18 ppm	0.030 ppm	—
Sulfur dioxide	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
	1-hour	0.25 ppm	—	—
PM_{10}	Annual	20 µg/m^3	--[f]	Same as primary
	24-hour	50 µg/m^3	150 µg/m^3	Same as primary
$PM_{2.5}$	Annual	12 µg/m^3	15 µg/m^3	
	24-hour	—	35 µg/m^3 [f]	
Lead	Calendar quarter	—	1.5 µg/m^3	Same as primary
	30-day average	1.5 µg/m^3	—	—

a) Standards, other than for ozone and those based on annual averages, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
b) Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
c) Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.
d) Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
e) The national 1-hour ozone standard was revoked by U.S. EPA on June 15, 2005. A new 8-hour standard was established in May 2008.The annual PM_{10} standard was revoked by U.S. EPA on September 21, 2006 and a new $PM_{2.5}$ 24-hour standard was established.

Source: California Air Resources Board 2009

formation of PM_{10} (see discussion of PM_{10} below). Monitored levels in the Bay Area are well below ambient air quality standards.

Sulfur Oxides. Sulfur oxides, primarily SO_2, are a product of high-sulfur fuel combustion. The main sources of SO_2 are coal and oil used in power stations, in industries, and for domestic heating. Industrial chemical manufacturing is another source of SO_2. SO_2 is an irritant gas that attacks the throat and lungs. It can cause acute respiratory symptoms and diminished ventilator function in children. Due to the lack of sources, SO_2 is found at low concentrations in the North Bay region.

Suspended Particulate Matter. Respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) consist of particulate matter that is ten microns or less in diameter and 2.5 microns or less in diameter, respectively. PM_{10} and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled and cause adverse health effects. PM_{10} and $PM_{2.5}$ are a health concern, particularly at levels above the federal and State ambient air quality standards. $PM_{2.5}$ (including diesel exhaust particles) is thought to have greater effects on health because minute particles are able to penetrate to the deepest parts of the lungs. Scientific studies have suggested links between fine particulate matter and numerous health problems including asthma, bronchitis, acute and chronic respiratory symptoms such as shortness of breath and painful breathing. Children are more susceptible to the health risks of $PM_{2.5}$ because their immune and respiratory systems are still developing. Very small particles of certain substances (e.g., sulfates and nitrates) can also directly cause lung damage or can contain absorbed gases (e.g., chlorides or ammonium) that may be injurious to health. PM_{10} and $PM_{2.5}$ pose a greater health risk than larger-size particles because these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract, increasing the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Whereas larger particles tend to collect in the upper portion of the respiratory system, $PM_{2.5}$ are so miniscule and can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility. The U.S. EPA recently adopted a new more stringent standard of 35 $\mu g/m^3$ for 24-hour exposures based on a review of the latest new scientific evidence. At the same time, U.S. EPA revoked the annual PM_{10} standard due to a lack of scientific evidence correlating long-term exposures of ambient PM_{10} with adverse health effects. Most stations in the Bay Area report elevated PM_{10} and $PM_{2.5}$ levels on similar fall/winter days, indicating a regional air quality problem. The primary sources of these pollutants are wood smoke and traffic. Meteorological conditions that are common during this time of the year result in calm winds and strong surface-based inversions that trap pollutants near the surface. The buildup of these pollutants is greatest during the evenings and early morning periods. The high levels of PM_{l0} result in not only health effects, but also reduced visibility.

Particulate matter pollution consists of very small particles suspended in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when industry and gaseous pollutant undergo chemical reactions in the atmosphere. Respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$) represent fractions of particulate matter. PM_{10} refers to particulate matter less than 10 microns in diameter and $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in diameter. Major sources of $PM_{2.5}$ results primarily from diesel fuel combustion (from motor vehicles, power generation, industrial facilities), residential fireplaces, and wood stoves. PM_{10} include all $PM_{2.5}$ sources as well as emissions from dust generated by construction, landfills, and agriculture; wildfires and brush/waste burning, industrial sources, windblown dust from open lands, and atmospheric chemical and photochemical reactions.

Toxic Air Contaminants (TAC)

Besides the "criteria" air pollutants, there is another group of substances found in ambient air referred to as Hazardous Air Pollutants (HAPs) under the Federal Clean Air Act and Toxic Air Contaminants (TACs) under the California Clean Air Act. These contaminants tend to be localized and are found in relatively low concentrations in ambient air. However, they can result in adverse chronic health effects if exposure to low concentrations occurs for long periods. They are regulated at the local, State, and Federal level.

HAPs are the air contaminants identified by US EPA as known or suspected to cause cancer, serious illness, birth defects, or death. Many of these contaminants originate from human activities, such as fuel combustion and solvent use. Mobile source air toxics (MSATs) are a subset of the 188 identified HAPS. Of the 21 HAPs identified by EPA as MSATs, priority lists of six HAPs were identified that include: diesel exhaust, benzene, formaldehyde, acetaldehyde, acrolein, and 1,3-butadiene. While vehicle miles traveled in the United States is expected to increase by 64 percent over the period 2000 to 2020, emissions of MSATs are anticipated to decrease substantially as a result of efforts to control mobile source emissions (by 57 percent to 67 percent depending on the contaminant)[2].

California developed a program under the Tanner Toxics Act (AB 1807) to identify, characterize and control toxic air contaminants (TACs). Subsequently, AB 2728 incorporated all 188 HAPs into the AB 1807 process. TACs include all HAPs plus other contaminants identified by CARB. These are a broad class of compounds known to cause morbidity or mortality (cancer risk). TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Chronic exposure to TACs can result in adverse health effects. Like criteria air pollutants, TACs are regulated at the regional, State, and Federal level.

Particulate matter from diesel exhaust is the predominant TAC in urban air and was estimated to represent about two-thirds of the cancer risk from TACs (based on the statewide average in 2000). According to CARB, diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by CARB, and are listed as carcinogens either under State Proposition 65 or under the Federal Hazardous Air Pollutants programs.

CARB reports that recent air pollution studies have shown an association that diesel exhaust and other cancer-causing toxic air contaminants emitted from vehicles are responsible for much of the overall cancer risk from TACs in California. Diesel particulate matter (DPM) emitted by diesel-fueled engines was found to comprise much of that risk. DPM can be distributed over large regions, thus leading to widespread public exposure. The particles emitted by diesel engines are coated with chemicals, many of which have been identified by EPA as HAPs, and by CARB as TACs. Diesel engines emit particulate matter at a rate about 20 times greater than comparable gasoline engines. The vast majority of diesel exhaust particles (over 90 percent) consist of $PM_{2.5}$, which are particles that can be inhaled deep into the lung. Like other particles of this size, a portion will eventually become trapped within the lung possibly leading to adverse health effects. While the gaseous portion of diesel exhaust also contains TACs, CARB's 1998 action was specific to DPM, which accounts for much of the cancer-causing potential from diesel exhaust. California has adopted a comprehensive diesel risk reduction program to reduce DPM

[2] Federal Highway Administration, 2006. Interim Guidance on Air Toxic Analysis in NEPA Documents.

emissions 85 percent by 2020. The U.S. EPA and CARB adopted low sulfur diesel fuel standards in 2006 that reduce diesel particulate matter substantially.

Smoke from residential wood combustion can also be a source of TACs. Wood smoke is typically emitted during wintertime when dispersion conditions are poor. Localized high TAC concentrations can result when cold stagnant air traps smoke near the ground and, with no wind; the pollution can persist for many hours, especially in sheltered valleys during winter. Wood smoke also contains a significant amount of PM_{10} and $PM_{2.5}$. Wood smoke is an irritant and is implicated in worsening asthma and other chronic lung problems.

Air Pollution Potential

The clear skies with relatively warm conditions that are typical in summer combine with localized air pollutant emissions to elevate O_3 levels. Air quality standards for O_3 traditionally are exceeded when relatively stagnant conditions occur for periods of several days during the warmer months of the year. Weak wind flow patterns combined with strong inversions substantially reduces normal atmospheric mixing. Key components of ground-level O_3 formation are sunlight and heat; therefore, significant O_3 formation only occurs during the months from late spring through early fall. Air pollution potential in the project area is not as high as other parts of the Bay Area because winds generally do not transport enough of the precursor pollutants into that area (highest concentrations occur at monitoring stations in the eastern and southern portions of the Bay Area that are usually downwind of the major urban areas). However, pollutants emitted in the Santa Rosa area can be transported down-wind and contribute to air quality problems in those areas. Light winds that are common in winter combine with strong surface-based inversions, caused by cold air trapped near the surface, to trap pollutants such as particulates (e.g., wood smoke) and carbon monoxide. This can lead to localized high concentrations of these pollutants.

Air Monitoring Data

The BAAQMD monitors air quality conditions at over 30 locations throughout the Bay Area. The Santa Rosa Monitoring Station on Fifth Street is closest and most representative of the project site. Criteria pollutants monitored include O_3, CO, NO_2, hydrocarbons, PM_{10}, and $PM_{2.5}$. The gaseous pollutants (i.e., O_3, CO and NO_2) are monitored continuously while particulate matter (i.e., PM_{10} and $PM_{2.5}$) are sampled for 24-hours every sixth day. A summary of the data recorded at this station is shown in **Table 2** for the period 2003 through 2007

Table 3 shows the number of days per year that air pollutant levels exceeded national or state standards in Santa Rosa and the entire Bay Area monitoring network. No exceedances of the NAAQS for O_3 (1- or 8-hour concentrations) were recorded at this station. Measured concentrations of CO and NO_2 did not exceed the NAAQS or CAAQS. However, measured concentrations of O_3 and PM_{10} exceeded the State standards during the 5-year period. The State standard for O_3 was exceeded on one day in 2003. The State standard for PM_{10} was exceeded on two sampling days in 2006. There was one exceedance of the NAAQS for $PM_{2.5}$ in 2006. Both PM_{10} and PM2.5 are sampled once every 6 days in Santa Rosa, so the PM_{10} standard was estimated to be exceeded about 12 days in 2006 and exceedances of the $PM_{2.5}$ standard were estimated at 6 days.

Data from all stations throughout the Bay Area indicate that the national ambient air quality standard for 8-hour O_3 concentrations was exceeded 0 to 12 days annually. The more stringent State 1-hour O_3 standard was exceeded on 7 to 19 days annually and the recent 8-hour O3 standard was exceeded on 9 to 22 days annually. The State PM_{10} standard was exceeded on 6 to 15 sampling days annually and the new $PM_{2.5}$ national standard was exceeded on 10 to 14 days annually.

Table 2 Highest Measured Air Pollutant Concentrations

Pollutant	**Average Time**	**Measured Air Pollutant Levels**				
		2003	**2004**	**2005**	**2006**	**2007**
Santa Rosa						
Ozone (O_3)	1-Hour	**0.10** ppm	0.08 ppm	0.072 ppm	0.77 ppm	0.071 ppm
	8-Hour	0.08 ppm	0.06 ppm	0.051 ppm	0.058 ppm	0.059 ppm
Carbon Monoxide (CO)	8-Hour	1.8 ppm	1.6 ppm	2.0 ppm	1.7 ppm	1.7 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.06 ppm	0.05 ppm	0.05 ppm	0.04 ppm	0.05 ppm
	Annual	0.012ppm	0.011ppm	0.011ppm	0.011ppm	0.011ppm
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	39 $\mu g/m^3$	27 $\mu g/m^3$	34 $\mu g/m^3$	**59 $\mu g/m^3$**	32 $\mu g/m^3$
	Annual	9 $\mu g/m^3$	8 $\mu g/m^3$	8 $\mu g/m^3$	9 $\mu g/m^3$	8 $\mu g/m^3$
Respirable Particulate Matter (PM_{10})	24-Hour	36 $\mu g/m^3$	48 $\mu g/m^3$	*39* $\mu g/m^3$	**90 $\mu g/m^3$**	37 $\mu g/m^3$
	Annual	17 $\mu g/m^3$	18 $\mu g/m^3$	16 $\mu g/m^3$	19 $\mu g/m^3$	17 $\mu g/m^3$
Bay Area (Basin Summary)						
Ozone (O_3)	1-Hour	**0.12** ppm	**0.11** ppm	**0.12** ppm	**0.12** ppm	**0.12** ppm
	8-Hour	**0.10** ppm	**0.08** ppm	**0.09** ppm	**0.11 ppm**	**0.09 ppm**
Carbon Monoxide (CO)	8-Hour	4.0 ppm	3.4 ppm	3.1 ppm	2.9 ppm	2.7 ppm
Nitrogen Dioxide (NO_2)	1-Hour	0.09 ppm	0.07 ppm	0.07 ppm	0.11 ppm	0.07 ppm
	Annual	0.021ppm	0.019ppm	0.019ppm	0.018ppm	0.017ppm
Fine Particulate Matter ($PM_{2.5}$)	1-Hour	**60** ug/m^3	**65** ug/m^3	**81** ug/m^3	**73** ug/m^3	**78** ug/m^3
	Annual	**25** ug/m^3	**26** ug/m^3	**24** ug/m^3	**23** ug/m^3	**26** ug/m^3
Respirable Particulate Matter (PM_{10})	24-Hour	56 ug/m^3	52 ug/m^3	55 ug/m^3	**75** ug/m^3	**58** ug/m^3
	Annual	12 ug/m^3	12 ug/m^3	12 ug/m^3	11 ug/m^3	11 ug/m^3

Source: BAAQMD 2007.
Note: ppm = parts per million
Values reported in bold exceed ambient air quality standard
NA = data not available.

Table 3. Number of Days Measured Air Quality Levels Exceeded Standards

Pollutant	Standard	Monitoring Station	Days Exceeding Standard 2003	2004	2005	2006	2007
Ozone (O3.)	NAAQS 1-hr	Santa Rosa BAY AREA	0 1	0 0	X X	X X	X X
	NAAQS 8-hr	Santa Rosa BAY AREA	0 7	0 0	0 1	0 12	0 1
	CAAQS 1-hr	Santa Rosa BAY AREA	1 19	0 7	0 9	0 18	0 4
	CAAQS 8-hr	Santa Rosa BAY AREA	-- --	-- --	1 9	5 22	0 9
Fine Particulate Matter (PM_{10})	NAAQS 24-hr	Santa Rosa BAY AREA	0 0	0 0	0 0	0 0	0 0
	CAAQS 24-hr	Santa Rosa BAY AREA	0 6	0 7	0 6	2 15	0 4
Fine Particulate Matter ($PM_{2.5}$)	NAAQS 24-hr	Santa Rosa BAY AREA	0 0	0 1	0 0	1 10	0 14
All Other (CO, NO_2, Lead, SO_2)	All Other	Santa Rosa BAY AREA	0 0	0 0	0 0	0 0	0 0

* Based on standard of 65 µg/m^3 that was in place until September 21, 2006, then 35 µg/m^3 standard in 2006.
X = Standard revoked in 2004. -- = Standard not in place.
Source: Bay Area Air Quality Management District – Bay Area Air Pollution Summaries

Attainment Status for State and Federal Ambient Air Quality Standards

Areas that do not violate ambient air quality standards are considered to have attained the standard. Violations of ambient air quality standards are based on air pollutant monitoring data and are judged for each air pollutant. The Bay Area as a whole does not meet State or federal ambient air quality standards for ground level O_3 and State standards for particulate matter (both PM_{10} and $PM_{2.5}$). Recently (December 2008) EPA designated the entire Bay Area as nonattainment for the 24-hour $PM_{2.5}$ NAAQS. Violations of the NAAQS at the Vallejo and San Jose stations prompted this action. The final EPA order formally designating the Bay Area as nonattainment with the federal $PM_{2.5}$ standard becomes effective in April 2009. The Bay Area will then have until April 2012 to develop a plan for meeting the standard and will have until April 2014 to achieve compliance with the standard.

Under the Federal CAA, the U.S. EPA has classified the region as marginally nonattainment for the 1997 8-hour ozone standard. U.S. EPA required the region to attain the standard by 2007. The U.S. EPA determined that the Bay Area has met this standard, but a formal redesignation request and maintenance plan would have to be submitted before formal redesignation could be made. In May 2008, U.S. EPA lowered the 8-hour ozone standard from 0.08 to 0.075 ppm. Final designations based upon the new 0.075 ppm standard will be made by March 2010. The Bay Area has met the federal CO standards for over a decade and is classified attainment maintenance by the U.S. EPA. The U.S. EPA grades the region unclassified for all other air pollutants, which includes PM_{10}.

At the State level, the region is considered *serious non-attainment* for ground level O_3 and *non-attainment* for PM_{10} and $PM_{2.5}$. As noted earlier, California ambient air quality standards are more stringent than the national ambient air quality standards. The region is required to adopt plans on a triennial basis that show progress towards meeting the State O_3 standard. The area is considered attainment or unclassified for all other pollutants. While plans to reduce particulate matter are not required under the California CAA, the BAAQMD proposes to address these pollutants in the next Clean Air Plan update.

Air Quality Regulations

The Federal Clean Air Act governs air quality in the United States. In addition to being subject to federal requirements, air quality in California is also governed by more stringent regulations under the California Clean Air Act. At the Federal level, the United States Environmental Protection Agency (US EPA) administers the Clean Air Act (CAA). The California Clean Air Act is administered by the California Air Resources Board (CARB) at the State level and by the Air Quality Management Districts at the regional and local levels. The Bay Area Air Quality Management District (BAAQMD) regulates air quality at the regional level, which includes much of the nine-county Bay Area.

United States Environmental Protection Agency The USEPA is responsible for enforcing the Federal CAA. The USEPA is also responsible for establishing the National Ambient Air Quality Standards (NAAQS). The NAAQS are required under the 1977 CAA and subsequent amendments. The USEPA regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain types of locomotives. The agency has jurisdiction over emission sources outside state waters (e.g., beyond the outer continental shelf) and establishes various emission standards, including those for vehicles sold in states other than California. Automobiles sold in California must meet the stricter emission standards established by the CARB.

California Air Resources Board The CARB, part of the California Environmental Protection Agency, is responsible for meeting the state requirements of the Federal CAA, administering the California CAA, and establishing the California Ambient Air Quality Standards (CAAQS). The California CAA, as amended in 1992, requires all air districts in the State to endeavor to achieve and maintain the California Ambient Air Quality Standards (CAAQS). The CAAQS are more stringent than the corresponding federal standards and incorporate additional standards for sulfates, hydrogen sulfide, vinyl chloride and visibility reducing particles. The CARB regulates mobile air pollution sources, such as motor vehicles. The agency is responsible for setting emission standards for vehicles sold in California and for other emission sources, such as consumer products and certain off-road equipment. The CARB established passenger vehicle fuel specifications, which became effective on March 1996. The CARB oversees the functions of local air pollution control districts and air quality management districts, which in turn administer air quality activities at the regional and county level. The CARB also monitors ambient air quality throughout the State.

Bay Area Air Quality Management District In 1955, the California Legislature created the Bay Area Air Quality Management District (BAAQMD). The agency is primarily responsible for assuring that the National and State ambient air quality standards are attained and maintained in the Bay Area. The BAAQMD is also responsible for adopting and enforcing rules and regulations concerning air pollutant sources, issuing permits for stationary sources of air pollutants, inspecting stationary sources of air pollutants, responding to citizen complaints, monitoring ambient air quality and meteorological conditions, awarding grants to reduce motor vehicle emissions, conducting public education campaigns, as well as many other activities. The BAAQMD does not have authority to regulate emissions from motor vehicles.

Air Quality Planning

The BAAQMD and other agencies prepare clean air plans in response to the State and Federal Clean Air Acts. The City of Santa Clara also includes General Plan policies that encourage development that reduces air quality impacts. In addition, BAAQMD has developed CEQA Guidelines to assist local agencies in evaluating and mitigation air quality impacts.

Regional Clean Air Plans

2001 Ozone Attainment Plan

The Bay Area 2001 Ozone Attainment Plan was prepared by BAAQMD, the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). This plan is a proposed revision to the Bay Area’s part of the State Implementation Plan, or SIP to achieve the NAAQS for the 1-hour ozone standard. The plan was prepared in response to US EPA's partial approval and partial disapproval of the Bay Area's 1999 Ozone Attainment Plan. Although the U.S. EPA revoked the 1-hour NAAQS, commitments made in that plan along with emissions budgets remain valid until the region develops an attainment demonstration/maintenance plan for the 8-hour NAAQS for ozone. The U.S. EPA has determined that the region met the 1997 8-hour ozone standard. However, the region will be required to submit a maintenance plan and demonstration of attainment with a request for redesignation to U.S. EPA when the 8-hour ozone NAAQS is met. BAAQMD will likely not act on this submittal for a few years. In addition, the U.S. EPA’s new, slightly more stringent, 8-hour standard was recently established. The U.S. EPA will be making new attainment designations based on that standard in about 3 years and eventually revoking the older standard. A Carbon Monoxide Maintenance Plan was approved in 1998 by EPA, which demonstrated how NAAQS for carbon monoxide standard would be maintained.

1991 Clean Air Plan

In 1991, BAAQMD, MTC and ABAG prepared the Bay Area 1991 Clean Air Plan or CAP. This air quality plan addresses the California Clean Air Act. Updates are developed approximately every three years. The plans are meant to demonstrate progress toward meeting the more stringent 1-hour ozone CAAQS. The latest update to the plan, which was adopted in January 2006, is called the *Bay Area 2005 Ozone Strategy*. This plan includes a comprehensive strategy to reduce emissions from stationary, area, and mobile sources. The plan objective is to indicate how the region would make progress toward attaining the stricter state air quality standards, as mandated by the California Clean Air Act. The plan is designed to achieve a region-wide reduction of ozone precursor pollutants through the expeditious implementation of all feasible measures. The plan proposes expanded implementation of transportation control measures (TCMs) and programs such as Spare the Air. Spare the Air is a public outreach program designed to educate the public about air pollution in the Bay Area and promote individual behavior changes that improve air quality. Some of these measures or programs rely on local governments for implementation. An update to the plan is currently being developed and should be available by 2009.

PM_{10} and $PM_{2.5}$ Plans

The clean air planning efforts for ozone will also reduce PM_{10} and $PM_{2.5}$, since a substantial amount of this air pollutant comes from combustion emissions such as vehicle exhaust. In addition, BAAQMD adopts and enforces rules to reduce particulate matter emissions and develops public outreach programs to educate the public to reduce PM_{10} and $PM_{2.5}$ emissions (e.g., Spare the Night Program). SB 656 requires further action by CARB and air districts to reduce public exposure to PM_{10} and $PM_{2.5}$. Efforts identified by BAAQMD in response to SB656 are primarily targeting reductions in wood smoke emissions and adoption of new rules to further reduce NOx and particulate matter from internal combustion engines and reduce particulate matter from commercial charbroiling activities. BAAQMD recently adopted a rule addressing residential wood burning. The rule restricts operation of any indoor or outdoor fireplace, fire pit, wood or pellet stove, masonry heater or fireplace insert on specific days during the winter when air quality conditions are forecasted to exceed the NAAQS for $PM_{2.5}$. The rule would also limits excess visible emissions from wood burning devices and require clean burning technology for wood burning devices sold (or resold) or installed in the Bay Area. NOx emissions contribute to ammonium nitrate formation that resides in the atmosphere as particulate matter, so a reduction in NOx emissions would reduce wintertime $PM_{2.5}$ levels. The Bay Area experiences the highest PM_{10} and $PM_{2.5}$ in winter when wood smoke and ammonium nitrate contributions to particulate matter are highest.

Sonoma County General Plan

The Open Space and Resource Conservation Element of the Sonoma County General Plan 2020 has the following goals, objectives and policies pertaining to this project and air quality:

Goal: OSRC-16 Preserve and maintain good air quality and provide for an air quality standard that will protect human health and preclude crop, plant and property damage in accordance with the requirements of the Federal and State Clean Air Acts.

Objective OSRC-16.1: Minimize air pollutant and greenhouse gas emissions.

Objective OSRC-16.2: Encourage reduced motor vehicle use as a means of reducing resultant air pollution.

The following policies, in addition to those of the Circulation and Transit Element, shall be used to carry out these objectives:

> **Policy OSRC-16a:** Require that commercial and industrial development projects be designed to minimize air emissions. Reduce direct emissions by decreasing the need for space heating.
>
> **Policy OSRC-16c:** Refer projects to the local air quality districts for their review.
>
> **Policy OSRC-16d:** Review proposed changes in land use designations for potential deterioration of air quality and deny them unless they are consistent with the air quality levels projected in the general plan EIR.
>
> **Policy OSRC-16h:** Require that development within the Bay Area Air Quality Management District that generates high numbers of vehicle trips, such as shopping centers and business parks, incorporate air quality mitigation measures in their design.
>
> **Policy OSRC-16i:** Ensure that any proposed new sources of toxic air contaminants or odors provide adequate buffers to protect sensitive receptors and comply with applicable health standards. Promote land use compatibility for new development by using buffering techniques such as landscaping, setbacks, and screening in areas where such land uses abut one another.
>
> **Policy OSRC-16k:** Require that discretionary projects involving sensitive receptors (facilities or land uses that include members of the population sensitive to the effects of air pollutants such as children, the elderly, and people with illnesses) proposed near the Highway 101 corridor include an analysis of mobile source toxic air contaminant health risks. Project review should, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.

Applicable BAAQMD Rules and Regulations

The BAAQMD regulates air quality in the southern portion of Sonoma County where the project will be located. Certain stationery and area emission sources are subject to BAAQMD Regulations and Rules. Mobile sources, both off-and on-road are not subject to BAAQMD authority. The District's rules and regulations that may apply to the proposed hospital facility are described below.

- Permitting Rule 2-1-301 requires that any person installing, modifying, or replacing any equipment, the use of which may reduce or control the emission of air contaminants, shall first secure written authorization from the Air Pollution Control Officer (APCO). Equipment that may require permitting includes the boiler, cooling tower, chillers, and diesel-fueled emergency generator. Rule 2-1-302 requires that written authorization from the APCO be secured before any such equipment is used or operated.

- New Source Review Rule 2-2, New Source Review (NSR), applies to all new and modified sources or facilities that are subject to the requirements of Rule 2-1-301. The purpose of the rule is to provide for review of such sources and to provide mechanisms by which no net increase in emissions will result.

- Best Available Control Technology Rule 2-2-301 requires that an applicant for an Authority to Construct (ATC) or Permit to Operate (PTO) apply best available control technology (BACT) to any new or modified source that results in an increase in emissions and has emissions of precursor organic compounds, non-precursor organic compounds, NO_x, SO_2, PM_{10}, or CO of 10.0 pounds or more per highest day.

- Equipment Specific Requirements Both the boiler and emergency generator would be to equipment-specific requirements.

  - *Boiler Requirements* - The boiler will be subject to Rule 9-7, Nitrogen Oxides and Carbon Monoxide From Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters, which applies to boilers and other equipment with a rated heat input of 10 million Btus per hour (MMBtu) or greater. The rule includes minimum emission limits for NO_x and CO to be met, as well as monitoring, record keeping and reporting requirements. The boiler would also be subject to the federal New Source Performance Standards (NSPS) for boilers, which have been adopted by the BAAQMD under Regulation 10, Standards of Performance for New Stationary Sources.

  - *Diesel Fueled Engines* – Rule 9-8, Nitrogen Oxides and Carbon Monoxide From Stationary Internal Combustion Engines, includes NO_x and CO emission limits for internal combustion engines, as well as operating, monitoring, record keeping, and reporting requirements for emergency generators. In addition to Rule 9-8, diesel-fueled engines that emit diesel exhaust particulate matter are subject to the District's Risk Management Policy for Diesel-Fueled Engines in addition to the standard permitting requirements. The applicant must demonstrate through air dispersion modeling that the diesel exhaust particulate matter would not cause a significant health risk. The acceptable health risk is an increased cancer risk of one in one million (1×10^{-6}), unless the engine used Best Available Control Technology for Toxics (TBACT), in which case the acceptable risk is 10 in one million (10×10^{-6}).

- Prohibitory Rules - Regulation 6 pertains to particulate matter and visible emissions and limits the quantity of particulate matter emitted into the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity. Visible emissions from a source are required to be less than 20% opacity (No. 1 Ringelmann) for any period aggregating to 3 minutes in any one hour. Additionally, for heat transfer operations (e.g., the boiler), the particulate matter emissions are not to exceed 0.15 grains per dry standard cubic foot, corrected to 6% oxygen. Although, the engine for the emergency generator will be fired with diesel fuel, the BAAQMD will require that the engine be a modern, low emissions engine, and is not expected to exceed the opacity limit. For the boiler, since it will be fired on natural gas, no visible emissions are expected and particulate matter emissions will be negligible.

Specific requirements, including emission control technology requirements and emission limitations, as well as operating, monitoring, record keeping, and reporting requirements for the equipment that need to be permitted by the BAAQMD would be determined during the permitting process prior to installation of the applicable equipment. Compliance with BAAQMD permit requirements would ensure that individual impacts from stationary sources of air pollutants would be less than significant.

IMPACTS AND MITIGATION

Air Quality. Would the project result in:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
A. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐

The Bay Area Air Quality Management District (BAAQMD) is the regional agency responsible for overseeing compliance with State and Federal laws, regulations, and programs within the San Francisco Bay Area Air Basin. The BAAQMD has prepared and/or implements specific plans to meet the applicable laws, regulations, and programs. The Bay Area 2005 Ozone Strategy is the latest adopted plan (adopted in January 2006). This plan describes the Bay Area's strategy for compliance with State one-hour ozone standard planning requirements. The BAAQMD has also developed CEQA guidelines to assist lead agencies in evaluating the significance of air quality impacts.

In formulating compliance strategies, the BAAQMD relies on planned land uses established by local general plans. When a project proposes to change planned uses, by requesting a general plan amendment (GPA), the project may depart from the assumptions used to formulate clean air plan strategies in such a way that the cumulative result of incremental changes may hamper or prevent the Plan from achieving the goals. This is because land use patterns influence transportation needs, and motor vehicles are the primary source of air pollution. Projects proposed in jurisdictions with general plans that are consistent with the BAAQMD's *Clean Air Plan* and projects that conform to the applicable general plan would not have significant cumulative impacts. The BAAQMD's Clean Air Plan also contains a list of transportation control measures that are intended to reduce emissions from vehicles travel. Among this list are 7 measures that the BAAQMD relies on local jurisdictions such as the County to implement through General Plan policies. The County is currently updating the General Plan. This update would include new projections and policies to address regional air quality concerns and Clean Air Plan transportation control measures.

This project is anticipated to serve the needs of forecasted population growth in the region. Both the current General Plan and the zoning allow for the proposed development and land use. An amendment to the Sonoma County General Plan is being requested as part of the project to include the site within the Urban Service Boundary. Development of the project is not anticipated to interfere with population projections used in Clean Air Plans.

The project includes modifications to the U.S. 101 off ramp to Mark West Springs Road. Consultation would be required with Caltrans to identify whether or not the project would be exempt from regional air quality conformity analysis. If the project is not exempt from regional conformity, then it would have to be included in the MTC's latest Regional Transportation Improvement Program (TIP) that would be required to be found to conform with the State Implementation Plan. A local air quality conformity analysis would likely be necessary, because the project is adding capacity the off-ramp. That analysis would address hot-spot CO impacts at localized intersections and qualitatively address PM_{10}, $PM_{2.5}$, mobile source air toxics (MSAT) impacts. This analysis would be subject to Caltrans review.

Air Quality. Would the project result in:	**Potential Significant Impact**	**Less Than Significant Impact With Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
B. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☑	☐

Carbon monoxide emissions from traffic generated by the project would be the pollutant of greatest concern at the local level. The intersection of Mark West Springs Road and Old Redwood Highway would be most affected by project traffic that could lead to the highest carbon monoxide concentrations at sensitive receptors (i.e., residences). Congested intersections with a large volume of traffic have the greatest potential to cause high-localized concentrations of carbon monoxide. Carbon monoxide concentrations would be the highest at this interchange. There are 1- and 8-hour standards for carbon monoxide. The 8-hour standard is the most stringent and historically has always been exceeded if the 1-hour standard is exceeded. Therefore, this analysis evaluated impacts against the 8-hour standard.

Carbon monoxide concentrations were modeled using screening methods recommended by the BAAQMD that are based on the Caline4 Line-Source dispersion model. This method uses traffic volumes, emissions, meteorology, and the roadway/receptor geometry. For this assessment, meteorological conditions most conducive for high carbon monoxide concentrations in the Bay Area, peak-hour traffic conditions (i.e., evening period), slow traffic speeds and emission factors generated by the California Air Resources Board emission factor model (i.e., EMFAC2002) were used as input to the model. Modeled concentrations were added to background levels to predict total carbon monoxide concentrations. This assessment was conducted for existing conditions (2008) and both background build-out with and without the project conditions for 2014. Results of this assessment, shown in Table 5, indicate that carbon monoxide conditions would remain below ambient air quality standards. Assumptions used for the prediction of project-related carbon monoxide concentrations are provided in the Attachment.

Table 5. Predicted 8-Hour Worst Case Carbon Monoxide Levels (in PPM)

Description	**2008 Existing**	**2014 No Project**	**2014 with Project (Ph. I & II)**
Mark West Springs Road and Old Redwood Highway	4.4 ppm	4.4 ppm*	4.4 ppm*
Significance Thresholds (CAAQS)	*9.0 ppm for 8-hour exposure*		

* Emission rates are anticipated to decrease by about 45 percent between 2008 and 2014, resulting in much lower CO levels.

Air Quality. Would the project result in:	**Potential Significant Impact**	**Less Than Significant Impact With Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
C. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☑	☐	☐	☐

The Bay Area is considered a non-attainment area for ground-level ozone and $PM_{2.5}$ under both the federal Clean Air Act and the California Clean Air Act. The area also considered non-attainment for respirable particulates or particulate matter with a diameter of less than 10 micrometers (PM_{10}) under the California Clean Air Act, but not the federal act. The area has attained both State and federal ambient air quality standards for carbon monoxide. The area is considered to be in attainment for all other regulated air pollutants (i.e., nitrogen dioxide, sulfur dioxide and lead). Attainment means the region normally does not violate air quality standards. In an effort to attain and maintain ambient air quality standards for ozone and PM_{10}, the BAAQMD has established thresholds of significance for evaluating direct and indirect emissions of air pollutants from projects. These thresholds are for ozone precursors (reactive organic gases and nitrogen oxides) and PM_{10}. There are no thresholds for $PM_{2.5}$; however, the PM_{10} thresholds would include $PM_{2.5}$.

The primary sources of air pollutant emissions from the project include indirect emissions from traffic, area-source emissions (e.g., natural gas usage and landscaping), natural gas fired boilers for steam generation, and emissions associated with daily testing of an emergency generator. Emissions associated with helicopter operations were not expected to change with the project.

Project-related emissions of air pollutants from traffic and area sources were predicted using the URBEMIS2007 model (Version 9.3), which is approved for use by the BAAQMD. This model predicts daily emissions associated with land use developments. The model combines predicted daily traffic activity, associated with the different land use types, with emission factors from the State's mobile emission factor model (i.e., EMFAC2007). Dowling and Associates provided trip generation. Assumptions used for predicting project-related emissions of air pollutants that affect the region are provided in the Attachment.

Build out of the project would result in the construction or modification of stationary air pollutant sources that are not properly accounted for in the URBEMIS 2007 modeling. Stationary sources identified at this design phase include natural-gas fired boilers and two 1500-kilowatt Standby Generator Set. The boilers would be fired by natural gas and the generator sets would use diesel fuel. These sources would be subject to BAAQMD permit requirements. Overall, these sources would result in minor emissions, compared to those from traffic generation reported above.

ROG, NOx, and PM_{10} emissions from the boilers are included as part of the natural gas consumption emissions. The applicants Engineer provided estimated annual natural gas consumption rates. Emission factors for natural gas used by the URBEMIS2007 model were applied to these usage rates to develop daily and annual emissions. Separate emissions for the boilers were not computed. The calculations provided in this assessment would over predict the emissions, since emission standards, specified by BAAQMD regulations, would likely apply to these boilers.

Emergency generator emissions, including diesel particulate matter (DPM), were computed for two Caterpillar 1250kw Generator Set. These emissions are based on the manufacturer data at 100% load. A testing schedule of 5 minutes per week, ½ hour each month and annual testing on one day for eight hours (18.3 hours per year operation) was assumed for these calculations.

The BAAQMD CEQA Guidelines do not recommend quantification of construction period emissions because these emissions are temporary and construction equipment is considered to be included in the regional air pollutant emissions inventories that are the basis of regional attainment plans. The BAAQMD does not have thresholds for construction emissions. However, haul trips to import the estimated 100,000 cubic yards of fill are considered to be non-standard construction activities. Emissions from haul trucks trips were calculated using travel estimates and emission factors from the EMFAC2007 model.

Project Phasing

The project would be constructed in several phases over the next 5 years or longer. Each phase is described below.

Phase I

Site grading and preparation would occur under Phase I.

Phase II

Under Phase II, the project would relocate hospital facilities to the project site. This would result in changes in traffic patterns that would affect air pollution emissions. The primary sources of new air pollutant emissions to the region from Phase II of the hospital portion of the project would be increased travel distances to the new hospital facility, emissions from testing of an emergency generator system (required by State law), and areas source emissions such as natural gas emissions from space and water heating. Emissions for Phase II were calculated for 2014, the earliest date of operation.

Phase III

This phase may include future expansion of the Sutter hospital by 29 beds and expansion to the Luther Burbank Memorial Foundation with internal renovation of the Person Theatre.

Project-Related Emissions

Modeled project emission sources include daily haul truck traffic, natural gas combustion on site for space and water heating (including boiler gas consumption), area sources that include landscape equipment, routine testing of emergency generators, and mobile sources. Project direct and indirect emissions were calculated and are included as Attachment 1 to this report.

Phase I - Haul Truck Trips

About 100,000 cubic yards of fill maybe imported to the site. Estimates include about 200 loads of material would be brought to the site per day for a total of about 50 days or 8,695 trips. Each load would include two trips: one in and one out. Sources of fill material have been identified within a 15-mile travel distance of the site. For this analysis, trip lengths of 15 miles at 35 miles per hour were assumed for haul trips. The PM_{10} gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy-heavy-duty trucks for the year 2010. Travel activity and emission rates were combines to estimate daily air pollutant emissions during this activity. Truck haul emissions are reported in **Table 6**. Assuming all haul trips are conducted in 2010, annual emissions from this activity would not exceed the annual thresholds established by the BAAQMD. However, daily emissions from this activity would exceed thresholds for NOx and PM_{10}. The NOx emissions would be associated with vehicle exhaust, while most of the PM_{10} emissions would be associated with entrained dust from truck travel. Although temporary (about 50 days), the daily emissions associated with haul truck trips would be considered significant.

Table 6. Project Emissions from Haul Truck Trip Activity

Scenario	**Modeled Emissions in pounds per day and tons per year**		
	Reactive Organic Gases (ROG)	**Nitrogen Oxides (NOx)**	**Respirable Particulates (PM_{10})**
Daily Haul Trips (200)	18 pounds	240 pounds	240 pounds
2010 Annual Haul Trips	0.33 tons	4.27 tons	4.28 tons
BAAQMD Thresholds	*80 pounds per day and 15 tons per year*		

Phase II Build-Out Hospital/Medical Office Building Operation

Operation of the project would include onsite emissions and traffic-related emissions from activity associated with the new hospitals and medical office building. The future uses of the existing hospital facilities, which are being replaced with this project, are unknown at this time. Therefore, this analysis assumed that the hospital related emissions at the project site would be new to the region. The one exception was the emissions associated with helicopter flights, since helicopter operations would be moved from the current facilities to the project site. It is unlikely that future uses of the current hospital facilities would be as intensive, so this analysis represents a credible worst-case scenario.

Area sources from Phase II build out of the proposed project were predicted using the URBEMIS2007 and computing emissions from natural gas consumption. The URBEMIS2007 modeling did not include natural gas consumption. Since only annual natural gas consumption rates were provided, emissions were averaged over the entire year (i.e., daily consumption was the annual consumption divided by 365 days).

Projected trip generation (i.e., 4,584 daily trips) along with the project land use types and sizes were input to the URBEMIS2007 model. Emissions were computed for a summer day and annually. Build out of the project was anticipated to occur in 2014 at the earliest. The year of analysis is important to consider when modeling vehicle emissions. The vehicle emission rates for ROG and NOx are currently decreasing with each year and are predicted to decrease substantially between 2010 and 2020. For instance, NOx emission rates will decrease by 56 percent during that period because of improvements in vehicle emissions and retirement of older, more polluting, vehicles from the roadways.

Daily emissions from typical operation of the hospital are reported in **Table 7**. The typical daily operation of the hospital facilities and medical office building built out in Phase II would have daily emissions that are below the BAAQMD significance thresholds. Typical operation of the proposed project would have *less than significant* daily emissions.

Table 7. Phase II Daily Operation Emissions

	Modeled Emissions in pounds per day		
Scenario	**Reactive Organic Gases (ROG)**	**Nitrogen Oxides (NOx)**	**Respirable Particulates (PM_{10})**
Area Sources	**3 pounds**	**10 pounds**	**<1 pounds**
Mobile Sources	**29 pounds**	**31 pounds**	**32 pounds**
Total	32 pounds	41 pounds	32 pounds
BAAQMD Thresholds	*80 pounds per day and 15 tons per year*		

Phase III – Possible Expansion of Sutter Hospital

In Phase III, Sutter could expand the hospital by 29 beds. This would then include a total of 241,000 square feet of hospital space (includes both Sutter and Physicians Medical Center). Emissions with full build out of the project, as defined in Phase III, was also modeled with URBEMIS2007. Full build-out of Phases I through III was anticipated for 2014. Emissions are reported in Table 8.

Table 8. Phase III Daily Operation Emissions

Scenario	Modeled Emissions in pounds per day		
	Reactive Organic Gases (ROG)	**Nitrogen Oxides (NOx)**	**Respirable Particulates (PM_{10})**
Area Sources	**3 pounds**	**10 pounds**	**<1 pounds**
Mobile Sources	**31 pounds**	**34 pounds**	**35 pounds**
Total	34 pounds	44 pounds	35 pounds
BAAQMD Thresholds	*80 pounds per day and 15 tons per year*		

<u>Phase II Build-Out with Generator Testing</u>

The hospital facilities would require diesel-powered generators to provide electrical power to the hospitals during power outages. These generators must be tested routinely. The proposed schedule for testing would be 5 minutes each week, 30 minutes each month, and 8-hours each year. Emissions associated with operation of both generators during each of the three types of testing are reported in Table 8. Since normal hospital and medical office building would occur simultaneously on days with testing, those emissions were added to the generator testing emissions. Annual emissions associated with the project and generator testing are also reported.

Under a worst-case future scenario reported in Table 9, the hospital would be operating under normal weekday conditions and the generators would be tested. Normal project operation with testing of the generators for either 5 minutes or 30 minutes per day would result in emissions that would be below the BAAQMD daily thresholds of 80 pounds per day. When the generators are tested once annually for 8 hours, NOX emissions would exceed the BAAQMD daily thresholds; and therefore, be considered significant. However, annual emissions from the proposed project that include all sources operating in 2014 (including generator testing) would not exceed the BAAQMD annual significance thresholds.

Summary of Emission Affecting Regional Air Quality

Emissions shown above indicate that the project would have a potentially significant impact on regional air quality. This would occur in 2010 during Phase I when haul trucks import material to the site. NOx emissions from this activity would exceed both NOx and PM_{10} emission thresholds. This would result in a temporary significant impact to regional air quality.

Normal project operation beginning in 2014 would have daily and annual emissions that are less than the BAAQMD thresholds. Emissions of NOx would exceed these thresholds on one day per year when generators are tested for 8 hours. NOx is a precursor pollutant that aids the formation of ground-level ozone or smog. Ozone formation is greatest during the late spring, summer and early fall when temperatures are warm and there is abundant sunshine to also aid in smog formation. As a result, the Bay Area experiences unhealthy levels of ozone during the months May through October. During this ~180-day period, there is an exceedance of the State ozone standard somewhere in the Bay Area on about 9 to 22 days. Fortunately, exceedances in the North Bay region have been rare. However, in some wind patterns, emissions from the North Bay Area can be transported to eastern or southern portions of the Bay Area and contribute to those measured exceedances. Testing of the generators for more than one hour per day during the months May through October would be *significant*.

The BAAQMD has not identified emission thresholds for $PM_{2.5}$. Project emissions were calculated and are contained in Attachment 1. It should be noted that BAAQMD's emission threshold for PM_{10} is based on the State PM_{10} standard of 50 µg/m^3. The new federal $PM_{2.5}$ standard is 35 µg/m^3, which is about 70% of the PM_{10} standard. Maximum daily emissions of $PM_{2.5}$ are predicted at 9.7 pounds per day, which is only 12% of the BAAQMD's PM_{10} threshold. While there is no established emission threshold for PM2.5, comparison of project $PM_{2.5}$ to PM_{10} emissions indicate that these emissions would be less-than-significant.

Table 9. Phase III Operational Emissions with Generator Testing

	Modeled Emissions in pounds per day and tons per year		
Scenario	**Reactive Organic Gases (ROG)**	**Nitrogen Oxides (NOx)**	**Respirable Particulates (PM_{10})**
5-minute Generator Test (once per week)	**<1 pounds**	**4 pounds**	**<1 pounds**
Operation Sources	34 pounds	44 pounds	35 pounds
Total	34 pounds	49 pounds	35 pounds
30-minute Generator Test (once per month)	**<1 pounds**	**24 pounds**	**<1 pounds**
Operation Sources	34 pounds	44 pounds	35 pounds
Total	34 pounds	68 pounds	35 pounds
8-hour Generator Test (once annually)	**9 pounds**	**387 pounds**	**2 pounds**
Operation Sources	34 pounds	44 pounds	35 pounds
Total	43 pounds	**431 pounds**	37 pounds
Total Annual Emissions	6.5 tons	9.3 tons	6.4 tons
BAAQMD Thresholds	*80 pounds per day and 15 tons per year*		

Mitigation Measure 1: Measures to reduce haul truck trips

The following measures could reduce emissions associated with haul truck trips to the project site.

a) Preference for material to be imported to the site should be given to sources closest to the project site;

b) Enforce state idling restrictions that apply to large trucks and construction equipment by posting clearly visible signs at the haul truck entrances that clearly stating the restrictions and fines;

c) If possible, avoid haul truck trips on days when Spare the Air Days are forecasted by the BAAQMD.

Because the source of the fill material and schedule for importing fill cannot be determined at this time, the effectiveness is unknown and therefore, the impact would be considered *significant and unavoidable*.

Mitigation Measure 2: Generator Testing Schedule

Testing of the diesel generators for more than one hour per day should not occur during the months may through October, to ensure that these emissions would not contribute to exceedances of State ozone standards in the region.

Mitigation Measure 3: Ensure compliance with BAAQMD Rules and Regulations

Some mechanical equipment used at the proposed hospital would require permits from the BAAQMD. The applicants should be responsible for consulting with the BAAQMD to ensure compliance with appropriate rules and regulations so that emissions are properly controlled and do not exceed levels reported in this analysis.

Mitigation Measure 4: Reduce air pollutant emissions on Spare the Air Days

The Hospital administrators shall sign up with the BAAQMD to receive Spare the Air notifications and make attempts to avoid scheduling generator testing on these days. In addition, Hospital and office building staffs should be informed of the Spare the Air Days so that they may voluntarily reduce emissions through carpooling, using transit or other means.

Air Quality. Would the project result in:	Potential Significant Impact	Less Than Significant Impact With Mitigation Incorporation	Less Than Significant Impact	No Impact
D. Expose sensitive receptors to substantial pollutant concentrations?	☐	☑	☐	☐

Construction Dust

During demolition, grading and construction activities, dust would be generated. Most of the dust would result during grading activities. The amount of dust generated would be highly variable and is dependent on the size of the area disturbed, amount of activity, soil conditions and meteorological conditions. Typical winds during late spring through summer are from the west-southwest. Nearby residences could be adversely affected by dust generated during construction activities.

Although grading and construction activities would be temporary, they would have the potential to cause both nuisance and health air quality impacts. PM_{10} is the pollutant of greatest concern associated with dust. If uncontrolled, PM_{10} levels downwind of actively disturbed areas could possibly exceed State standards. In addition, dust fall on adjacent properties could be a nuisance. If uncontrolled, dust generated by demolition, grading and construction activities represents a potentially *significant* impact.

Mitigation Measure 5: Include measures to control dust emissions.

Implementation of the measures recommended by the BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less than significant level:

1 Water all active construction areas at least twice daily and more often during windy periods. Active areas adjacent to residences should be kept damp at all times.

2 Cover all hauling trucks or maintain at least two feet of freeboard. Dust-proof chutes shall be used as appropriate to load debris onto trucks during demolition.

3 Pave, apply water at least twice daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas.

4 Sweep daily (with water sweepers) all paved access roads, parking areas, and staging areas and sweep streets daily (with water sweepers) if visible soil material is deposited onto the adjacent roads.

5 Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (i.e., previously-graded areas that are inactive for 10 days or more).

6 Enclose, cover, water twice daily, or apply (non-toxic) soil binders to exposed stockpiles.

7 Limit traffic speeds on any unpaved roads to 15 mph.

8 Replant vegetation in disturbed areas as quickly as possible.

9 Suspend construction activities that cause visible dust plumes to extend beyond the construction site.

10 Limit the area subject to excavation, grading and other construction activity at any one time

Construction Equipment Exhaust

Construction equipment and associated heavy-duty truck traffic generates diesel exhaust, which is a known Toxic Air Contaminant. The BAAQMD has not developed any procedures or guidelines for identifying these impacts from temporary construction activities where emissions are transient. They are typically evaluated for stationary sources (e.g., large compression ignition engines such as generators) in health risk assessments over the course of lifetime exposures (i.e., 24 hours per day over 70 years). Diesel exhaust poses both a health and nuisance impact to nearby receptors. These construction activities are expected to occur during a relatively short time, and therefore, the impacts are considered to be l*ess than significant* if reasonable available control measures are applied.

Mitigation Measure 6: Include measures to reduce diesel particulate matter exhaust from construction equipment.

1. Prohibit equipment with dirty emissions. The project shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. This measure means that equipment with continuous dark emissions is in violation of the requirement.
2. The contractor shall install temporary electrical service whenever possible to avoid the need for independently powered equipment (e.g. compressors).
3. Signs shall be posted that indicate diesel-powered equipment standing idle for more than five minutes shall be turned off or operators would be subject to fines. This would include trucks waiting to deliver or receive soil, aggregate, or other bulk materials. Rotating drum concrete trucks could keep their engines running continuously as long as they were onsite.
4. Properly tune and maintain equipment for low emissions.
5. The County shall designate a Disturbance Coordinator responsible for ensuring that mitigation measures to reduce air quality impacts to nearby residences from construction are properly implemented. The Disturbance Coordinator shall be responsible for notifying adjacent land uses of construction activities and schedule and shall provide a written list of the aforementioned dust control measures. The list shall identify a contact

person that will respond to any complaints. A log shall be kept of all complaints and the actions taken to remedy any valid complaint as well as the response period.

Toxic Air Contaminant Emissions from Construction and Operation of the Project

Residences near the proposed project could be exposed to emissions of TACs from project construction and operation. The primary sources of TACs would include DPM emitted from construction activities, routine truck deliveries during operation, and testing of the generators. The health risks, in terms of incremental lifetime cancer risk, were assessed for nearby residences. Emissions for each activity or process were computed and used in the ISCST3 dispersion model to predict DPM concentrations. The modeling used screening meteorological conditions that typically result in over predictions of the concentrations. Modeling assumptions are described in the Attachment.

Construction Activity

Construction activities included emissions from the campus construction as estimated by the URBEMIS2007 model using default values and the estimated area of disturbance due to construction. URBEMIS2007 provides exhaust PM_{10} emissions, which were assumed to be DPM. There would also be emissions from roadway construction adjacent to the project site. These emissions were estimated using the Roadway Construction Emission Model (Version 6.3.1) with default assumptions. Roadway construction was assumed to cover about 5 acres and occur over 6 months. The PM_{10} exhaust emissions from this model were assumed to be PM_{10}. The roadway and construction emissions were combined and then modeled as two separate area sources across the site.

About 100,000 cubic yards of fill maybe imported to the site. Estimates include about 200 loads of material would be brought to the site per day for a total of about 50 days or 8,695 trips. Each load would include two trips: one in and one out. The PM_{10} gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy-heavy-duty trucks for the year 2010. Predicted PM_{10} truck exhaust emissions were assumed to be DPM. Each truck was assumed to travel along Mark West Springs Road for the entire frontage of the project. Travel to the center of the site was also assumed in the truck modeling.

Routine Operation of the Project Site

The primary source of TACs from routine operation of the project would be DPM emitted from truck deliveries. On average, there would be almost 6 large truck and 5 medium truck trip deliveries anticipated per day. These deliveries would have two trips associated with them: one in and one out. The PM_{10} gram per mile exhaust emission rate was estimated using the EMFAC2007 model for heavy-heavy and medium-duty trucks for the year 2014. Predicted PM_{10} truck exhaust emissions were assumed to be DPM. These emissions were assumed to occur 7 days per week over 70 years of project operation. While emissions of DPM from trucks are anticipated to decrease substantially, the higher 2014 emission factor was assumed for this assessment. Use of this factor would overstate the heath risk associated with this activity. Similar to haul truck trips, these trucks were assumed to travel the entire frontage of Mark West Springs Road and travel on site to the loading areas.

Emergency Generator Testing

The project would include the installation and weekly testing of an emergency generator. This generator would be powered by diesel fuel. While operation under emergency conditions is anticipated to be minimal, State law and the manufacturer would require testing. Diesel particulate matter from the exhaust could pose a health risk to nearby sensitive receptors. The nearest residences are estimated to be over 700 feet from the proposed central plant location where the generators would be located. Emissions of DPM from the routine testing of the generators were included in the screening airway health risk assessment.

As currently proposed, two Caterpillar 1500 KW Generator Sets would be used for emergency power needs. The generator emissions information is provided in the Attachment. As mentioned above, testing of the generator set would occur on a weekly basis for 5 minutes, on a monthly basis for 30 minutes, and annually for 8 hours. During testing, the generators are assumed to operate at full load or over 2,200 horsepower.

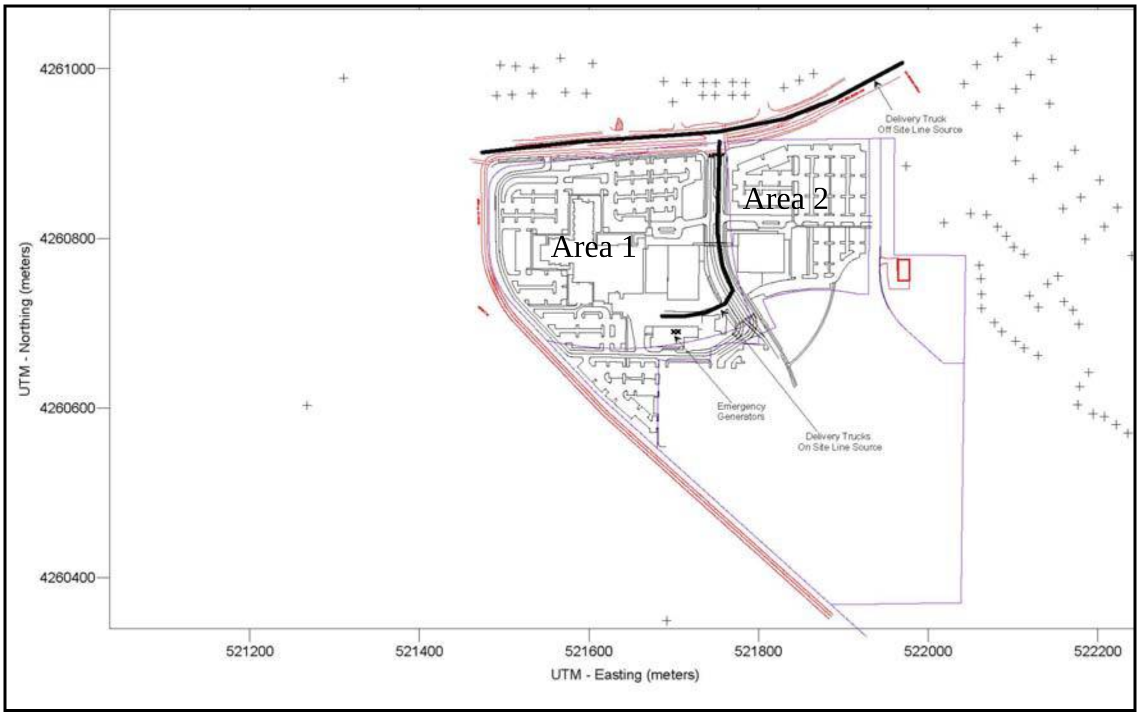
Predicted Incremental Cancer Risk

The ISCST3 model provided 1-hour concentrations at nearby receptor locations from each source. **Figure 1** shows the locations of the receptors, project and DPM sources. The 1-hour diesel particulate matter concentrations predicted by the model were adjusted to annual concentrations using a factor of 0.10. The maximum-modeled annual concentrations resulting from construction activity would range from 0.14 to 0.17 $\mu g/m^3$ of DPM. The lifetime incremental cancer risk associated with this exposure would be 1.38 excess cancer cases per million people. The highest annual DPM concentration for exposure to project operation would be 0.0018 $\mu g/m^3$. Assuming emissions remained similar through a 70-year lifetime exposure period, the incremental cancer risk would be 0.58 excess cancer cases per million people. Note that heavy-duty truck DPM emissions are anticipated to decrease in the future, so the cancer risk would also decrease. The maximum DPM concentrations from construction and operational activities occur at different locations. However, the maximum risk from construction was added to the maximum risk from operation for this screening assessment (even though maximum concentrations occurred at two different receptors). This resulted in a predicted lifetime incremental cancer risk of 1.97 excess cancer cases per million people for a 70-year lifetime exposure.

The acceptable health risk is an increased cancer risk of one in one million (1×10^{-6}) for individual sources (i.e., generator engines), unless the engine used Best Available Control Technology for Toxics (TBACT), in which case the acceptable risk is 10 in one million (10×10^{-6}). The BAAQMD uses a lifetime cancer risk of 10 in one million to evaluate the significance of health risks from projects. The risk of 2 excess cancer cased per million caused by the project would result in a *less-than-significant* impact.

It should be noted that the risk presented in this assessment are overstated and would be less. Key factors contributing to this overestimate are: (1) use of a lifetime exposure that assumes nearly continuous exposure to these sources over a 70-year lifetime, (2) use of 2014 truck emission factors to assess DPM exposure from almost 70 years of project operation, (3) use of screening meteorology in the dispersion modeling assessment, and (4) addition of maximum construction risks to maximum operation risks that occur at two different locations.

Figure 1. Project Sources and Nearby Receptors



Exposure of Hospital Patients and Workers to Toxic Air Contaminants from US 101 Traffic

The proposed project would place a hospital within 500 feet of the travel lanes of U.S. 101. In 2005, CARB issued guidance to local governments that recommended buffers between sources of air pollution and sensitive receptors. CARB identified medical facilities, such as a hospital, as sensitive land uses. For freeways, CARB recommended that sensitive land uses be avoided within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day. Caltrans reports that U.S. 101 currently has about 91,000 vehicle trips per day just south of the Mark West/River Road interchange (Caltrans 2008). The CARB recommendations are advisory in nature and do not reflect local conditions. In their guidance, CARB notes that land use agencies have to balance other considerations including housing and transportation needs, economic development priorities, and other quality of life issues.

A review of air pollution studies by CARB indicates that residing close to freeways or busy roadways may result in adverse health effects beyond those typically found in urban areas. Several studies found an association between adverse non-cancer health effects (e.g., asthma) and living or attending school near heavily traveled urban roadways. Many of these studies focused on children and developed causal links such as links between proximity of the freeway and hospital or medical visits. However, these proximity studies (and others) found that the roadway and truck traffic densities were key factors affecting the strength of association with adverse health impacts. For urban roadways, the association of traffic-related emissions with adverse health impacts was generally strongest within 300 feet.

Proximity to freeways increases exposure to particulate matter and cancer risk. Diesel particulate matter, or DPM, poses the greatest cancer risk from roadways. On average, CARB reports that DPM represents about 70 percent of the potential cancer risk from vehicle travel. The number and type of diesel-fueled vehicles on any roadway is key in understanding the potential cancer risks. There are other contaminants emitted from motor vehicles (e.g., benzene and 1,3 butadiene), but their potential risks are much smaller compared to DPM.

CARB reviewed studies that found measured air pollution concentrations from motor vehicles drop off dramatically between the source and 500 feet. These studies were consistent with CARB air quality modeling and risk analyses performed for freeways. The estimated risk from DPM exposure was found to vary substantially due to meteorology, where typical downwind areas had much higher risk than upwind areas. Freeways with low truck volumes had lower risks. CARB based their 500-foot buffer recommendation on review of the studies and air dispersion modeling. CARB's modeling was based on 2000 information that included higher DPM emissions rates. CARB's EMFAC2007 model shows that new vehicle standards, diesel fuel reformulation, and CARB adopted Diesel Risk Reduction Measures has resulted in lower vehicle emissions. CARB's published health risk maps show that potential cancer risks near freeways will be substantially reduced in 2010 from 2000 levels. In addition, CARB recently adopted new rules requiring retrofit of large diesel-fueled vehicles that will further reduce DPM emissions by over 50 percent in 2014.

U.S. 101 near the project site currently has relatively low truck traffic volumes, when compared to urban freeways. This portion of U.S. 101 through Santa Rosa carries about 91,000 average daily trips (Caltrans 2008). Of these trips, 5% are trucks (3% are considered large trucks that are almost all diesel-fueled). This is a relatively low fraction of diesel vehicles, when compared to urban freeways that can have up to 20% diesel powered vehicles. In the Air Quality and Landuse Handbook, CARB identified a typical freeway as having truck traffic of 10,000 to 20,000 trucks per day. U.S. 101 near the project has about 3,000 daily large truck trips, about 1/3rd to 1/6th the volumes of the roadways considered by CARB. Based on site-specific traffic levels alone, the siting of sensitive receptors near US 101 could be 1/3rd less than the CARB recommended criteria of 500 feet. In this case, it would be less than 335 feet.

In response to CARB's recommendation, Sonoma County's recent General Plan update requires analysis of health risks for projects near the U.S. 101 corridor:

Policy OSRC-16k: Require that discretionary projects involving sensitive receptors (facilities or land uses that include members of the population sensitive to the effects of air pollutants such as children, the elderly, and people with illnesses) proposed near the Highway 101 corridor include an analysis of mobile source toxic air contaminant health risks. Project review should, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.

In response to CARB guidance and the Sonoma County General Plan policy, a health risk assessment was performed to evaluate the cancer risks at the project site. The health risk involved prediction of vehicle emission rates, prediction of traffic levels, and dispersion modeling of emissions associated with US 101 traffic.

Emissions

Lower future vehicle emission rates that have been established by regulations through 2006 were taken into account in the analysis. Note that DPM emissions are anticipated to decrease in the future. CARB has been developing new regulations and emission standards since identifying DPM as a carcinogenic. Some of these requirements take time to provide substantial emission reductions. For example, new trucks would have considerably lower emission rates than older trucks, but older trucks will only slowly leave the vehicle fleet. Since this analysis assessed the risk of proposed hospital uses to future exposures, the lower future emissions were taken into account. The EMFAC2007 results were then adjusted to the traffic mix on US 101 reported by Caltrans. Emission factors were developed for 2014, 2020 and 2030, using the calculated mix of diesel-fueled vehicles.

CARB's diesel reduction plan includes proposed regulatory actions developed in 2000 that are intended to substantially decrease emissions of DPM. CARB has implemented many of the control measures outlined in the plan and many of those actions are reflected in the EMFAC2007 model runs. Future regulatory actions and additional measures not yet adopted that would lower emissions rates were not included. Such measures include a recent regulation to reduce DPM emissions from in-use on-road diesel-fueled vehicles, which requires truck fleet owners to either retrofit or phase out older engines over time. CARB predicts substantial short-term reductions in DPM as a result of this action.

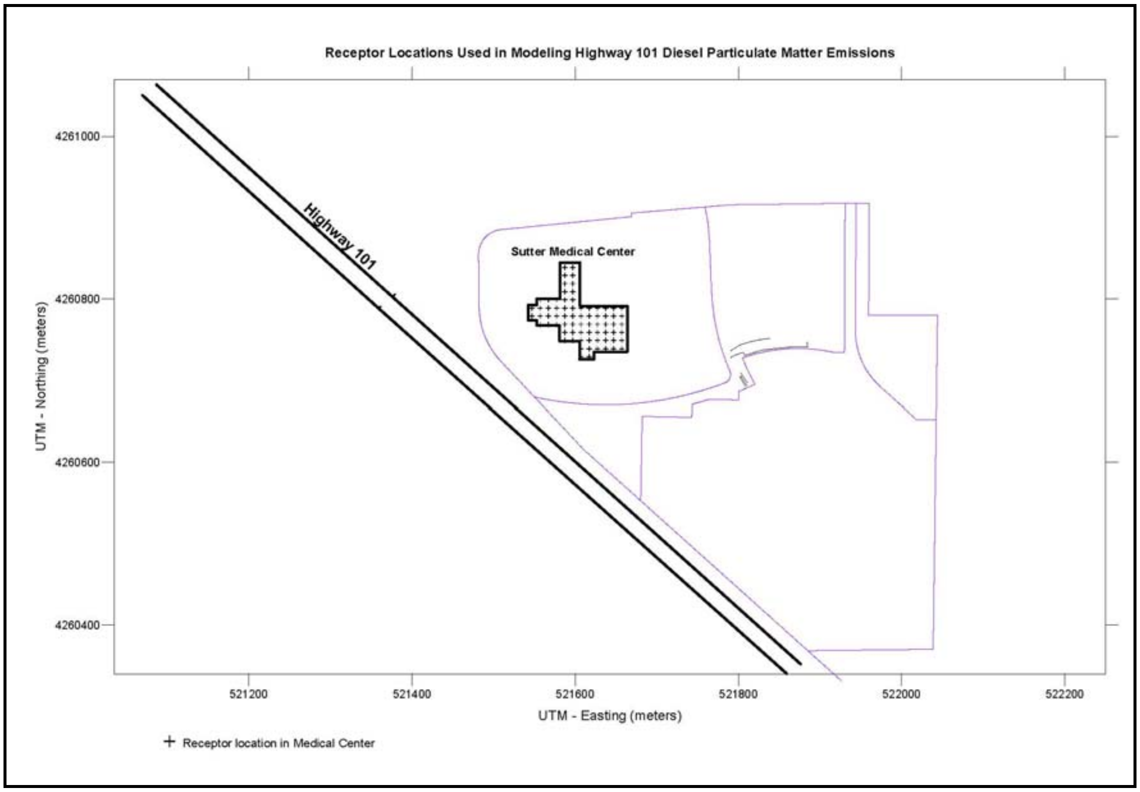
Traffic Levels

Future DPM emissions for traffic on US 101 were developed using the latest version of the CARB EMFAC2007 emission factor model with defaults for Sonoma County. Future traffic increases projected on US 101 were provided by Dowling and Associates.

Dispersion Model

Dispersion modeling was conducted using the Cal3qhcr model, which is acceptable to the BAAQMD for this type of analysis. A 4-year set of hourly meteorological data for the Sonoma County Airport was obtained from the BAAQMD's website and used in the modeling. The station, located one mile south-southwest of the project site, is considered to have metrological conditions that are reasonably representative of the project site. Figure 2 shows US 101 and the modeled hospital receptors. Other inputs to the model included geometry (based on site plans), current traffic conditions reported by Caltrans for US 101, and the DPM emission factors obtained from the EMFAC 2007 model. Inputs along with computed results at receptors are contained in Attachment 1.

Figure 2. US 101 and Project Hospital Receptors



Cancer Risk

The maximum-modeled annual concentrations at the hospital resulting from US 101 traffic would be 0.12 µg/m^3 of DPM, annualized for 2014. This concentration would decrease to 0.08 µg/m^3 in 2020 and 0.06 µg/m^3 in 2030 as emission rates from traffic decrease. The California Office Of Environmental Health Hazard Assessment (OEHHA) does not have recommendations for determining hospital patient cancer risks. Hospital patients tend to spend relatively short periods at the hospital and their time is spent mostly indoors. Therefore, this assessment considered two different exposures: a continuous exposure of a hospital patient for one year (using 2014 emission rates and traffic) and a worker exposure for workers who would work at the hospital and live off-site for 40 years (beginning with 2014 emission rates and traffic).

The highest modeled DPM concentrations and associated health risk were considered for this impact evaluation. Over the course of a 1-year continuous exposure during the first year of hospital operation, the incremental risk is calculated at 0.6 excess cancer cases per for a hospital patient. This is based on highway traffic DPM emissions during 2014. Because highway DPM emissions are anticipated by the EMFAC2007 model to decrease, cancer risk for future years would be less. A worker continuously exposed at this location would have a cancer risk of 4.5 excess cancer cases. The DPM concentrations decrease at positions further from the freeway. It should be clearly noted that these risks are based on outdoor exposures. The indoor risks, especially those inside a hospital, would be less.

On-Site Sources

The project would include DPM emissions from routine testing of emergency power generators and truck deliveries. Emissions and dispersion modeling of these sources were conducted to predict the impact to the project (i.e., hospital). This assessment was similar to that conducted for off-site residential uses. The difference for this impact is that the 4-year meteorological data set obtained from the BAAQMD was used. Results of this assessment show that on-site sources would have a negligible effect on the overall cancer risk predicted for the hospital uses. The cancer risks reported above include the contribution of these sources.

Other Factors Not Considered

The predicted cancer risk is based on outdoor exposures. Patients and workers at the hospital would spend most of their time indoors. While building codes for hospitals require operable windows, most indoor air would be provided through air handling systems. Natural ventilation through windows or other openings such as louvers is considered as supplemental to the required mechanical ventilation systems. Filtration is required in hospital mechanical ventilation systems. CARB estimates a $1/3^{rd}$ reduction in cancer risk between outdoor and indoor air in a residence. This reduction would be greater in a hospital, since most indoor air is mechanically supplied and conditioned with filtration. Also, air intakes are usually located on the rooftops, which have lower exposure than near the ground. Predicted DPM concentrations for this assessment were predicted near ground level, since details of the proposed project mechanical ventilation system were not available.

These results show that a hospital patient exposed continuously for one year or a worker exposed continuously while working at the hospital for 40 years would have incremental cancer risks from US 101 traffic that would be less than ten in one million. This would be below the BAAQMD cancer risk criteria contained in their CEQA Guidelines. The BAAQMD considers an incremental cancer risk of 10 in one million or greater as a significant impact. As a result, this impact would be *less than significant*.

Air Quality. Would the project result in:	**Potential Significant Impact**	**Less Than Significant Impact With Mitigation Incorporation**	**Less Than Significant Impact**	**No Impact**
E. Create objectionable odors affecting number of people?	☐	☐	☐	☑

The project is not expected to be a source of objectionable odors that would affect the general public. Existing sources of odors that could affect the proposed project were not identified.

Cumulative Impacts

Construction of the proposed project would have a temporary significant impact to regional air quality in 2010 when haul trucks import material to the site. Mitigation measures to effectively reduce these emissions to less than significant levels cannot be identified. Typical daily operation of the project would have less than significant long-term impacts to air quality. The project would be required to test two generators for 8 hours in one day once per year. Testing on this one day a year would have NOx emissions that would be considered significant. However, if testing occurs outside of the ozone season (i.e., testing in the months November –April), then the emissions would not contribute to unhealthy air pollutant levels. As a result, those emissions could be mitigated. A project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact. As a result, the project would have a temporary significant cumulative impact to air quality when haul truck trips occur in 2010. Mitigation Measure 1 would reduce this impact, but not to a level of insignificance.

Appendix C3

Attachment for Environmental Air Quality Assessment:

Operational Emissions Calculations-2014

Operational Emissions Calculations-2014 (Proposed)

Operational Emissions Calculations-2014 (Standard)

Santa Rosa Sutter Hospital
Operational Emissions Calculations - 2014

Components:

162,000	Expanded Sutter Medical Center
100,000	Physicians Medical Center
80,000	Medical Office Building

Daily Emissions (lbs/day)	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	2.00	0.04	0.01	0.01	
Operational	31.4	33.51	34.85	7.31	
Emergency Generator Emissions					
5-minute testing of 2 generators	0.1	4.0	0.02	0.02	377.0
30-minute testing of 2 generators	0.5	24.2	0.1	0.15	2261.9
8-hour testing of 2 Generators	8.6	386.7	2.3	2.33	36190.7
Natural Gas Consumption					
	0.70	9.61	0.02	0.02	
Total Daily Emissions (lbs/day)	**ROG**	**NOx**	**PM10**	**PM2.5**	
No Generator Testing	34.1	43.2	34.9	7.3	
5-min. Generator testing	34.2	47.2	34.9	7.4	
30-min. Generator testing	34.6	67.3	35.0	7.5	
8-hour Generator testing	42.7	429.9	37.2	9.7	

Annual Emissions (tons/year)	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	0.39	0.00	0.00	0.00	0.51
Operational	5.99	7.14	6.36	1.33	6493.4
Emergency Generator Emissions					
Annual generator testing	0.01	0.44	0.00	0.00	41.47
Electricity Consumption					
					2047.27
Natural Gas Consumption					
	0.13	1.75	0.00	0.00	1043.39
	ROG	**NOx**	**PM10**	**PM2.5**	**CO_2**
Annual Daily Emissions (tons/year)	**6.52**	**9.34**	**6.37**	**1.34**	

9,626

Natural Gas Consumption

Annual consumption rate of

178,387 therms = 17,403,610 ft^3

where 1 therm = 100,000 btu and 1,025 btu = 1 ft3.

Emission Rates[1,2]

ROG	7.26	lbs/million ft^3
NOx	100.00	lbs/million ft^3
PM	0.18	lbs/million ft^3
CO2	119905.00	lbs/million ft^3

Notes:
1 ROG, NOx and PM emission rates from URBEMIS2007
2 CO2 emission rates from California Action Registry Reporting Protoco
Rate = 53.06 kg CO2/mbtu = 116.98 lbsCO2/mbtu
= 0.1199 lbs/ft^3

Electricity Consumption

Annual consumption rate of

7,814,016 kW hrs

Emission Rates[3]

CO2 0.524 lbs/kW hr

Notes: 3 CO2 emission rate from PG&E's carbon footpront calculator
http://www.pge.com/myhome/environment/calculator/assumptions.shtml

Santa Rosa Sutter Hospital
Mitigated Operational Emissions Calculations - 2014

Components:

162,000 Expanded Sutter Medical Center
100,000 Physicians Medical Center
80,000 Medical Office Building

Daily Emissions (lbs/day)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	2.00	0.04	0.01	0.01	
Operational	31.4	33.51	34.85	7.31	
Emergency Generator Emissions					
5-minute testing of 2 generators	0.1	4.0	0.02	0.02	377.0
30-minute testing of 2 generators	0.5	24.2	0.1	0.15	2261.9
8-hour testing of 2 Generators	8.6	386.7	2.3	2.33	36190.7
Natural Gas Consumption					
	0.70	9.61	0.02	0.02	

Total Daily Emissions (lbs/day)	**ROG**	**NOx**	**PM10**	**PM2.5**
No Generator Testing	34.1	43.2	34.9	7.3
5-min. Generator testing	34.2	47.2	34.9	7.4
30-min. Generator testing	34.6	67.3	35.0	7.5
8-hour Generator testing	42.7	429.9	37.2	9.7

Annual Emissions (tons/year)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	0.39	0.00	0.00	0.00	0.51
Operational	5.69	6.78	6.04	1.26	6168.73
Emergency Generator Emissions					
Annual generator testing	0.01	0.44	0.00	0.00	41.47
Electricity Consumption					
					1708.39
Natural Gas Consumption					
	0.13	1.75	0.00	0.00	639.51

	ROG	**NOx**	**PM10**	**PM2.5**	**CO_2**
Annual Daily Emissions (tons/year)	**6.22**	**8.98**	**6.05**	**1.27**	

8,559

Natural Gas Consumption

Annual consumption rate of

109,337 therms = 10,667,024 ft^3

where 1 therm = 100,000 btu and 1,025 btu = 1 ft3.

Emission Rates[1,2]

ROG	7.26	lbs/million ft^3
NOx	100.00	lbs/million ft^3
PM	0.18	lbs/million ft^3
CO2	119905.00	lbs/million ft^3

Notes:
1 ROG, NOx and PM emission rates from URBEMIS2007
2 CO2 emission rates from California Action Registry Reporting Protoco
Rate = 53.06 kg CO2/mbtu = 116.98 lbsCO2/mbtu
= 0.1199 lbs/ft^3

Electricity Consumption

Annual consumption rate of

6,520,577 kW hrs

Emission Rates[3]

CO2 0.524 lbs/kW hr

Notes: 3 CO2 emission rate from PG&E's carbon footpront calculator
http://www.pge.com/myhome/environment/calculator/assumptions.shtml

Operational Emissions

Reduced by 5% for Trip Reduction Measures

Santa Rosa Sutter Hospital
Construction Emissions Calculations

Components:

162,000 Expanded Sutter Medical Center
100,000 Physicians Medical Center
80,000 Medical Office Building

	ROG	NOx	$PM10_{exhaust}$	$PM10_{total}$	CO_2
Import Fill Material 2011					
Import Fill Material (tons)	0.33	4.27	0.14	4.28	527.52
Per Day (lbs./day) =	18	240	8	240	29,595
Hospital Campus Construction Activity from URBEMIS2007					
2012 Totals (tons)	0.22	1.76	0.1	1.84	186.36
2013 Totals (tons)	3.97	1.4	0.1	0.1	361.96
Roadway Construction from RoadwayConstruction Model					
2011 Totals (tons)	0.28	2.12	0.11	0.39	201.26
Export Fill Material 2013					
Import Fill Material (tons)	0.08	1.05	0.03	1.28	159.75
Per Day (lbs./day) =	2	22	1	27	3,429

Annual Total Emissions	**ROG**	**NOx**	**$PM10_{exhaust}$**	**$PM10_{total}$**	**CO_2**
2011 =	**0.61**	**6.39**	**0.25**	**4.67**	**728.79**
2012 =	**0.22**	**1.76**	**0.10**	**1.84**	**186.36**
2013 =	**4.05**	**2.45**	**0.13**	**1.38**	**521.71**

Import fill material based on large trucks that import 7,130 loads of material and have a one-way trip length of 15 miles. EMFAC2007 was used to calculate 2011 year emission rates for 30 mph. The calcualtions wer updated to reflect import fill of 100,000 cy (8,695

EMFAC2007 Rates grams per mile

ROGe	NOx	CO2	PM10	PM10e	PM10t	PM10b	PM10ent
1.14	14.87	1836.28	14.89	0.49	0.03	0.03	14.344

7130 loads = 82000
8695 loads = 100000

Entrained Roadway Dust Emissions

$E= k(sL/2)^{0.65} * (W/3)^{1.5}$

Loaded	Unloaded			
		Loaded =	40	tons
		Unloaded =	10	tons
		silt Loading	0.035	gm/mile
0.056	0.007 lbs/mi	k =	0.016	

Roadway Construction Model v6.3-1 with default values assuming 0.5 miles and 5 acres of construction.

Export fill material based on large trucks that import 2,609 loads of material and have a one-way trip length of 15 miles. EMFAC2007 was used to calculate 2013 year emission rates for 30 mph. The calcualtions wer updated to reflect export fill of 30,000 cy (2,609 loads).

EMFAC2007 Rates grams per mile (2011-14)

ROGe	NOx	CO2	PM10	PM10e	PM10t	PM10b	PM10ent
0.96	12.13	1853.28	14.79	0.39	0.03	0.03	14.34

2609 loads = 30000 cy
15 loads per day assumming =

EMFAC2007 Rates grams per mile (2014)

ROGe	NOx	CO2	PM10	PM10e	PM10t	PM10b	PM10ent
0.78	9.39	1870.29	14.70	0.29	0.04	0.03	14.344

Road Construction Emissions Model, Version 6.3.1

Emission Estimates for -> Mark West Springs Road Widening Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)
Grubbing/Land Clearing	4.2	18.1	34.8	6.5	1.5	5.0	2.4	1.4	1.0	3,205.6
Grading/Excavation	4.8	19.9	37.4	6.9	1.9	5.0	2.8	1.7	1.0	3,628.3
Drainage/Utilities/Sub-Grade	4.2	16.6	31.9	6.7	1.7	5.0	2.6	1.6	1.0	2,976.3
Paving	2.8	8.9	14.5	1.3	1.3	-	1.2	1.2	-	1,244.0
Maximum (pounds/day)	4.8	19.9	37.4	6.9	1.9	5.0	2.8	1.7	1.0	3,628.3
Total (tons/construction project)	0.3	1.1	2.1	0.4	0.1	0.3	0.2	0.1	0.1	201.3

Notes:

Project Start Year -> 2011
Project Length (months) -> 6
Total Project Area (acres) -> 5
Maximum Area Disturbed/Day (acres) -> 1
Total Soil Imported/Exported (yd^3/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Mark West Springs Road Widening Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)
Grubbing/Land Clearing	1.9	8.2	15.8	3.0	0.7	2.3	1.1	0.6	0.5	1,457.1
Grading/Excavation	2.2	9.1	17.0	3.1	0.9	2.3	1.3	0.8	0.5	1,649.2
Drainage/Utilities/Sub-Grade	1.9	7.5	14.5	3.0	0.8	2.3	1.2	0.7	0.5	1,352.9
Paving	1.3	4.1	6.6	0.6	0.6	-	0.5	0.5	-	565.4
Maximum (kilograms/day)	2.2	9.1	17.0	3.1	0.9	2.3	1.3	0.8	0.5	1,649.2
Total (megagrams/construction project)	0.3	1.0	1.9	0.4	0.1	0.3	0.1	0.1	0.1	182.5

Notes:

Project Start Year -> 2011
Project Length (months) -> 6
Total Project Area (hectares) -> 2
Maximum Area Disturbed/Day (hectares) -> 0
Total Soil Imported/Exported ($meters^3$/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sume of exhaust and fugitive dust emissions shown in columns K and L.

SUTTER HOSPITAL EMERGENCY GENERATOR
ESTIMATED EMISSIONS FROM 1500 KILOWATT EMERGENCY DIESEL-FUELED GENERATOR

Caterpillar 3512C Tier 2 Diesel Engine

Number of Engines	1						
Engine Horsepower (hp)	2206	standby					
Generator output (kW)	1500	standby					
Fuel Consumption Diesel (Gal/hr)	104.8						
Heat Content Diesel (Btu/gal)	138,500						
Heat Rate (Btu/hr)	14,514,800						
Sulfur Content - Diesel (%)	0.0015		Annual	1100	minutes	18.3	hours
Typical testing	0.08		Daily	5	minutes	0.08	hours
Maximum daily testing	8.0		Max Daily	480	minutes	8.0	hours
Days per Year Operation	18.3		Monthly	30	minutes	0.5	hours
Annual Hours Operation	18.3						

Pollutant	Emission Factor (g/hp-hr)	Emission Per Engine (lb/hr)	Emission Per Engine (g/s)	Annualized[a] Emission Rate (g/s)	Testing[b] Emission Per Engine (lb/day)	Maximum[c] Emission Per Engine (lb/day)	Testing Emission Per Engine (lb/yr)	Testing Emission Per Engine (ton/yr)
Nitrogen Oxides[d]	4.97	24.17	3.05	0.006374	2.01	193.37	443.14	0.222
Carbon Monoxide[d]	0.45	2.19	0.28	-	0.18	17.51	40.12	0.020
HC[d]	0.11	0.53	0.07	-	0.04	4.28	9.81	0.005
Diesel Particulate Matter[d]	0.030	0.15	0.02	0.000038	0.01	1.17	2.67	0.001
Sulfur Dioxide[e]	0.01	0.03	0.003	0.000007	0.002	0.21	0.49	0.0002
CO_2[d]		2262	285.0	-	188.49	18095	41468.53	20.73

Notes:
General: Emissions assume 1/2 hour testing per week
[a] Calculated as total annual emissions divided by 8,760 hours per year.
[b] Daily emissions based on typical testing hours per day
[c] Emissions calculated based on hours of maximum daily testing
[d] Emission factors based on manufacturer data
[e] SO2 emission factor from Chapter 3, Table3.4-1 of EPA AP-42, Compilation of Air Pollutant Emission Factors

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: U:\I&R Docs\2004\04-135 Sutter Hosp. Luther Burbank Center\AQ Stuff\Revised AQ Modeling\Updated Construction102309.urb924

Project Name: Sutter Santa Rosa - Sutter Hospital, Physicians Hospital and Medical Office Bldng.

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.22	1.76	1.75	0.09	1.84	0.37	0.08	0.45	186.36
2013 TOTALS (tons/year unmitigated)	3.97	1.40	0.01	0.09	0.10	0.00	0.08	0.08	361.96

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.39	0.00	0.00	0.00	0.51
TOTALS (tons/year, mitigated)	0.39	0.00	0.00	0.00	0.51
Percent Reduction	0.00	NaN	NaN	NaN	0.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	5.99	7.14	6.36	1.33	6,492.79

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	6.38	7.14	6.36	1.33	6,493.30

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2012	0.22	1.76	1.75	0.09	1.84	0.37	0.08	0.45	186.36
Mass Grading 04/30/2012-06/15/2012	0.17	1.40	1.75	0.07	1.82	0.37	0.06	0.43	146.84
Mass Grading Dust	0.00	0.00	1.75	0.00	1.75	0.37	0.00	0.37	0.00
Mass Grading Off Road Diesel	0.17	1.40	0.00	0.07	0.07	0.00	0.06	0.06	142.82
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.02
Asphalt 06/30/2012-07/30/2012	0.03	0.18	0.00	0.02	0.02	0.00	0.01	0.01	19.54
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.17	0.00	0.01	0.01	0.00	0.01	0.01	14.89
Paving On Road Diesel	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.23
Paving Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.41
Trenching 07/21/2012-08/21/2012	0.02	0.17	0.00	0.01	0.01	0.00	0.01	0.01	19.98
Trenching Off Road Diesel	0.02	0.17	0.00	0.01	0.01	0.00	0.01	0.01	18.86
Trenching Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
2013	3.97	1.40	0.01	0.09	0.10	0.00	0.08	0.08	361.96
Building 01/11/2013-08/22/2013	0.31	1.40	0.01	0.09	0.10	0.00	0.08	0.08	357.59
Building Off Road Diesel	0.24	1.15	0.00	0.08	0.08	0.00	0.07	0.07	134.72
Building Vendor Trips	0.01	0.15	0.00	0.01	0.01	0.00	0.01	0.01	44.17
Building Worker Trips	0.06	0.10	0.01	0.00	0.01	0.00	0.00	0.01	178.70
Coating 08/08/2013-12/31/2013	3.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.36
Architectural Coating	3.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.36

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Phase Assumptions

Phase: Mass Grading 4/30/2012 - 6/15/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 55

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

2 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

1 Sweepers/Scrubbers (91 hp) operating at a 0.68 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 7/21/2012 - 8/21/2012 - Defaul trenching

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 6/30/2012 - 7/30/2012 - Default Paving Description

Acres to be Paved: 3.92

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/11/2013 - 8/22/2013 - Default Building Construction Description

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 8/8/2013 - 12/31/2013 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas					
Hearth	0.00	0.00	0.00	0.00	0.00
Landscape	0.02	0.00	0.00	0.00	0.51
Consumer Products	0.00				
Architectural Coatings	0.37				
TOTALS (tons/year, unmitigated)	0.39	0.00	0.00	0.00	0.51

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Area Source Mitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Mitigated

Source	ROG	NOx	PM10	PM2.5	CO2
Natural Gas					
Hearth	0.00	0.00	0.00	0.00	0.00
Landscape	0.02	0.00	0.00	0.00	0.51
Consumer Products	0.00				
Architectural Coatings	0.37				
TOTALS (tons/year, mitigated)	0.39	0.00	0.00	0.00	0.51

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	PM10	PM25	CO2
Medical office building	1.99	2.43	2.16	0.45	2,202.55
Hospital	4.00	4.71	4.20	0.88	4,290.24
TOTALS (tons/year, unmitigated)	5.99	7.14	6.36	1.33	6,492.79

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Season: Annual

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Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Medical office building		21.70	1000 sq ft	80.00	1,736.00	13,020.87
Hospital		12.23	1000 sq ft	262.00	3,204.26	25,273.60
					4,940.26	38,294.47

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.7	0.4	99.2	0.4
Light Truck < 3750 lbs	18.1	1.1	93.9	5.0
Light Truck 3751-5750 lbs	20.0	0.5	99.0	0.5
Med Truck 5751-8500 lbs	7.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.8	0.0	72.2	27.8
Lite-Heavy Truck 10,001-14,000 lbs	1.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.2	0.0	16.7	83.3
Heavy-Heavy Truck 33,001-60,000 lbs	0.2	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.5	51.1	48.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Medical office building				7.0	3.5	89.5
Hospital				25.0	12.5	62.5

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: U:\I&R Docs\2004\04-135 Sutter Hosp. Luther Burbank Center\AQ Stuff\Revised AQ Modeling\Updated Construction102309.urb924

Project Name: Sutter Santa Rosa - Sutter Hospital, Physicians Hospital and Medical Office Bldng.

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (lbs/day unmitigated)	9.60	80.23	43.13	0.01	100.01	3.75	103.76	20.89	3.45	24.33	8,390.70
2013 TOTALS (lbs/day unmitigated)	74.30	17.56	35.50	0.03	0.13	1.09	1.22	0.05	0.99	1.04	4,553.83

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	2.25	0.04	3.09	0.00	0.01	0.01	5.62
TOTALS (lbs/day, mitigated)	2.20	0.03	2.47	0.00	0.01	0.01	5.62
Percent Reduction	2.22	25.00	20.06	NaN	0.00	0.00	0.00

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	31.64	33.50	362.93	0.36	34.83	7.31	37,219.50

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	33.89	33.54	366.02	0.36	34.84	7.32	37,225.12

Both Area and Operational Mitigation must be turned on to get a combined mitigated total.

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 4/30/2012-6/15/2012 Active Days: 35	9.60	80.23	43.13	0.00	**100.01**	3.75	103.76	**20.89**	3.45	24.33	**8,390.70**
Mass Grading 04/30/2012- 06/15/2012	9.60	80.23	43.13	0.00	100.01	3.75	103.76	20.89	3.45	24.33	8,390.70
Mass Grading Dust	0.00	0.00	0.00	0.00	100.00	0.00	100.00	20.88	0.00	20.88	0.00
Mass Grading Off Road Diesel	9.52	80.10	40.66	0.00	0.00	3.74	3.74	0.00	3.44	3.44	8,161.21
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.08	0.14	2.47	0.00	0.01	0.01	0.02	0.00	0.01	0.01	229.49
Time Slice 7/2/2012-7/20/2012 Active Days: 15	3.28	17.50	12.92	0.00	0.02	1.45	1.47	0.01	1.34	1.34	1,860.59
Asphalt 06/30/2012-07/30/2012	3.28	17.50	12.92	0.00	0.02	1.45	1.47	0.01	1.34	1.34	1,860.59
Paving Off-Gas	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.65	16.20	10.06	0.00	0.00	1.41	1.41	0.00	1.29	1.29	1,418.44
Paving On Road Diesel	0.08	1.16	0.38	0.00	0.01	0.04	0.05	0.00	0.04	0.04	212.66
Paving Worker Trips	0.08	0.14	2.47	0.00	0.01	0.01	0.02	0.00	0.01	0.01	229.49
Time Slice 7/23/2012-7/30/2012 Active Days: 6	5.12	32.81	22.03	0.01	0.02	2.19	2.21	0.01	2.01	2.02	3,677.23
Asphalt 06/30/2012-07/30/2012	3.28	17.50	12.92	0.00	0.02	1.45	1.47	0.01	1.34	1.34	1,860.59
Paving Off-Gas	0.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.65	16.20	10.06	0.00	0.00	1.41	1.41	0.00	1.29	1.29	1,418.44
Paving On Road Diesel	0.08	1.16	0.38	0.00	0.01	0.04	0.05	0.00	0.04	0.04	212.66
Paving Worker Trips	0.08	0.14	2.47	0.00	0.01	0.01	0.02	0.00	0.01	0.01	229.49
Trenching 07/21/2012-08/21/2012	1.84	15.30	9.11	0.00	0.00	0.74	0.74	0.00	0.68	0.68	1,816.63
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.04	0.06	1.10	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.99

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Time Slice 7/31/2012-8/21/2012 Active Days: 16	1.84	15.30	9.11	0.00	0.00	0.74	0.74	0.00	0.68	0.68	1,816.63
Trenching 07/21/2012-08/21/2012	1.84	15.30	9.11	0.00	0.00	0.74	0.74	0.00	0.68	0.68	1,816.63
Trenching Off Road Diesel	1.80	15.24	8.01	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,714.64
Trenching Worker Trips	0.04	0.06	1.10	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.99
Time Slice 1/11/2013-8/7/2013 Active Days: 149	3.83	17.51	34.67	0.03	0.13	1.08	1.21	0.05	0.99	1.04	4,469.93
Building 01/11/2013-08/22/2013	3.83	17.51	34.67	0.03	0.13	1.08	1.21	0.05	0.99	1.04	4,469.93
Building Off Road Diesel	2.95	14.37	10.59	0.00	0.00	0.95	0.95	0.00	0.88	0.88	1,684.06
Building Vendor Trips	0.16	1.93	1.92	0.01	0.02	0.07	0.09	0.01	0.07	0.07	552.08
Building Worker Trips	0.72	1.21	22.17	0.02	0.11	0.06	0.17	0.04	0.05	0.09	2,233.79
Time Slice 8/8/2013-8/22/2013 Active Days: 11	**74.30**	17.56	35.50	**0.03**	0.13	1.09	1.22	0.05	0.99	1.04	4,553.83
Building 01/11/2013-08/22/2013	3.83	17.51	34.67	0.03	0.13	1.08	1.21	0.05	0.99	1.04	4,469.93
Building Off Road Diesel	2.95	14.37	10.59	0.00	0.00	0.95	0.95	0.00	0.88	0.88	1,684.06
Building Vendor Trips	0.16	1.93	1.92	0.01	0.02	0.07	0.09	0.01	0.07	0.07	552.08
Building Worker Trips	0.72	1.21	22.17	0.02	0.11	0.06	0.17	0.04	0.05	0.09	2,233.79
Coating 08/08/2013-12/31/2013	70.47	0.05	0.83	0.00	0.00	0.00	0.01	0.00	0.00	0.00	83.90
Architectural Coating	70.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.03	0.05	0.83	0.00	0.00	0.00	0.01	0.00	0.00	0.00	83.90
Time Slice 8/23/2013-12/31/2013 Active Days: 93	70.47	0.05	0.83	0.00	0.00	0.00	0.01	0.00	0.00	0.00	83.90
Coating 08/08/2013-12/31/2013	70.47	0.05	0.83	0.00	0.00	0.00	0.01	0.00	0.00	0.00	83.90
Architectural Coating	70.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.03	0.05	0.83	0.00	0.00	0.00	0.01	0.00	0.00	0.00	83.90

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Phase Assumptions

Phase: Mass Grading 4/30/2012 - 6/15/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 55

Maximum Daily Acreage Disturbed: 5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

2 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

1 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

2 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

1 Sweepers/Scrubbers (91 hp) operating at a 0.68 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Trenching 7/21/2012 - 8/21/2012 - Defaul trenching

Off-Road Equipment:

2 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Other General Industrial Equipment (238 hp) operating at a 0.51 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 0 hours per day

Phase: Paving 6/30/2012 - 7/30/2012 - Default Paving Description

Acres to be Paved: 3.92

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/11/2013 - 8/22/2013 - Default Building Construction Description

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 6 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 8/8/2013 - 12/31/2013 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas							
Hearth - No Summer Emissions							
Landscape	0.25	0.04	3.09	0.00	0.01	0.01	5.62
Consumer Products	0.00						
Architectural Coatings	2.00						
TOTALS (lbs/day, unmitigated)	2.25	0.04	3.09	0.00	0.01	0.01	5.62

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Area Source Mitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas							
Hearth - No Summer Emissions							
Landscape	0.20	0.03	2.47	0.00	0.01	0.01	5.62
Consumer Products	0.00						
Architectural Coatings	2.00						
TOTALS (lbs/day, mitigated)	2.20	0.03	2.47	0.00	0.01	0.01	5.62

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Medical office building	10.35	11.41	122.16	0.12	11.84	2.48	12,627.26
Hospital	21.29	22.09	240.77	0.24	22.99	4.83	24,592.24
TOTALS (lbs/day, unmitigated)	31.64	33.50	362.93	0.36	34.83	7.31	37,219.50

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2014 Temperature (F): 85 Season: Summer

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Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Medical office building		21.70	1000 sq ft	80.00	1,736.00	13,020.87
Hospital		12.23	1000 sq ft	262.00	3,204.26	25,273.60
					4,940.26	38,294.47

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.7	0.4	99.2	0.4
Light Truck < 3750 lbs	18.1	1.1	93.9	5.0
Light Truck 3751-5750 lbs	20.0	0.5	99.0	0.5
Med Truck 5751-8500 lbs	7.3	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.8	0.0	72.2	27.8
Lite-Heavy Truck 10,001-14,000 lbs	1.0	0.0	50.0	50.0
Med-Heavy Truck 14,001-33,000 lbs	1.2	0.0	16.7	83.3
Heavy-Heavy Truck 33,001-60,000 lbs	0.2	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.5	51.1	48.9	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Medical office building				7.0	3.5	89.5
Hospital				25.0	12.5	62.5

Santa Rosa Sutter Hospital
Operational Emissions Calculations - 2014

Components:

162,000 Sutter Medical Center
100,000 Physicians Medical Center
80,000 Medical Office Building

Daily Emissions (lbs/day)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	2.00	0.04	0.01	0.01	
Operational	31.4	33.51	34.85	7.31	
Emergency Generator Emissions					
5-minute testing of 2 generators	0.1	4.0	0.02	0.02	377.0
30-minute testing of 2 generators	0.5	24.2	0.1	0.15	2261.9
8-hour testing of 2 Generators	8.6	386.7	2.3	2.33	36190.7
Natural Gas Consumption					
	0.70	9.61	0.02	0.02	

Total Daily Emissions (lbs/day)	**ROG**	**NOx**	**PM10**	**PM2.5**
No Generator Testing	34.1	43.2	34.9	7.3
5-min. Generator testing	34.2	47.2	34.9	7.4
30-min. Generator testing	34.6	67.3	35.0	7.5
8-hour Generator testing	42.7	429.9	37.2	9.7

Annual Emissions (tons/year)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	0.36	0.00	0.00	0.00	0.51
Operational	5.96	7.14	6.36	1.33	6494.18
Emergency Generator Emissions					
Annual generator testing	0.01	0.44	0.00	0.00	41.47
Electricity Consumption					
					1708.39
Natural Gas Consumption					
	0.13	1.75	0.00	0.00	639.51

	ROG	**NOx**	**PM10**	**PM2.5**	**CO_2**
Annual Daily Emissions (tons/year)	**6.46**	**9.34**	**6.37**	**1.34**	

8,884

Natural Gas Consumption

Annual consumption rate of

109,337 therms = 10,667,024 ft^3

where 1 therm = 100,000 btu and 1,025 btu = 1 ft3.

Emission Rates[1,2]

ROG	7.26	lbs/million ft^3
NOx	100.00	lbs/million ft^3
PM	0.18	lbs/million ft^3
CO2	119905.00	lbs/million ft^3

Notes:
1 ROG, NOx and PM emission rates from URBEMIS2007

2 CO2 emission rates from California Action Registry Reporting Protocol
Rate = 53.06 kg CO2/mbtu = 116.98 lbsCO2/mbtu
= 0.1199 lbs/ft^3

Electricity Consumption

Annual consumption rate of

6,520,577 kW hrs

Emission Rates[3]

CO2 0.524 lbs/kW hr

Notes: 3 CO2 emission rate from PG&E's carbon footpront calculator
http://www.pge.com/myhome/environment/calculator/assumptions.shtml

Santa Rosa Sutter Hospital
Operational Emissions Calculations - 2014

Components:

162,000 Sutter Medical Center
100,000 Physicians Medical Center
80,000 Medical Office Building

Daily Emissions (lbs/day)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	2.00	0.04	0.01	0.01	
Operational	31.4	33.51	34.85	7.31	
Emergency Generator Emissions					
5-minute testing of 2 generators	0.1	4.0	0.02	0.02	377.0
30-minute testing of 2 generators	0.5	24.2	0.1	0.15	2261.9
8-hour testing of 2 Generators	8.6	386.7	2.3	2.33	36190.7
Natural Gas Consumption					
	0.70	9.61	0.02	0.02	

Total Daily Emissions (lbs/day)	**ROG**	**NOx**	**PM10**	**PM2.5**
No Generator Testing	34.1	43.2	34.9	7.3
5-min. Generator testing	34.2	47.2	34.9	7.4
30-min. Generator testing	34.6	67.3	35.0	7.5
8-hour Generator testing	42.7	429.9	37.2	9.7

Annual Emissions (tons/year)

	ROG	NOx	PM10	PM2.5	CO_2
From URBEMIS					
Area	0.36	0.00	0.00	0.00	0.51
Operational	5.96	7.14	6.36	1.33	6494.18
Emergency Generator Emissions					
Annual generator testing	0.01	0.44	0.00	0.00	41.47
Electricity Consumption					
					2047.27
Natural Gas Consumption					
	0.13	1.75	0.00	0.00	1043.39

	ROG	**NOx**	**PM10**	**PM2.5**	**CO_2**
Annual Daily Emissions (tons/year)	**6.46**	**9.34**	**6.37**	**1.34**	

9,627

Natural Gas Consumption

Annual consumption rate of

178,387 therms = 17,403,610 ft^3

where 1 therm = 100,000 btu and 1,025 btu = 1 ft3.

Emission Rates[1,2]

ROG	7.26	lbs/million ft^3
NOx	100.00	lbs/million ft^3
PM	0.18	lbs/million ft^3
CO2	119905.00	lbs/million ft^3

Notes: 1 ROG, NOx and PM emission rates from URBEMIS2007

2 CO2 emission rates from California Action Registry Reporting Protocol
Rate = 53.06 kg CO2/mbtu = 116.98 lbsCO2/mbtu
= 0.1199 lbs/ft^3

Electricity Consumption

Annual consumption rate of

7,814,016 kW hrs

Emission Rates[3]

CO2 0.524 lbs/kW hr

Notes: 3 CO2 emission rate from PG&E's carbon footpront calculator
http://www.pge.com/myhome/environment/calculator/assumptions.shtml

Appendix C4

Sutter Hospital Air Pollution Emissions for Helicopter Operation

ILLINGWORTH & RODKIN, INC.
Acoustics • Air Quality

Memo

To: **Nadin Sponamore**

Cc: Cheri Velzy, URS

Date: **August 28, 2009**

From: **James A. Reyff**

Subject: **Sutter Hospital Air Pollutant Emissions for Helicopter Operations**

As requested, we calculated air pollutant (ROG, NOx and PM) and greenhouse gas (GHG) emissions associated with Sutter Hospital helicopter operations. The attached worksheet includes these emissions.

Helicopter emissions were calculated using published emissions factors for landing/takeoff operations (LTO) for a Bell 222 or similar helicopter[1]. The hospital was assumed to currently generate 200 annual helicopter trips. The number of helicopter trips is expected to increase to 240 trips per year. This increase would equate to about one additional trip per day. Helicopter trips are anticipated to be in the County and most new trips would come from outside of the County, Mendocino or Lake Counties. The project site lies relatively close to the boundaries of the San Francisco Bay Area air basin. As a result, average trip length for air pollutant emissions was assumed to be 15 miles for a one-way trip and 30 miles for a two-way trip (to and from the hospital). Travel speed was assumed to be 80 miles per hour. As a result, average daily emissions associated with helicopter operations are less than 1 pound of NOx or PM and about 1.6 pounds of ROG. These emissions are negligible when considering the overall burden to the air basin and were not added to the project-related emissions reported in the air quality analysis prepared to support the DEIR. In addition, most of these emissions are and will continue to occur on the air basin.

GHG emissions were computed for existing and future helicopter operations, for operations within and outside of the air basin. Currently, annual helicopter operations are estimated to emit 516 tons of CO_2 per year. Future operations would emit 619 tons of CO_2 per year, a 103 ton per year increase.

[1] Guidance on Determination of Helicopter Emissions. Swiss Confederation, Federal Department of the Environment, Transport, Energy and Conservation. March 2009.

Helicopter Emissions

Annual Emissions

Condition	Flights per day	Travel Speed (mph)	Travel Distance (mi)	Fuel Use (kg/yr)	ROG (lb/yr)	NOx (lb/yr)	PM (lb/yr)
Existing	200	80	30	30,085	318.58	107.91	3.54
Proposed	240	80	30	36,102	382.29	129.50	4.24
Increase	***40***	***-***	***-***	***6017***	***63.7***	***21.6***	***0.7***

Daily Emissions

Condition	Flights per day	Travel Speed (mph)	Travel Distance (mi)	Fuel Use (kg/day)	ROG (lb/day)	NOx (lb/day)	PM (lb/day)
Increased Daily Emissions	***1***	***80***	***30***	***150***	***1.59***	***0.54***	***0.02***

GHG Emissions
Annual Emissions

Condition	Flights per day	Travel Speed (mph)	Travel Distance (mi)	Fuel Use (kg/yr)	Fuel Use (gal/yr)	CO2 Emission Factor (kg/gal)	Annual CO2 Emissions (kg/yr)	Annual CO2 Emissions (tons/yr)
Existing	200	80	200	150,360	49,036	9.57	469,275	516
Proposed	240	80	200	180,432	58,843	9.57	563,130	619
Increase	***40***	***-***	***-***	***30072***	***9807***	***-***	***93,855***	***103***

Emission Factors

	Landing/Takeoff Fuel Use and Emissions				Cruise Fuel Use and Emissions (one hour emissions)			
	Fuel (kg)	**ROG (g)**	**NOx (g)**	**PM (g)**	**Fuel (kg)**	**ROG (g)**	**NOx (g)**	**PM (g)**
Bell 222 Helicopter	44.3	722	244	8	283	1.38	1.98	0.059

Source: Guidance on Determination of Helicopter Emissions. Swiss Confederation, Federal Department of the Environment, Transport, Energy and Communications, March 2009

Assumptions:

Bell 222 or similar helicopter
1 landing and takeoff
Avergar travel speed of 80 mph
30 mi roundtrip travel
Fuel density = 6.76 lb/gal

Appendix C5

Global Climate Change

GLOBAL CLIMATE CHANGE

I. INTRODUCTION

This section discusses the existing global, national, and statewide conditions for greenhouse gases (GHG) and global climate change and evaluates the potential impacts on global climate from the implementation of the Proposed Project. The section also provides a discussion of the applicable federal, state, regional, and local agencies that regulate, monitor, and control GHG emissions. Copies of the modeling runs to estimate GHG emissions associated with the Proposed Project and supporting technical data are found in Appendix A.

The following sources were used to prepare this section:

- County of Sonoma General Plan 2020 and Final Environmental Impact Report (Sponamore Associates)
- California Air Pollution Control Officers Association's California Environmental Quality Act (CEQA) & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the CEQA
- California Climate Action Registry's General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas
- Governor's Office of Planning and Research (OPR) Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions

II. EXISTING ENVIRONMENT

1. Description of the Greenhouse Effect

Heat retention within the atmosphere is an essential process to sustain life on Earth. The natural process through which heat is retained in the troposphere[1] is called the "greenhouse effect." The greenhouse effect traps heat in the troposphere through a three-fold process as follows: Short-wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long-wave radiation; and GHGs in the upper atmosphere absorb this long-wave radiation and emit this long-wave radiation into space and toward the Earth. This "trapping" of the long-wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect. Without the greenhouse effect, the Earth's average temperature would be approximately -18 degrees Celsius (°C) (0° Fahrenheit [°F]) instead of its present 14 °C (57 °F) (National Climatic Data Center 2008). The most abundant GHGs are water vapor and carbon dioxide. Many other trace gases have greater ability to absorb and re-radiate long-wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each

[1] *The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers).*

GHG based on its ability to absorb and re-radiate long-wave radiation. The GWP of a gas is determined using carbon dioxide as the reference gas with a GWP of 1.

2. Greenhouse Gases

A. Primary Greenhouse Gases

Greenhouse gases include, but are not limited to, the following:[2]

1) Carbon dioxide (CO2). Carbon dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, the concentration of carbon dioxide in the atmosphere has increased 35 percent (US Environmental Protection Agency [US EPA] 2008b). Carbon dioxide is the most widely emitted GHG and is the reference gas (GWP of 1) for determining GWPs for other GHGs. In 2004, 83.8 percent of California's GHG emissions were carbon dioxide (California Energy Commission [CEC] 2006a).
2) Methane (CH4). Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane come from landfills, natural gas systems, and enteric fermentation (US EPA 2006b). Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 21.
3) Nitrous oxide (N2O). Nitrous oxide is produced by both natural and human-related sources. Primary human-related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of nitrous oxide is 310.
4) Hydrofluorocarbons (HFCs). HFCs are typically used as refrigerants for both stationary refrigeration and mobile air conditioning. The use of HFCs for cooling and foam blowing is growing as the continued phase-out of chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) gains momentum. The GWP of HFCs range from 140 for HFC-152a to 6,300 for HFC-236fa.
5) Perfluorocarbons (PFCs). Perfluorocarbons are compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. Perfluorocarbons are potent GHGs with a GWP several thousand times that of carbon dioxide, depending on the specific PFC. Another area of concern regarding PFCs is their long atmospheric lifetime (up to 50,000 years) (Energy Information Administration n.d.). The GWPs of PFCs range from 5,700 to 11,900.

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[2] *All GWPs are given as 100-year GWP. Unless noted otherwise, all GWPs were obtained from IPCC 1996.*

6) Sulfur hexafluoride. Sulfur hexafluoride is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride is the most potent GHG that has been evaluated by the Intergovernmental Panel on Climate Change (IPCC) with a GWP of 23,900. However, its global warming contribution is not as high as the GWP would indicate due to its low mixing ratio compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm]) (US EPA n.d.).

7) Water vapor (H2O). Although water vapor has not received the scrutiny of other GHGs, it is the primary contributor to the greenhouse effect. Water vapor and clouds contribute 66 to 85 percent of the greenhouse effect (water vapor alone contributes 36 to 66 percent) (Schmidt 2005). Natural processes such as evaporation from oceans and rivers and transpiration from plants contribute 90 percent and 10 percent of the water vapor in our atmosphere, respectively (US Geological Survey 2007). The primary human-related source of water vapor comes from fuel combustion in motor vehicles; however, this is not believed to contribute a substantial amount (less than 1 percent) to atmospheric concentrations of water vapor (Energy Information Administration 2008). Therefore, the control and reduction of water vapor emissions is not within reach of human actions. The IPCC has not determined a GWP for water vapor.

B. Other Greenhouse Gases

In addition to the six major GHGs discussed above (excluding water vapor), many other compounds have the potential to contribute to the greenhouse effect. Some of these substances were previously identified as stratospheric ozone depletors; therefore, their gradual phaseout is currently in effect. A few of these compounds are discussed below:

1) Hydrochlorofluorocarbons (HCFCs). HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, all developed countries that adhere to the protocol are subject to a consumption cap and gradual phase-out of HCFCs. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The GWPs of HCFCs range from 93 for HCFC-123 to 2,000 for HCFC-142b (US EPA 1996).

2) 1,1,1-trichloroethane. 1,1,1-trichloroethane or methyl chloroform is a solvent and degreasing agent commonly used by manufacturers. In 1992, the US EPA issued Final Rule 57 FR 33754 scheduling the phaseout of methyl chloroform by 2002 (US EPA 2007). Therefore, the threat posed by methyl chloroform as a GHG will diminish. Nevertheless, the GWP of methyl chloroform is 110 times that of carbon dioxide (US EPA 1996).

3) Chlorofluorocarbons (CFCs). CFCs are used as refrigerants, cleaning solvents, and aerosol spray propellants. CFCs were also part of the US EPA's Final Rule 57 FR 3374 for the phaseout of ozone depleting substances. Currently, CFCs have been replaced by HFCs in cooling

systems and a variety of alternatives for cleaning solvents. Nevertheless, CFCs remain suspended in the atmosphere, contributing to the greenhouse effect. CFCs are potent GHGs with GWPs ranging from 4,600 for CFC-11 to 14,000 for CFC-13 (US EPA 2006a).

4) Ozone. Ozone occurs naturally in the stratosphere where it is largely responsible for filtering harmful ultraviolet (UV) radiation. In the troposphere, ozone acts as a GHG by absorbing and re-radiating the infrared energy emitted by the Earth. As a result of the industrial revolution and rising emissions of oxides of nitrogen (NOX) and volatile organic compounds (VOCs) (ozone precursors), the concentrations of ozone in the troposphere have increased (IPCC 2008). Due to the short life span of ozone in the troposphere, its concentration and contribution as a GHG is not well established. However, the greenhouse effect of tropospheric ozone is considered small, as the radiative forcing[3] of ozone is 25 percent of that of carbon dioxide (IPCC 2007).

3. Contributions to Greenhouse Gas Emissions

A. Global

Anthropogenic GHG emissions worldwide as of 2005 (the latest year for which data are available for Annex 1 countries[4]) totaled approximately 30,800 CO2 equivalent million metric tons (MMTCO2E).[5] It should be noted that global emissions inventory data are not all from the same year and may vary depending on the source of the emissions inventory data (UNFCCC n.d.[a] and UNFCCC n.d.[b]).[6] Six countries and the European Community accounted for approximately 70 percent of the total global emissions (See Table 1, Six Top GHG Producer Countries and the European Community). The GHG emissions in more recent years may be substantially different than those shown in Table 1.

1) United States

As noted in Table 1, the United States was the top producer of greenhouse gas emissions as of 2005. Based on GHG emissions in 2004, six of the states—Texas, California, Pennsylvania, Ohio, Illinois, and Florida, in ranked order—would each rank among the top 30 GHG emitters internationally

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[3] *Radiative forcing, measured in Watts/m2, is an externally imposed perturbation (e.g., stimulated by greenhouse gases) in the radiative energy budget of the Earth's climate system (i.e., energy and heat retained in the troposphere minus energy passed to the stratosphere).*

[4] *Annex 1 countries are developed countries which have adopted greenhouse gas emission reduction obligations under the Kyoto Protocol.*

[5] *The CO2 equivalent emissions are commonly expressed as "million metric tons of carbon dioxide equivalent (MMTCO2E)" The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP, such that MMTCO2E = (million metric tons of a GHG) x (GWP of the GHG). For example, the GWP for methane is 21. This means that emissions of one million metric tons of methane are equivalent to emissions of 21 million metric tons of CO2.*

[6] *The global emissions are the sum of Annex I and non-Annex I countries without counting Land-Use, Land-Use Change and Forestry (LULUCF). For countries that 2004 data were unavailable, the UNFCCC data for the most recent year were used.*

(World Resources Institute 2006). The primary greenhouse gas emitted by human activities in the United States was CO2, representing approximately 84 percent of total greenhouse gas emissions (US EPA 2008b). Carbon dioxide from fossil fuel combustion, the largest source of US greenhouse gas emissions, accounted for approximately 80 percent of US GHG emissions (US EPA 2008b).

Table 1
Six Top GHG Producer Countries and the European Community

Emitting Countries	GHG Emissions ($MMTCO_2E$)*
United States	7,241.5
China	4,882.7
European Community	4,192.6
Russian Federation	2,132.5
India	1,606.5
Japan	1,359.9
Germany	1,001.5
Total	21,415.7

2) State of California

Based upon the 2004 GHG inventory data (the latest year available) compiled by the California Air Resources Board (CARB) for the California 1990 greenhouse gas emissions inventory, California emitted emissions of 484 MMTCO2E, including emissions resulting from out-of-state electrical generation (CARB 2007). Based on the CARB inventory and GHG inventories for countries contributing to the worldwide GHG emissions inventory compiled by the United Nations Framework Convention on Climate Change (UNFCCC) for 2005, California's GHG emissions rank second in the United States (Texas is number one) with emissions of 423 MMTCO2E (excluding emissions related to imported power) and internationally between Ukraine (418.9 MMTCO2E) and Spain (440.6 MMTCO2E) (UNFCCC n.d.[a]).

A California Energy Commission (CEC) emissions inventory report placed CO2 produced by fossil fuel combustion in California as the largest source of GHG emissions in 2004, accounting for 81 percent of the total GHG emissions (CEC 2006a). CO2 emissions from other sources contributed 2.8 percent of the total GHG emissions, methane emissions 5.7 percent, nitrous oxide emissions 6.8 percent, and the remaining 2.9 percent was composed of emissions of high-GWP gases (CEC 2006a). These high-GWP gases are largely composed of refrigerants and a small contribution of sulfur hexafluoride (SF6) used as insulating materials in electricity transmission and distribution.

The primary contributors to GHG emissions in California are transportation, electric power production from both in state and out-of-state sources, industry, agriculture and forestry, and other sources, which include commercial and residential activities. These primary contributors to California's GHG emissions and their relative contributions are presented in Table 2, GHG Sources in California.

Table 2
GHG Sources in California

Source Category	Annual GHG Emissions ($MMTCO_2E$)	Percent of Total	Annual GHG Emissions ($MMTCO_2E$)	Percent of Total
Agriculture	27.9	5.8%	27.9	6.6%
Commerical Uses	12.8	2.6%	12.8	3.0%
Electricity Generation	119.8	24.7%	58.5	13.8%
Forestry (excluding sinks)	0.2	0.0%	0.2	0.0%
Industrial Uses	96.2	19.9%	96.2	22.7%
Residential Uses	29.1	6.0%	29.1	6.9%
Transportation	182.4	37.7%	182.4	43.1%
Other	16.0	3.3%	16.0	3.8%
Totals	484.4	100.0%	423.1	100.0%

It should be noted that emissions from each of these economic sectors are not confined to emissions from a single process, since there is crossover with other sectors. For example, the GHG emissions from cement production places clinker manufacturing in its own category and the fuel used to heat the cement production process within the industrial fuel category. In the case of landfills, methane emissions and CO2 emissions and sinks are reported in their respective portions of the inventory. Taken together, the CO2 sinks approximately offset the landfill methane emissions. Additionally, fuel-related GHG emissions from transporting wastes to landfills are included in transportation fuels.

4. Global Climate Change

Climate change refers to any substantial change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer) (US EPA 2008a). Climate change may result from

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g., changes in ocean circulation, reduction in sunlight from the addition of GHG and other gases to the atmosphere from volcanic eruptions); and

- human activities that change the atmosphere's composition (e.g., through burning fossil fuels) and the land surface (e.g., deforestation, reforestation, urbanization, desertification).

A. Indications of Anthropogenic Influences

The impact of anthropogenic activities on global climate change is readily apparent in the observational record. For example, surface temperature data shows that 11 of the 12 years from 1995 to 2006 rank among the 12 warmest since 1850, the beginning of the instrumental record for global surface temperature (IPCC 2007). In addition, the atmospheric water vapor content has increased since at least the 1980s over land, sea, and in the upper atmosphere, consistent with the capacity of warmer air to hold more water vapor; ocean temperatures are warmer to depths of 3,000 feet; and a marked decline has occurred in mountain glaciers and snowpack in both hemispheres, and in polar ice and ice sheets in both the arctic and Antarctic regions (IPCC 2007).

B. Influence of Industrialization

Air trapped by ice has been extracted from core samples taken from polar ice sheets to determine the global atmospheric variation of carbon dioxide, methane, and nitrous oxide from before the start of the industrialization, around 1750, to over 650,000 years ago. For that period, it was found that carbon dioxide concentrations ranged from 180 ppm to 300 ppm. For the period from around 1750 to the present, global carbon dioxide concentrations increased from a pre-industrialization period concentration of 280 ppm to 379 ppm in 2005, with the 2005 value far exceeding the upper end of the pre-industrial period range (IPCC 2007). Global methane and nitrous oxide concentrations show similar increases for the same period (see **Table 3, Comparison of Global Pre-Industrial and Current GHG Concentrations**).

Table 3
Comparison of Global Pre-Industrial and Current GHG Concentrations

Greenhouse Gas	Early Industrial Period Concentrations (ppm)	Natural Range for Last 650,000 Years (ppm)	2005 Concentrations (ppm)
Carbon Monoxide	280	180 to 300	379
Methane	715	320 to 790	1774
Nitrous Oxide	270	NA	319

C. Secondary Effects of Global Climate Change

The primary effect of global climate change has been a rise in average global tropospheric temperature of 0.2° Celsius per decade, determined from meteorological measurements worldwide between 1990 and 2005 (IPCC 2007). Climate change modeling using 2000 emission rates shows that further warming would occur, which would induce further changes in the global climate system during the current century (IPCC 2007). Changes to the global climate system and ecosystems and to California would include, but would not be limited to:

1) The loss of sea ice and mountain snowpack resulting in higher sea levels and higher sea surface evaporation rates with a corresponding increase in tropospheric water vapor due to the atmosphere's ability to hold more water vapor at higher temperatures; (IPCC 2007)
2) A rise in global average sea level primarily due to thermal expansion and melting of glaciers and ice caps, the Greenland and Antarctic ice sheets (IPCC 2007)
3) Changes in weather that include widespread changes in precipitation, ocean salinity, and wind patterns, and more energetic aspects of extreme weather including droughts, heavy precipitation, heat waves, extreme cold, and the intensity of tropical cyclones; (IPCC 2007)
4) The decline of Sierra snowpack, which accounts for approximately half of the surface water storage in California, by 70 percent to as much as 90 percent over the next 100 years; (California EPA [Cal/EPA] Climate Action Team 2006)
5) An increase in the number of days conducive to ozone formation by 25 to 85 percent (depending on the future temperature scenario) in high ozone areas of Los Angeles and the San Joaquin Valley by the end of the 21st century (California EPA Climate Action Team 2006); and
6) High potential for erosion of California's coastlines and sea water intrusion into the Delta and associated levee systems due to the rise in sea level (California EPA Climate Action Team 2006).

D. Secondary Effects of Global Climate Change on Groundwater Supply

Global changes in temperature and precipitation patterns, including changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns, and aspects of extreme weather including droughts, heavy precipitation, and heat waves all have the potential to significantly affect the nation's water resources and water demands. It is projected that climate change will cause more precipitation in the form of rain rather than snow, resulting in less water storage in the annual snowpack and earlier snowmelt. The hydrology in California is controlled by the timing and intensity of the spring snowmelt, and is facilitated primarily by the degree of warming during this time period. It is expected that surface water yields in California will increase in late winter/early spring because of increased runoff due to the seasonality of the precipitation changes and to an earlier spring snowmelt caused by the projected warming under climate change. Conversely, decreases in surface water are expected through summer and fall (DWR 2006).

The vast majority of California's groundwater that is accessible in significant amounts is stored in alluvial groundwater basins, which cover nearly 40 percent of the geographic area of the state (DWR 2003). Groundwater supplies contribute water used for beneficial purposes and has historically been depended upon during droughts. In many areas of California, current levels of groundwater use are already unsustainable, with pumping rates exceeding natural recharge (DWR 2005). During drier years, groundwater pumping is often relied upon to balance the increased demands caused by heat and drought (DWR 2006). It is anticipated that groundwater would be used in this capacity to increase water supply reliability through period of climate fluctuations associated with global climate change.

The global climate change would directly impact groundwater supplies through changes in recharge of surface water resulting from changes in effective rainfall as well as a change in the timing of the recharge season. In general, a large portion of recharge during the winter comes from deep percolation of precipitation below the rooting zone, whether of native vegetation or farmland. The increased winter rainfall and higher temperatures could increase the groundwater recharge during the period of infiltration where soils freeze. Higher evaporation or shorter rainfall seasons, on the other hand, could mean that the moisture deficits in the soil persist for longer periods of time, shortening recharge seasons. Therefore, a greater amount of rain in subsequent storms would then be required to wet the root zone and provide water for deep percolation (DWR 2005). The generally warmer and wetter winters would increase the amount of runoff available for groundwater recharge. However, this additional runoff in the winter would be occurring at a time when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge (DWR 2005).

III. APPLICABLE LAWS, REGULATIONS, PLANS, AND POLICIES

1. International Activities

A. Kyoto Protocol

The original Kyoto Protocol was negotiated in December 1997 and came into force on February 16, 2005. As of May 2008, 181 countries and the European Economic Community have ratified the agreement (UNFCCC n.d.[c]). Notably, however, the US has not ratified the protocol. Participating nations are separated into Annex 1 (i.e., industrialized countries) and Non-Annex 1 (i.e., developing countries) countries that have differing requirements for GHG reductions. The goal of the protocol is to achieve overall emissions reduction targets for six GHGs by the period 2008 to 2012. The six GHGs regulated under the protocol are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, HFCs, and PFCs. Each nation has an emissions reduction target under which they must reduce GHG emissions a certain percentage below 1990 levels (e.g., 8 percent reduction for the European Union, 6 percent reduction for Japan). The average reduction target for nations participating in the Kyoto Protocol is approximately five percent below 1990 levels (Pew Center on Global Climate Change n.d.). Although the United States has
not ratified the protocol, it has established a target of 18 percent reduction in GHG emissions intensity by 2012 (White House n.d.). Greenhouse gas intensity is the ratio of GHG emissions to economic output (i.e., gross domestic product).

B. Intergovernmental Panel on Climate Change

The World Meteorological Organization (WMO) and United Nations Environmental Program (UNEP) established the IPCC in 1988. The goal of the IPCC is to evaluate the risk of climate change caused by human activities. Rather than performing research or monitoring climate, the IPCC relies on peer-reviewed and published scientific literature to make its assessment. The IPCC assesses information (i.e., scientific literature) regarding human-induced climate change, impacts of human-induced climate change, and options for adaptation and mitigation of climate change. The IPCC reports its evaluation through special reports called "assessment reports." The latest assessment report (i.e., Fourth Assessment Report, consisting of three working group reports and a synthesis report based on the first three reports) was published in 2007.[7]

2. Federal Activities

In *Massachusetts vs. EPA,* the Supreme Court held that US EPA has the statutory authority under Section 202 of the federal Clean Air Act (CAA) to regulate GHGs from new motor vehicles. The court did not hold that the US EPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHGs from motor vehicles cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. Upon the final decision, President Bush signed Executive Order 13432 on May 14, 2007, directing the US EPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court's decision. The order requires the US EPA to coordinate closely with other federal agencies and to consider the president's Twenty-in-Ten plan in this process. The Twenty-in-Ten plan would establish a new alternative fuel standard that would require the use of 35 billion gallons of alternative and renewable fuels by 2017. The US EPA will be working closely with the Department of Transportation in developing new automotive efficiency standards.

3. California Activities

California has enacted several legislative bills and executive orders aimed at reducing the state's greenhouse gas inventory and its impact on global climate change. These are discussed in chronological order below.

A. Assembly Bill 1493

In a response to the transportation sector accounting for more than half of California's CO2 emissions, Assembly Bill 1493 (AB 1493, Pavley) was enacted on July 22, 2002. AB 1493 required CARB to set GHG emission standards for passenger vehicles, light-duty trucks, and other vehicles determined by the state board to be vehicles whose primary use is noncommercial personal transportation in the state. The bill required that CARB set the GHG emission standards for motor vehicles manufactured in 2009 and all subsequent model years. In setting these standards, CARB must consider cost-effectiveness, technological feasibility, economic impacts, and provide maximum flexibility to

[7] *The IPCC's Fourth Assessment Report is available online at http://www.ipcc.ch/.*

manufacturers. CARB adopted the GHG emissions standards in September 2004. These standards are intended to reduce emissions of carbon dioxide and other greenhouse gases (e.g., nitrous oxide, methane). The new standards would phase in during the 2009 through 2016 model years. When fully phased in, the near-term (2009–2012) standards will result in a reduction of about 22 percent in greenhouse gas emissions compared to the emissions from the 2002 fleet, while the mid-term (2013-2016) standards will result in a reduction of about 30 percent. Some currently used technologies that achieve GHG reductions include small engines with superchargers, continuously variable transmissions, and hybrid electric drive.

In December 2004, these regulations were challenged in federal court by the Alliance of Automobile Manufacturers, who claimed that the law regulated vehicle fuel economy, a duty assigned to the federal government. The case had been put on hold by a federal judge in Fresno pending the US Supreme Court's decision in *Massachusetts vs. EPA*. The US Supreme Court's ruling in favor of the state of Massachusetts has been discussed as a likely vindication of state efforts to control GHG emissions. In December 2007, Judge Ishii of the US District Court for the Eastern District dismissed the case by the Alliance of Automobile Manufacturers. However, before these regulations may go into effect, the US EPA must grant California a waiver under the federal CAA, which ordinarily preempts state regulation of motor vehicle emission standards. Following the issuance of the *Massachusetts vs. EPA* decision, the USEPA announced that it would decide whether to grant California a waiver by December 2007. On December 19, 2007, Stephen Johnson, the US EPA Administrator, denied the waiver citing the need for a national approach to reducing greenhouse gas emissions, the lack of a "need to meet compelling and extraordinary conditions," and the benefits to be achieved through the Energy Independence and Security Act of 2007 (Johnson 2007). The California Attorney General subsequently filed suit in January 2008 to overturn the administrator's decision.

On January 27, 2009, President Obama signed an executive order requiring the EPA to review its previous decision denying the waiver. It is expected that the EPA will act in the Spring of 2009 to grant the waiver, allowing CARB to implement its 2004 GHG emissions standards for motor vehicles.

B. Executive Order S-3-05

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order S-3-05. The Executive Order established the following goals: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050. The secretary of Cal/EPA is required to coordinate efforts of various agencies in order to collectively and efficiently reduce GHGs. Some of the agency representatives involved in the GHG reduction plan include the secretary of the Business, Transportation and Housing Agency; the secretary of the Department of Food and Agriculture, the secretary of the Resources Agency, the Chairperson of CARB; the chairperson of the CEC; and the president of the Public Utilities Commission. Representatives from each of the aforementioned agencies comprise the Climate Action Team. The Climate Action Team is responsible for implementing global warming emissions reduction programs. In order to achieve these goals, the Climate Action Team is organized into two subgroups: the market-based options subgroup and the scenario analysis subgroup. The Cal/EPA secretary is required to submit a biannual progress report from the Climate Action Team to the governor and state legislature disclosing the progress made toward GHG emission reduction targets. In addition, another biannual report must be submitted illustrating the impacts of global warming on California's water supply, public health, agriculture, the coastline, and forestry, and reporting possible mitigation and adaptation plans to combat these impacts. The Climate Action Team has fulfilled both of these report requirements through its March 2006 Climate Action Team Report to Governor Schwarzenegger and the legislature (California EPA Climate Action Team 2006). Some strategies currently being implemented by state agencies include CARB introducing vehicle climate change standards and diesel anti-idling measures, the Energy Commission implementing building and appliance efficiency standards, and the Cal/EPA implementing their green building initiative. The Climate Action Team also recommends future emission reduction strategies, such as using only low-GWP refrigerants in new vehicles, developing ethanol as an alternative fuel, reforestation, solar power initiatives for homes and businesses, and investor-owned utility energy efficiency programs. According to the report, implementation of current and future emission reduction strategies have the potential to achieve the goals set forth in Executive Order S-3-05.

C. Assembly Bill 32

In furtherance of the goals established in Executive Order S-3-05, the Legislature enacted Assembly Bill 32 (AB 32, Nuñez and Pavley), the California Global Warming Solutions Act of 2006, which Governor Schwarzenegger signed on September 27, 2006. AB 32 represents the first enforceable statewide program to limit GHG emissions from all major industries with penalties for noncompliance. CARB has been assigned to carry out and develop the programs and requirements necessary to achieve the goals of AB 32. The foremost objective of CARB is to adopt regulations that require the reporting and verification of statewide GHG emissions. This program will be used to monitor and enforce compliance with the established standards. The first GHG emissions limit is equivalent to the 1990 levels, which are to be achieved by 2020. CARB is also required to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions. AB 32 allows CARB to adopt market-based compliance mechanisms to meet the specified requirements. Finally, CARB is ultimately
responsible for monitoring compliance and enforcing any rule, regulation, order, emission limitation, emission reduction measure, or market-based compliance mechanism adopted. In order to advise CARB, it must convene an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee. By January 2008, the first deadline for AB 32, a statewide cap for 2020 emissions based on 1990 levels and mandatory reporting rules for significant sources of GHGs must be adopted. The following year (January 2009), CARB must adopt a scoping plan indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. The first action under AB 32 resulted in the adoption of a report listing early action greenhouse gas emission reduction measures on June 21,

2007. The early actions include three specific GHG control rules. On October 25, 2007, CARB approved an additional six early action GHG reduction measures under AB 32. These early action GHG reduction measures are to be adopted and enforced before January 1, 2010, along with 32 other climate-protecting measures CARB is developing between now and 2011. The report divides early actions into three categories:

1) Group 1 - GHG rules for immediate adoption and implementation;
2) Group 2 - Several additional GHG measures under development;
3) Group 3 - Air pollution controls with potential climate co-benefits.

The original three adopted early action regulations meeting the narrow legal definition of “discrete early action GHG reduction measures” include:

1) A low-carbon fuel standard to reduce the “carbon intensity” of California fuels;
2) Reduction of refrigerant losses from motor vehicle air conditioning system maintenance to restrict the sale of ”do-it-yourself” automotive refrigerants; and
3) Increased methane capture from landfills to require broader use of state-of-the-art methane capture technologies.

The additional six early action regulations adopted on October 25, 2007, also meeting the narrow legal definition of “discrete early action GHG reduction measures,” include:

1) Reduction of aerodynamic drag, and thereby fuel consumption, from existing trucks and trailers through retrofit technology;
2) Reduction of auxiliary engine emissions of docked ships by requiring port electrification;
3) Reduction of perfluorocarbons from the semiconductor industry;
4) Reduction of propellants in consumer products (e.g., aerosols, tire inflators, and dust removal products);
5) Require that all tune-up, smog check and oil change mechanics ensure proper tire inflation as part of overall service in order to maintain fuel efficiency; and
6) Restriction on the use of sulfur hexafluoride (SF6) from non-electricity sectors if viable alternatives are available.

As required under AB 32, on December 6, 2007, CARB approved the 1990 greenhouse gas emissions inventory, thereby establishing the emissions limit for 2020. The 2020 emissions limit was set at 427 MMT CO2E. The inventory revealed that in 1990 transportation, with 35 percent of the state's total emissions, was the largest single sector, followed by industrial emissions, 24 percent; imported electricity, 14 percent; in-state electricity generation, 11 percent; residential use, 7 percent; agriculture, 5 percent; and commercial uses, 3 percent.

In addition to the 1990 emissions inventory, CARB also adopted regulations requiring mandatory reporting of greenhouse gases for large facilities on December 6, 2007. The mandatory reporting regulations require annual reporting from the largest facilities in the state, which account for 94 percent of greenhouse gas emissions from industrial and commercial stationary sources in California. About 800 separate sources that fall under the new reporting rules and include electricity generating facilities, electricity retail providers and power marketers, oil refineries, hydrogen plants, cement plants, cogeneration facilities, and industrial sources that emit over 25,000 tons of carbon dioxide each year from on-site stationary combustion sources. Transportation sources, which account for 38 percent of California's total greenhouse gas emissions, are not covered by these regulations but will continue to be tracked through existing means. Affected facilities will begin tracking their emissions in 2008, to be reported beginning in 2009 with a phase-in process to allow facilities to develop reporting systems and train personnel in data collection. Emissions for 2008 may be based on best available emission data.

Beginning in 2010, however, emissions reports will be more rigorous and will be subject to third-party verification. Verification will take place annually or every three years, depending on the type of facility.

As indicated above, AB 32 requires CARB to adopt a scoping plan by January 2009 indicating how reductions in significant GHG sources will be achieved through regulations, market mechanisms, and other actions. After receiving public input on their discussion draft of the Proposed Scoping Plan released in June 2008, CARB released the Climate Change Proposed Scoping Plan in October 2008 and adopted the Plan in December, 2008. This plan contains an outline of the proposed State strategies to achieve the 2020 greenhouse gas emission limits. Key elements of the Scoping Plan include the following recommendations:

1) Expanding and strengthening existing energy efficiency programs as well as building and appliance standards;
2) Achieving a statewide renewables energy mix of 33 percent;
3) Developing a California cap-and-trade program that links with other Western Climate Initiative partner programs to create a regional market system;
4) Establishing targets for transportation-related greenhouse gas emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
5) Adopting and implementing measures pursuant to existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel standard;
6) Creating targeted fees, including a public goods charge on water use, fees on high global warming potential gases, and a fee to fund the

administrative costs of the state's long-term commitment to AB 32 implementation.

Under the Scoping Plan, approximately 85 percent of the state's emissions are subject to a cap-and-trade program where covered sectors are placed under a declining emissions cap. The emissions cap incorporates a margin of safety whereas the 2020 emissions limit will still be achieved even in the event that uncapped sectors do not fully meet their anticipated emission reductions. Emissions reductions will be achieved through regulatory requirements and the option to reduce emissions further or purchase allowances to cover compliance obligations. It is expected that emission reduction from this cap-and trade program will account for a large portion of the reductions required by AB 32. Table 4, AB 32 Scoping Plan Measures, lists CARB's recommendations for achieving greenhouse gas reductions under AB 32 along with a brief description of the requirements and applicability.

Table 4
AB 32 Scoping Plan Measures

Scoping Plan Measure	Description
SPM-1: California Cap-and-Trade Program linked to Western Climate Initiative	Implement a broad-based cap-and-trade program that links with other Western Climate Initiative Partner programs to create a regional market system. Ensure California's program meets all applicable AB 32 requirements for market-based mechanisms. Capped sectors include transportation, electricity, natural gas, and industry. Projected 2020 business-as-usual emissions are estimated at 512 MTCO2E; preliminary 202 emissions limit under cap-and-trade program are estimated at 365 MTCO2E (29 percent reduction).
SPM-2: California Light-Duty Vehicle GHG Standards	Implement adopted Pavley standards and planned second phase of the program. AB 32 states that if the Pavley standards (AB 1493) do not remain in effect, CARB shall implement equivalent or greater alternative regulations to control mobile sources.
SPM-3: Energy Efficiency	Maximize energy efficiency building and appliance standards, and pursue additional efficiency efforts. The Proposed Scoping Plan considers green building standards as a framework to achieve reductions in other sectors, such as electricity.
SPM-4: Renewables Portfolio Standard	Achieve 33 percent Renewables Portfolio Standard by both investor-owned and publicly owned utilities.
SPM-5: Low Carbon Fuel Standard	Develop and adopt the Low Carbon Fuel Standard (LCFS). CARB identified the LCFS as a Discrete Early Action item and is developing a regulation for Board consideration in late 2008. In January 2007, Governor Schwarzenegger issued Executive Order S-1-07, which called the reduction of the carbon intensity of California's transportation fuels by at least ten percent by 2020.

SPM-6: Regional Transportation-Related Greenhouse Gas Targets	Develop regional greenhouse gas emissions reduction targets for passenger vehicles. SB 375 requires CARB to develop, in consultation with metropolitan planning organizations (MPOs), passenger vehicle greenhouse gas emissions reduction targets for 2020 and 2035 by September 30, 2010. SB 375 requires MPOs to prepare a sustainable communities strategy to reach the regional target provided by CARB.
SPM-7: Vehicle Efficiency Measures	Implement light-duty vehicle efficiency measures. CARB is pursuing fuel-efficient tire standards and measures to ensure properly inflated tires during vehicle servicing.
SPM-8: Goods Movement	Implement adopted regulations for port drayage trucks and the use of shore power for ships at berth. Improve efficiency in goods movement operations.
SPM-9: Million Solar Roofs Program	Install 3,000 MW of solar-electric capacity under California's existing solar programs.
SPM-10: Heavy/Medium-Duty Vehicles	Adopt heavy- and medium-duty vehicle and engine measures. Measures targeting aerodynamic efficiency, vehicle hybridization, and engine efficiency are recommended.
SPM-11: Industrial Emissions	Require assessment of large industrial sources to determine whether individual sources within a facility can cost-effectively reduce green- house gas emissions and provide other pollution reduction co-benefits. Reduce greenhouse gas emissions from fugitive emissions from oil and gas extraction and gas transmission. Adopt and implement regulations to control fugitive methane emissions and reduce flaring at refineries.
SPM-12: High Speed Rail	Support implementation of a high-speed rail (HSR) system. This measure supports implementation of plans to construct and operate a HSR system between Northern and Southern California serving major metropolitan centers.
SPM-13: Green Building Strategy	Expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings.
SPM-14: High GWP Gases	Adopt measures to reduce high global warming potential gases. The Proposed Scoping Plan contains 6 measures to reduce high GWP gases from mobile sources, consumer products, stationary sources, and semiconductor manufacturing.
SPM-15: Recycling and Waste	Reduce methane emissions at landfills. Increase waste diversion, composting, and commercial recycling. Move toward zero-waste.
SPM-16: Sustainable Forests	Preserve forest sequestration and encourage the use of forest biomass for sustainable energy generation. The federal government and California's Board of Forestry and Fire Protection has the regulatory authority to implement the Forest Practice Act to provide for sustainable management practices. This measure is expected to play a greater role in the 2050 goals.

SPM-17: Water	Continue efficiency programs and use cleaner energy sources to move water. California will also establish a public goods charge for funding investments in water efficiency that will lead to as yet undetermined reductions in greenhouse gases.
SPM-18: Agriculture	In the near term, encourage investment in manure digesters and at the five-year Scoping Plan update determine if the program should be made mandatory by 2020. Increase efficiency and encourage use of agricultural biomass for sustainable energy production. CARB has begun research on nitrogen fertilizers and will explore opportunities for emission reductions.

Source: California Air Resources Board, Climate Change Scoping Plan (2008).

D. Senate Bill 1368

Governor Schwarzenegger, just two days after signing AB 32, reiterated California's commitment to reducing GHGs by signing Senate Bill 1368 (SB 1368, Perata). SB 1368 requires the CEC to develop and adopt regulations for GHG emissions performance standards for the long-term procurement of electricity by local publicly owned utilities. These standards must be consistent with the standards adopted by the Public Utilities Commission. This effort will help to protect energy customers from financial risks associated with investments in carbon-intensive generation by allowing new capital investments in power plants whose GHG emissions are as low or lower than new combined-cycle natural gas plants, by requiring imported electricity to meet GHG performance standards in California and requiring that the standards be developed and adopted in a public process.

E. Executive Order S-1-07

On January 18, 2007, California further solidified its dedication to reducing GHGs by setting a new Low Carbon Fuel Standard (LCFS) for transportation fuels sold within the state. Executive Order S-1-07 sets a declining standard for GHG emissions measured in CO2-equivalent gram per unit of fuel energy sold in California. The target of the LCFS is to reduce the carbon intensity of California passenger vehicle fuels by at least 10 percent by 2020. The LCFS will apply to refiners, blenders, producers, and importers of transportation fuels and will use market-based mechanisms to allow these providers to choose how they reduce emissions during the "fuel cycle" using the most economically feasible methods. The Executive Order requires the secretary of Cal/EPA to coordinate with actions of the CEC, CARB, the University of California, and other agencies to develop a protocol to measure the "life-cycle carbon intensity" of transportation fuels. CARB is anticipated to complete its review of the LCFS protocols no later than June, 2007 and implement the regulatory process for the new standard by December, 2008.

F. Senate Bill 97

In August, 2007, as part of the legislation accompanying the state budget negotiations, the legislature enacted SB 97 (Dutton), which directs the Governor's Office of Planning and Research (OPR) to develop guidelines under CEQA for the mitigation of greenhouse gas emissions. OPR is to develop proposed guidelines by July 1, 2009, and the Resources Agency is directed to adopt guidelines by January 1, 2010. On June 19, 2008, OPR issued a technical advisory as interim guidance regarding the analysis of GHG emissions in CEQA documents (OPR 2008). The advisory indicated that a project's GHG emissions, including those associated with vehicular traffic, energy consumption, water usage, and construction activities, should be identified and estimated. The advisory further recommended that the lead agency determine significance of the impacts and impose all mitigation measures that are necessary to reduce GHG emissions to a less than significant level. The advisory did not recommend a specific threshold of significance—either quantitative or qualitative—leaving this to the lead agency's judgment and discretion, based upon factual data and guidance from regulatory agencies and other sources where available and applicable.

On January 8, 2009, OPR released its Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions. Generally, the proposed Guidelines seek to apply CEQA's existing basic rules for impact analysis to the topic of greenhouse gas emissions, specifying in several instances, for example, that determinations on greenhouse gas emissions must be supported by substantial evidence, as with other CEQA determinations. OPR's proposed amendments to the CEQA Guidelines would allow lead agencies to determine whether impacts are significant based on "compliance with plan" findings, to specify that projects may determine that their contribution to the cumulative impact of climate change is reduced to a less than significant level by compliance with climate action plans or statewide greenhouse gas mitigation plans.

On July 3, 2009, the California Natural Resources Agency began the formal rulemaking process for the adoption of CEQA Guideline amendments concerning the evaluation of greenhouse gas emissions, and the proposed guidelines, which remain subject to further comment and revision, are expected to become effective early in 2010. The draft guidelines as currently proposed do not set forth a specific proposed threshold of significance, but indicate that lead agencies assessing the significance of greenhouse has emissions on the environment may consider factors that include whether the project increases or reduces greenhouse gas emissions as compared to the existing environmental setting, whether project emissions exceed a significance threshold that the lead agency determines may apply to the project, and whether the project complies with regulations or requirements adopted to implement a greenhouse gas reduction plan.[8]

[8] Proposed Guideline 15064.4, *Determining the Significance of Impacts from Greenhouse Gas Emissions,* July 3, 2009.

G. Senate Bill 375

The California Legislature passed SB 375 (Steinberg) on September 1, 2008. SB 375 would require CARB to set regional greenhouse gas reduction targets after consultation with local governments. The target must then be incorporated within that region's Regional Transportation Plan (RTP), which is used for long-term transportation planning, in a Sustainable Communities Strategy. SB 375 also requires each region's Regional Housing Needs Assessment (RHNA) to be adjusted based on the Sustainable Communities Strategy in its RTP. Additionally, SB 375 will reform the environmental review process to create incentives to implement the strategy, especially transit priority projects. The governor signed SB 375 into law on September 30, 2008.

4. Other Statewide and Regional Activities

A. California Climate Action Registry

The California Climate Action Registry (CCAR) is a private non-profit organization formed by the State of California and serves as a voluntary GHG registry to protect and promote early actions to reduce GHG emissions by organizations. Senate Bill 1771 (SB 1771, Sher) formally established the CCAR with technical changes made to the statute in SB 527, which finalized the structure for the California Registry. The CCAR began with 23 Charter Members and currently has over 300 corporations, universities, cities and counties, government agencies and environment organizations voluntarily measuring, monitoring, and publicly reporting their GHG emissions using the CCAR protocols. The CCAR has published a General Reporting Protocol, as well as project- and industry-specific protocols for landfill activities, livestock activities, the cement sector, the power/utility sector, and the forest sector. The protocols provide the principles, approach, methodology, and procedures required for participation in the CCAR.

B. CAPCOA CEQA and Climate Change White Paper

The California Air Pollution Control Officers Association (CAPCOA) prepared a white paper on CEQA and climate change in January 2008. The white paper was intended to be used as a resource by lead agencies when considering policy options and not as a guidance document. Specifically, the white paper discusses three possible approaches to evaluating the significance of GHG emissions and possible mitigation measures; however, CAPCOA does not endorse any particular approach. The three alternative significance approaches are: (1) not establishing a significance threshold for GHG emissions; (2) setting the GHG emission threshold at zero; and (3) setting the GHG emission threshold at some non-zero level. The white paper evaluates potential considerations and pitfalls associated with the three approaches. At the end of the white paper, CAPCOA provides a list of potential mitigation measures and discusses each in terms of emissions reduction effectiveness, cost effectiveness, and technical and logistical feasibility. While programs are still being developed by CARB, the white paper provides public agencies with information to ensure that GHG emissions are, according to CAPCOA, "appropriately considered and addressed under CEQA."

C. The BAAQMD released draft thresholds of significance in September 2009 (these were updated in October 2009 and again in November 2009). BAAQMD proposes three different project thresholds of significance for GHG emissions: (1) compliance with a qualified Climate Action Plan, (2) a bright line emissions threshold of 1,100 metric tons of CO2e per year, or (3) emissions of and 4.6 metric tons of CO2e per capita per year for mixed use projects. The emissions based thresholds are for operational impacts. BAAQMD did not identify emission based thresholds for construction activities. Instead, best management practices are suggested for construction projects. These draft thresholds are currently under review and may be further revised, with adoption not expected to occur until December 2009 or early 2010.[9]

D. Sonoma County General Plan 2020

The Sonoma County General Plan 2020 includes a significant and broad based set of policies and programs to reduce GHG emissions. These include limiting new development to urban areas, preserving land uses that can offset and event remove GHG emissions, reducing vehicle miles traveled, promoting alternative transportation, reducing energy use and exploring renewable energy, promoting water conservation and reuse, and directly reducing GHG emissions. These include:

GOAL OSRC-16:	Preserve and maintain good air quality and provide for an air quality standard that will protect human health and preclude crop, plant and property damage in accordance with the requirements of the Federal and State Clean Air Acts.
Objective OSRC-16.1:	Minimize air pollution and greenhouse gas emissions.
Objective OSRC-16.2:	Encourage reduced motor vehicle use as a means of reducing resultant air pollution.

The following policies, in addition to those of the Circulation and Transit Element, such as Policy CT-2s: encourage measures that increase the average occupancy of vehicles, shall be used to achieve these objectives:

Policy OSRC-16a: Require that development projects be designed to minimize air emissions. Reduce direct emissions by utilizing construction techniques that decrease the need for space heating and cooling.

[9] *The BAAQMD proposals and updated versions of t hose proposals can be viewed on the BAAQMD website at http://www.baaqmd.gov/Divisions/Planning-and-Research/Planning-Programs-and-Initiatives/CEQA-GUIDELINES.aspx*

Policy OSRC-16b: Encourage public transit, ridesharing and van pooling, shortened and combined motor vehicle trips to work and services, use of bicycles, and walking. Minimize single passenger motor vehicle use.

Policy OSRC-16c: Refer projects to the local air quality districts for their review.

Policy OSRC-16f: Encourage the adoption of standards, the development of new technology, and retrofitting to reduce air pollution resulting from geothermal development.*

Policy OSRC-16h: Require that development within the Bay Area Air Quality Management District that generates high numbers of vehicle trips, such as shopping centers and business parks, incorporate air quality mitigation measures in their design.

Policy OSRC-16i: Ensure that any proposed new sources of toxic air contaminants or odors provide adequate buffers to protect sensitive receptors and comply with applicable health standards. Promote land use compatibility for new development by using buffering techniques such as landscaping, setbacks, and screening in areas where such land uses abut one another.

Policy OSRC-16k: Require that discretionary projects involving sensitive receptors (facilities or land uses that include members of the population sensitive to the effects of air pollutants such as children, the elderly, and people with illnesses) proposed near the Highway 101 corridor include an analysis of mobile source toxic air contaminant health risks. Project review should, if necessary, identify design mitigation measures to reduce health risks to acceptable levels.*

Policy OSRC-14d: Support project applicants in incorporating cost-effective energy efficiency that may exceed State standards.

Policy LU-11b: Encourage all types of development and land uses to use alternative renewable energy sources and meaningful energy conservation measures.

5. Sutter Health Planning and Development Building Design Policy for Sustainability

Sutter Health desires to reduce adverse impacts upon the environment resulting from the design, construction and operations of our health care facilities and therefore developed a Building Design Policy for Sustainability that outlines their commitment to adopt the accompanying guidelines for Building Design Policy for Sustainability and to conform to Part 11 of Title 24 California Building codes and the Green Guide for Health Care (GGHC), which are currently voluntary. The GGHC is a best practices guide for healthy and sustainable building design, construction, and operations for the healthcare industry. Sutter Health projects are evaluated on an individual basis.

This policy is intended to be used in the identification, evaluation and implementation of sustainable principles, objectives and elements in the planning and design of Sutter Health Facilities. The Leadership in Energy and Environment Design New Construction (LEED-NC) Version 2.2/Green Guide for Health Care (GGHC) Version 2.2 project checklist will be used to track and document the degree of compliance for each project.

Building design and construction practices will be administered in five key areas: Site selection, Water Efficiency and Conservation, Energy Efficiency, Material Conservation and Resource Efficiency, and Environmental Air Quality.

The Proposed Project would result in the development of a medical campus which would be integrated with the existing WFC Wells Fargo Center for the Arts facilities (WFC). The Medical Campus would include approximately 342,000 square feet of building space; a central utility plant, the existing WFCA facilities; 1,914 parking spaces (of which 903 are existing); athletic fields, open space and landscaped area.

IV. SIGNIFICANCE CRITERIA FOR EVALUATING EFFECTS

To date, no local or state air quality agency has adopted significance criteria for GHG emissions. While the Global Warming Solutions Act (AB 32) created a framework for the reduction of GHGs in California, the Act did not address the role of CEQA in achieving the goals of the Act. As noted earlier, in August 2007, the governor signed SB 97 (Dutton) into law, which requires the OPR to prepare *State CEQA Guidelines* for the mitigation of GHG emissions or the effects of greenhouse gas emissions. On January 8, 2009 OPR issued the Preliminary Draft CEQA Guideline Amendments. These Draft Amendments are currently under review, but the County has endeavored to develop the following significance criteria based on the Draft Amendments, and the guidance provided by the CAPCOA CEQA and Climate Change White Paper.

The County will consider whether the Proposed Project may result in a cumulatively considerable impact[10] to the environment that cannot be mitigated to a level of level of less than significant.

In assessing the potential significance of such cumulative impacts from GHG emissions from the Proposed Project, the County will qualitatively consider:

The extent to which the project would help or hinder attainment of the State's goals of reducing greenhouse gas emissions to 1990 levels by the year 2020 as stated in the Global Warming Solutions Act of 2006 (AB 32).

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[10] *While no guidance exists to indicate what level of GHG emissions would be considered substantial enough to result in a significant adverse impact on global climate, it is generally the case that an individual project of any size is of insufficient magnitude by itself to influence climate change or result in a substantial contribution to the global GHG inventory. Thus, GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). Accordingly, discussion of the Proposed Project's GHG emissions and their impact on global climate are addressed in terms of its contribution to a cumulative impact on global climate.*

V. METHODOLOGY FOR EVALUATING EFFECTS

The Proposed Project would result in emissions of GHGs due to fuel combustion in motor vehicles, mobile construction equipment, and building heating and water systems associated with the Medical Campus and would contribute to the global GHG inventory. Building and motor vehicle air conditioning systems may also use HFCs (and HCFCs and CFCs to the extent that they have not been completely phased out at later dates), which may result in emissions through leaks. The other primary GHGs (perfluorocarbons and sulfur hexafluoride) are associated with specific industrial sources and are not expected to be associated with the Proposed Project.

The emissions of CO2, the primary greenhouse gas associated with construction and operation of the Proposed Project were estimated using URBEMIS2007 (see Section Appendix A):

1. Motor vehicles: The CO2 emissions associated with construction and operation of the Campus are analyzed at vehicle miles traveled.

2. Area sources (natural gas combustion): The CO2 emissions from natural gas consumption for the Project were adjusted based on emission factors for CO2, CH4, and N2O for natural gas combustion from the California Climate Action Registry's *General Reporting Protocol* (California Climate Action Registry [CCAR] 2008), the global warming potential for each GHG; and 365 days per year.

3. Construction diesel trucks and equipment: No adjustment was made to the CO2 emissions because the GHGs in the exhaust from diesel engines are almost entirely CO2 (less than one percent CH4 and N2O on a CO2 equivalent basis).

The Proposed Project would also result in indirect GHG emissions due to the gas and electricity demands of the Medical Campus. Emission factors for GHGs due to gas and electrical demand from the Proposed Project were calculated by the mechanical engineers for the Project.

Indirect GHG emissions would also be associated with the electrical demand resulting from the provision of water to the project site, electrical demand and process emissions due to wastewater treatment, and decomposition of solid waste generated by the Proposed Project. The electrical demand associated with supplying water to the project site was calculated based on the estimated water; California Energy Commission estimates of electric use for water conveyance, treatment, and distribution (CEC 2005; CEC 2006b). The wastewater-related GHG emissions were not calculated as the Project will not contribute to wastewater flows as the Project will offset its flows through retrofitting toilets and showers within the County equivalent to its projected flows, resulting in a zero net increase. Lastly, the solid waste-related emissions were estimated based on the solid waste generation of the Proposed Project and US EPA emission factors (US EPA 1998).

On-site vegetation currently reduces GHG emissions by sequestering carbon dioxide. GHG emissions would not increase as on-site vegetation will be replaced with landscaping which would increase the number of trees on the site and therefore in the long run would provide greater carbon sequestration.

To put the proposed project's GHG emissions in context, the applicant has also provided an estimate of the GHG construction-related and operational emissions that would be expected with the construction and operation of a "standard" hospital and medical office project of the scale and location of the proposed project, and then compared that estimate with an estimate of the construction and operational emissions of the project as proposed with design features and emissions reduction measures included to reduce energy usage and greenhouse gas emissions. This approach, and the estimates, are set forth and explained below.

It should be noted that the analysis below likely overstates the project's actual contribution to the cumulative impact of global climate change in several important respects. First, the proposed project consists in substantial part of a new hospital that will be replacing an older existing hospital. In this analysis, the greenhouse gas emissions associated with the proposed project have been treated as new emissions, even though there are emissions at the existing hospital and there are substantial emissions associated with mobile emissions to and from the existing hospital. Thus, many of the emissions set forth below are already occurring, and some of those emissions may be reduced by the new project in comparison to the operation of the existing hospital. Also, as noted below, the analysis does not account for the substantial reductions in future emissions that will occur as more efficient fuels and engines are introduced, because the currently available emissions estimates do not yet account for these future emissions reductions.

"Standard" estimate of emissions. The "standard" construction-related GHG emissions estimates were calculated using the URBEMIS2007 model with model default assumptions for Sonoma County. The project size and construction schedule were used to develop an annual estimate of CO2 emissions. Emissions from the import and export of fill material were calculated separately using estimates of truck travel and CO2 emission factors developed with the EMFAC2007 on-road motor vehicle emissions factor model. In addition, emissions from road construction were computed using the Roadway Construction Emission Model (Version 6.3.1) with default assumptions for the estimated size of the roadway construction. These emissions are only those associated with usage of construction equipment, truck traffic and worker traffic. These emissions do not include the indirect emissions of manufacturing materials that comprise the project, as there are no reliable methods for calculating these emissions.

The California Air Pollution Control Officers Association (CAPCOA) has provided guidance for calculating project emissions.[11] Emissions from area, mobile and electricity usage are recommended by CAPCOA. Area and mobile source emissions were calculated using the URBEMIS2007 model with the same inputs used to calculate emissions of air pollutants.

The URBEMIS2007 model was used to predict the emissions from mobile sources associated with the project and minor area sources such as landscape equipment usage (note that natural gas combustion emissions for cooking and heating were calculated separately). Trip generation estimates for the project were used in the URBEMIS2007 model to predict operational (or mobile source) emissions of CO2.

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[11] *California Air Pollution Control Officers Association, 2008, CEQA & Climate Change, January.*

The "standard" operational GHG emissions estimates for energy usage (i.e., natural gas and electricity consumption) were calculated using data compiled as part of the U.S. Department of Energy's Commercial Building Energy Consumption Survey (CBECS). The CBECS is national sample survey that collects information on the stock of commercial buildings, their energy-related building characteristics, and their energy consumption and expenditures. The survey includes hospitals and medical office buildings. The most recent survey for which results are available on the CBECS website as of October 2009 is the 2003 survey.

The term "standard" is used because it is the terminology employed by PG&E in evaluating energy conservation measures, and it can also be considered a measure of the recent "business as usual" emissions for hospitals and medical centers (shown as inpatient health care on the CBECS charts) and medical office buildings (shown as outpatient health care on the CBECS charts).

V. IMPACTS AND MITIGATION MEASURES

The estimated annual consumption of natural gas and electricity were used to calculate CO2 emissions. For natural gas, the annual consumption rate was applied to the emission rate recommended by the California Climate Action Registry Reporting Protocol.[12] The annual electricity consumption rate was applied to the CO2 emission rate reported by PG&E, which is 524 pounds of CO2 per 1,000 kilo watt hours (see http://www.pge.com/myhome/environment/calculator/assumptions.shtml). It should be noted that PG&E's rate is about 40-percent lower than the statewide average emission rate for electricity production and about half of the national average.[13]

Table 5
Standard Estimated Construction GHG Emissions

Annual Total Emissions	CO2 (tons/year)
2011	729
2012	186
2013	522

[12] *Ref: California Climate Action Registry (CCAR), 2008, California Climate Action Registry General Reporting Protocol – Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.0, April.*

[13] *Emissions from electricity usage were computed using the CO2 rate that PG&E provides to their customers on their website to calculate emissions from household energy consumption. However, PG&E is listed by the Local Government Operations Protocol for quantification of GHG inventories (see ref below) as having a 2006 certified rate of 455.81 pounds of CO2 per megawatt of electricity produced. A 2006 certified rate for California as a whole was not available. However, in 2004 when PG&E's rate was 566.20 pounds of CO2 per megawatt, California's overall rate was 958.49 pounds per megawatt. Hence, PG&E's rate is about 40% lower than the California Grid Average. Local Government Operations Protocol For the quantification and reporting of greenhouse gas emissions inventories, Version 1.0. September 25, 2008. Developed in partnership by: California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. – Appendix G, Table G.5 "Utility-Specific Verified Electricity CO2 Emission Factors (2000-2006)."*

Table 6
Standard Estimated Operational GHG Emissions

Emission Source	CO2 (tons/year)
Operational (Mobile) Sources	6494
Electricity (including water)	2047
Emergency Generator Testing	41
Natural Gas	1044
Total	9626

"Proposed project" estimate of emissions. To provide a comparison to the "business as usual" scenario, the applicant has also an estimate of the GHG construction-related and operational emissions that would be expected with the construction and operation of the proposed project – the "proposed project" GHG emissions. These estimates reflect all of the measures incorporated into the design and planned operations of the proposed project which will reduce its construction-related and operational GHG emissions.

The "proposed project" construction-related GHG emissions estimates are assumed to be the same as the "standard" construction emissions. It is anticipated that best management practices for construction emissions will reduce GHG emission to some extent. However, there is not yet a basis for reliably calculating the savings in construction emissions that can be achieved through application of the generic types of best management practices such as those that are recommended by BAAQMD for reducing construction emissions of GHG.

The "proposed project" operational GHG emissions estimates were calculated by applying anticipated reductions in vehicle trips, and anticipated energy savings calculated by PG&E.

Mobile source emissions from a project of this type are difficult to reduce. Patients or customers would make up most of the trips, and they are likely to make these trips by car. The project would include many incentives for workers or regular users of the hospital or offices to use alternative means to travel to the project site. These measures would include on-site facilities to accommodate bikers and pedestrians. Such facilities would include secure bike storage, lockers and shower/dressing room facilities. In addition, the project would provide direct linkages of pedestrian paths to different project components and bike paths that connect to the roadways. A reduction in mobile source emissions of 5 percent is anticipated based on these features. In addition, transit access is better the proposed project site than at Sutter's existing Chanate campus, and this should further reduce mobile source emissions.

Energy savings features that would be included in the project to reduce electricity and natural gas consumption would also reduce GHG emissions. Consistent with Title 24 building standards, a number of energy reduction and efficiency measures are being incorporated into the project to reduce energy consumption, many of which are beyond what would normally be included in a hospital. In addition, all facilities are proposed to be LEED certified and as a result would use many of the best energy reduction and efficiency measures available. Energy savings were calculated using Energy Soft modeling as part of the energy savings by design modeling. These reductions were applied to the project to calculate proposed project operational GHG emissions. (It should be noted that the new hospital building and Physicians Medical Center will replace the existing, less energy-efficient medical facilities on Chanate Road. While the buildings on Chanate will likely be occupied by other uses, the new uses are unlikely to involve 24-hour-a-day operations like the existing hospital use, and therefore would likely consume less energy.)

Table 7
Proposed Project Estimated Construction GHG Emissions

Annual Total Emissions	CO2 (tons/year)
2011	729
2012	186
2013	522

There will be some nominal amount of constructions emissions in late 2010 as site grading and soil surcharging begins. The annual construction emissions figures set forth above vary based on the anticipated activity during each year. In 2011, the first year of substantial construction, it is anticipated there will be numerous truck trips for fill import. Roadway improvements are assumed to occur simultaneously. Most building and infrastructure construction is anticipated to take place in 2012 and 2013. In 2013, there would also be truck trips to export fill from the site [x-reference to construction truck trips discussion in Traffic section].

Table 8
Proposed Project Estimated Operational GHG Emissions

Emission Source	CO2 (tons/year)
Operational (Mobile) Sources	6169
Electricity (including water)	1709
Emergency Generator Testing	41
Natural Gas	640
Total	8559

Accordingly, the applicant has estimated that the project as proposed would result in 1067 fewer tons of operational GHG emissions per year, a reduction of just over eleven percent (11%), comparing “proposed project” operational emissions to “standard” operational emissions. The project’s actual reduction in emissions should be greater.

First, there will be some reduction from construction best management practices, but as previously noted it is not yet possible to calculate the amount of such reductions. Second, there will be substantial reductions in the largest category of emissions, operational mobile sources, as more efficient fuels and vehicle engines are introduced. Transportation emission rates would likely decrease due to increased fuel efficiency and lower carbon content in fuels. The URBEMIS2007 model does not reflect current future fuel efficiency projections. Efficiency is regulated by the U.S. Department of Transportation and current CARB regulations that address climate change. Newer fuel standards would increase light-duty automobile and light-duty truck fuel efficiency by 10 miles per gallon (to 35 miles per gallon for cars sold in 2020). In addition, California will require lower carbon content fuels. In the CARB scoping plan, these steps are anticipated to provide some of the most substantial GHG emissions reductions.[14] While PG&E has emission rates for electricity usage that are much lower than State or national averages, these rates are expected to be reduced in the future as power producers develop cleaner sources of energy.

These reductions in estimated GHG emissions reflect the proposed project's inclusion of design features and emission reduction measures that relate to operational emissions reductions, as set forth in Table 8.

Based on the proposed project's incorporation of these GHG reduction measures, which will result in a substantial decrease in the proposed project's GHG emissions as compared to a standard hospital and medical office project of this scale and location, the project would not impede or conflict with the emissions reduction targets and strategies prescribed in or developed to implement AB 32, and will help to achieve AB 32 goals. For the same reason, the project will not impede or conflict with the attainment of the County's greenhouse gas reduction goal as expressed in General Plan Objective OSRC 14.4. Accordingly, the project would not result a contribution to global climate change that would be considered cumulatively considerable, and the impact from the development of the Project on greenhouse gas emissions and global climate change would be considered less than significant. It is important to note that the project's reduction will be in addition to the emissions reductions that are anticipated based on implementation of the AB 32 scoping plan. BAAQMD staff estimate that the combination of key scoping plan measures (such as the renewable portfolio standard, improvements to Title 24, AB 1493 vehicle standards, and low carbon fuel standards) will reduce future emissions by almost 24 per cent. The project's reduction will largely be in addition to these other reductions.

As a further level of analysis, Sutter has provided to the County a qualitative evaluation of the project relative to pertinent measures included in ARB's Scoping Plan for the state's compliance with AB 32. Table 8, Consistency of Campus Project Features with AB 32 Scoping Plan Measures, lists all pertinent measures included in CARB's Scoping Plan for the state's compliance with AB 32, and presents Sutter's sustainability policies, programs, project design features that comply with the Scoping Plan measures.

Based on the analysis in Table 8, the project would reduce its contribution to GHG emissions and global climate change due to its consistency with these strategies and measures. In addition, the project would incorporate other project features, such as proximity to commercial centers and public services that would result in lower fuel

[14] *California Air Resources Board, Climate Change Scoping Plan (December 2008) at 17.*

combustion emissions, reduced energy usage, water conservation, and other collateral benefits with respect to GHG emissions.[15,16] Also, also there are several basic characteristics of the proposed project that reduce its contribution to GHG emissions and global climate change. These include the project's proximity to Highway 101, the improved transit access to the hospital compared to Sutter's current site, and the co-location of various medical facilities on the same campus, avoiding the need for vehicle trips between those facilities.

BAAQMD proposed significance thresholds: One criteria, proposed as the sole recommendation by BAAQMD staff in September 2009 and then proposed as one of several possible options in October 2009, is a threshold of 1,100 metric tons of CO2 equivalent per year in operational emissions associated with the project. The project's estimated operational greenhouse gas emissions of 8559 tons per year would exceed this threshold, were it to be adopted.

Another criteria proposed by BAAQMD staff is 4.6 metric tons per year of CO2 equivalent operational emissions per service population associated with the project, with "service population" being defined as the sum of the number of jobs and the number of residents provided by a project. If this threshold were adopted and if it applied to this project, based on the projected employment at the project, it is anticipated that the project would exceed this threshold.

Consideration of Off-Site Mitigation: In addition to the project design features and mitigation measures on the project site, the County has also considered the feasibility of off-site mitigation, namely the purchase of carbon offsets. There are several issues relating to the feasibility and enforceability of offsets at this time. First, the threshold used in this analysis is the extent to which the project will help or hinder the attainment of state and local greenhouse gas reduction goals, and the offset programs which are available generally do not offset emissions in California or specifically in Sonoma County. There are also a number of uncertainties associated with purchasing offsets, including the permanence of the offsets, price fluctuations, ownership, verification of emissions reductions, and additionality.[17] The Air Resources Board has not adopted an offsets program under AB 32, and has been holding meetings this year to evaluate the

[15] *Project design features and emission reduction measures that are intended to reduce criteria pollutant emissions associated with fuel combustion (e.g., motor vehicle emissions) or energy conservation would also serve to reduce GHG emissions.*

[16] *The proposed project would result, through Phase III, in GHG emissions of approximately 8559 tons per year. Accordingly, the County notes that, compared to the estimated GHGs from all sources in California, and without considering any deduction for the loss of emissions as the Chanate campus closes, the Project's contribution to global climate would add approximately 0.0017 percent to California's GHG emissions inventory (484 million metric tons, including out-of-state electrical generation). The County is not using this figure to determine the significance of the emissions, but is setting it forth for disclosure purposes.*

[17] *Additionality refers to whether emissions reductions are additional steps beyond business as usual. All of these limitations on offsets as potential mitigation are discussed in detail in a certified EIR prepared for a corporate park project in Southern California. Michael Brandman & Associates, Environmental Impact Report P07-157, Highland Fairview Corporate Park, City of Moreno Valley, California. Some of these issues are also addressed in the August 2008 Report by the U.S. General Accounting Office, Carbon Offsets: The U.S. Voluntary Market is Growing but Quality Assurance Poses Challenges for Market Participants.*

role of offsets in a cap-and-trade program.[18] There is not currently an offset program that is designed to meet AB 32 emissions reduction goals or assist in achieving compliance with the greenhouse gas reduction goals in the Sonoma County General Plan. In summary, purchasing offsets to reduce the project's contribution to greenhouse gas emissions is not feasible at this time.]

As noted above, Sutter intends to incorporate Leadership in Energy and Environmental Design (LEED) standards and principles in the design and construction of the campus. The Project will pursue LEED certification for new construction in furtherance of incorporating energy conservation and sustainability measures into the project. The following will be studied for incorporation into the design:

- Building designs to maximize passive approaches to energy usage and reduce reliance on mechanical systems that involve significant energy demands;
- Buildings that incorporate green roof designs to insulate rooftops from heat island effects, slow and filter rain runoff from rooftops, extend the life of the roof, and reduce energy use for cooling and heating;
- Buildings to use waterless urinals, low flow toilets and low flow baths and showers;
- Open space such as passive open space, active and recreational open space, and interstitial open spaces between buildings;
- The open space system resulting in less building coverage and emphasizes the regional landscape of Sonoma County;
- The campus to implement a variety of low impact development practices to minimize adverse impacts related to storm water runoff.

Table 9, Consistency of Campus Project Features with AB 32 Scoping Plan Measures, lists all pertinent measures included in CARB's Scoping Plan for the state's compliance with AB 32, and presents Sutter's sustainability policies, programs, project design features that comply with the Scoping Plan measures.

Table 9
Consistency of the Sutter Project Features with AB 32 Scoping Plan Measures

Scoping Plan Measure	Sutter Policy/Project Feature
SPM-1: California Cap-and-Trade Program linked to Western Climate Initiative	Not applicable.
SPM-2: California Light-Duty Vehicle GHG Standards	Not applicable.

[18] *Information on the ARB's consideration of offsets is available on the ARB website. http://www.arb.ca.gov/cc/capandtrade/capandtrade.htm*

Scoping Plan Measure	Sutter Policy/Project Feature
SPM-3: Energy Efficiency	Aggressive conservation efforts and development of renewable power will be fundamental to project design. Buildings will be designed to consume reduced levels of energy and demand over the current hospital. LEED: The project has been registered for LEED certification.
SPM-4: Renewables Portfolio Standard	Not applicable
SPM-5: Low Carbon Fuel Standard	Not applicable
SPM-6: Regional Transportation-Related Greenhouse Gas Targets	Develop a coordinated master plan to guide design and implementation of the principal circulation infrastructure, including plans that address streets, bikeways, pedestrian ways, transit and parking; created a comprehensive, interconnected bicycle and pedestrian circulation system that provides access to major buildings. Work with local and regional transit providers to coordinate transit service, and establish convenient transfers between transit and other modes of travel. Provide priority parking for vanpools, carpools, and energy efficient and low-pollution vehicles, with recharge stations for electric vehicles and provide a natural gas vehicle charging stations. Provide leadership by using alternative fuel or other low-emission vehicles in the campus service fleet.
SPM-7: Vehicle Efficiency Measures	Not applicable.
SPM-8: Goods Movement	Not applicable.
SPM-9: Million Solar Roofs Program	Sutter is working with PG&E in its Energy By Design Program to optimize solar and thereby minimizing grid connected peak electricity loads by shifting electricity used for cooling away from peak electricity demand periods through chilled water thermal storage, gas or cogeneration-driven cooling, and/or solar power.
SPM-10: Heavy/Medium-Duty Vehicles	Minimize construction emissions.
SPM-11: Industrial Emissions	Not applicable.
SPM-12: High Speed Rail	Not applicable.
SPM-13: Green Building Strategy	Buildings will be designed to consume less energy and demand than the existing hospital and surpass Title 24 minimum efficiency standards, and achieve LEED certification. There is a relationship between indoor environmental quality and materials, lighting, thermal comfort, human health & productivity. Accordingly, Sutter Health as a community role model has a vested interest in delivering environments that optimize patient outcomes and provide a "best place to work and practice"

Scoping Plan Measure	Sutter Policy/Project Feature
	environment for its employees. Minimizing and controlling sources of allergens, mutagens, carcinogens and endocrine disruptors, while providing access to daylight and comfortable indoor climate in an accessible setting are fundamental building design goals. Exposure conditions that adversely affect health can only be evaluated in the light of the benefits received and the alternatives available. **Environmental Air Quality Guidelines** • Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants • Minimize production, distribution and exposure to pollutants-provide risk group specific protection where elimination is impossible • Provide occupants with access to natural daylight and healing views • Provide energy efficient thermal comfort within acceptable ranges • Provide occupant controlled zoned environmental controls (light, view, thermal, ventilation) • Manage pathogens and infection transmission with appropriate barriers, air flow, discharge and refresh rates **Environmental Air Quality Strategies** • Ensure high quality indoor air and thermal comfort by meeting or exceeding ASHRAE 62-1999 and ASHRAE 55-1992 as the minimum basis of design • Baseline design with minimum impact methods and materials including low VOC / low toxic finishes and materials i.e. Green Seal-certified paints; composite wood and agrifiber products without urea-formaldehyde resins; carpet systems certified by Carpet & Rug Institute Green Label Program; adhesives meeting local Air Quality Management District guidelines. • Design and specify systems that prevent trapping of water and microbial growth • Define and implement ICRA Infection control plan for all construction and renovation projects • Install entryway systems (e.g., grates) to trap dirt and particulates • Position building air intakes to prevent contamination from vehicle exhaust and other sources • Assure easy access to inspect and clean filters and ductwork in Air handling systems • Ventilate enclosed parking areas and other source areas (smoking areas, housekeeping, copying rooms, hazardous waste) • For buildings not 100% non smoking, provide total environmental separation for non smokers and assure no feed in to ventilation system • Include automated HVAC carbon dioxide monitoring system to provide feedback on space ventilation performance

Scoping Plan Measure	Sutter Policy/Project Feature
	• Design environments including materials, products, mechanical systems and design features to attenuate sound and vibration within tolerances outlined in Hospital guidelines in ASHRAE Application Handbook.
SPM-14: High GWP Gases	Not applicable.
SPM-15: Recycling and Waste	**Materials Conservation and Resource Efficiency** The healthcare delivery environment is first and foremost concerned with the health and welfare of the patients and staff. Although use of sustainable materials can significantly enhance a building's environmental impacts, there is no room in a critical care setting to compromise the health of our patients. Products and materials used in the healthcare delivery setting must be the best available that is appropriate for the use intended. Total Life Cycle costs associated with operating and maintaining the products and materials proposed must be balanced with the first cost and life cycle environmental impacts of the products considered. Hospital designs must seek to include sustainable harvest material, minimize production of persistent and bioaccumulative toxics (PBTs) and reduce waste. **Materials Conservation and Resource Efficiency Guidelines** • Balance resource depletion reduction objectives with service specific requirements • Reduce embodied energy (use lowest energy density product available) • Reduce toxics generated throughout the life cycle of materials • Reduce waste by including waste evaluations in design choices • Reduce impact of reuse or disposal of building **Materials Conservation and Resource Efficiency Strategies** • Reuse existing structures with minimum demolition practical • Specify materials and methods with reduced (or free from) ozone depleting substances and/or equipment using CFCs, HCFCs, and halons, balancing ozone depletion potential (ODP) with global warming potential (GWP) • Review design alternatives that consider materials that; ❖are free from toxic chemicals ❖do not release toxic byproducts throughout their life cycle ❖do not include toxins that are carcinogenic, persistent or bioaccumulative. (e.g. mercury, arsenic, urea formaldehyde, plasticizers in PVC and asbestos) ❖are recycled, reused/salvaged, remanufactured or from sustainable sources ❖are sustainably harvested

<table>
<tr><th>Scoping Plan Measure</th><th>Sutter Policy/Project Feature</th></tr>
<tr><td></td><td>❖are from local sources when available
❖are easily reusable, recyclable, or biodegradable on disposal
❖are design for efficient material use (less material use and less waste)
❖are design for adaptability of building design as needs change (reusable movable)
❖are designed for disassembly and recycle or reuse at end of building life.</td></tr>
<tr><td>SPM-16: Sustainable Forests</td><td>Not applicable</td></tr>
<tr><td>SPM-17: Water</td><td>Water Efficiency and Conservation
Water efficient design balances water quality and quantity availability and demand, both inside and outside of the building/campus. Water efficient design incorporates available resources and is responsive to the watershed and utility systems capacity as both source and sink. Limitation in utility system capacity and effectiveness demand that water be treated as a constrained and precious resource. Storm and Sanitary Sewer effluent flows can be dramatically impacted by environmentally sound planning and design.

Water Efficiency and Conservation Guidelines
• Optimize the use of potable water resources to conserve community water quality and availability
• Minimize operational impacts to off site treatment of wastewater by avoiding harshest and most problematical chemicals and processes
• Minimize storm water peak releases from the site, (capture and stage/ meter/ re-use)
• Maximize use of on-site water resources, (e.g., rainwater, gray water) where appropriate
• Match source water quality with end use requirements

Water Efficiency and Conservation Strategies
• Use high performance fixtures and equipment: e.g., low flow and pressure assist toilets and urinals; low-flow showerheads and faucets; automatic use activation on sinks, toilets and urinals; Water saving “Energy Star” labeled dietary, housekeeping laundry and mechanical systems equipment.
• Minimize boiler, mechanical and cooling tower water blow down chemical loading on sanitary sewer by eliminating water treatment chemicals. When possible evaluate use of non-evaporative condenser heat rejection equipment (air cooled, or ground source)
• Specify native plants that are tolerant of local climate, soils and water</td></tr>
</table>

Scoping Plan Measure	Sutter Policy/Project Feature
	• Install drip irrigation and high efficiency irrigation control with moisture sensors, weather based controllers. • Implement appropriate, safe strategies to recycle site waste water (e.g. gray water or condensate) and/or municipal secondary treated water for irrigation, sewage conveyance, and toilet flushing • Collect and store storm water runoff from roofs and site and use for irrigation, sewage conveyance, toilet flushing and/or HVAC/process makeup water or aquifer recharge • Minimize hardscapes and install site water runoff control and metering systems including permeable peak storage, specialty paving and other pervious surface materials • Create managed wetlands systems to locally recharge underground water flows.
SPM-18: Agriculture	Not applicable.

Source: AB 32 Scoping Plan Measures and Sutter Health Facility Planning & Development Building Design Policy for Sustainability.

The following Table 10, Office of Planning and Research Suggested Mitigation Measures, present mitigation measures recommended by the Attorney General's office and OPR for lead agencies to consider in the development and approval of projects. Many of these measures are already covered by the policies contained in the Project application as well as by design features.

Table 10
Office of Planning and Research Suggested Mitigation Measures

Suggested Mitigation Measures	Project Compliance
Land Use and Transportation	
1. Implement land use strategies to encourage jobs/housing proximity, promote transit-oriented development, and encourage high-density development along transit corridors. Encourage compact, mixed-use projects, forming urban villages designed to maximize affordable housing and encourage walking, bicycling and the use of public transit systems.	The Project is adjacent to transit and will improve and enhance all bus stops along its frontage. The integration before WFCA and Sutter will promote shared uses and will be tied by bike paths and walkways.
2. Encourage infill, redevelopment, and higher density development, whether in incorporated or unincorporated settings.	The Project is compactly designed and is infill development as it is surrounded by development on 3 sides and the freeway.
3. Encourage new developments to integrate housing, civic and retail amenities (jobs, schools, parks, shopping opportunities) to help reduce VMT	The Project is located next to WFCA and within walking distance to the Larkfield community.

Suggested Mitigation Measures	Project Compliance
resulting from discretionary automobile trips.	
4. Apply advanced technology systems and management strategies to improve operational efficiency of transportation systems and movement of people, goods and services.	The hospital Project will incorporate the latest in technology.
5. Incorporate features into project design that would accommodate the supply of frequent, reliable and convenient public transit.	The Project is adjacent to transit and will improve and enhance all bus stops along its frontage. WFCA and Sutter will promote shared uses and will be tied by bike paths and walkways.
6. Implement street improvements that are designed to relieve pressure on a region's most congested roadways and intersections.	The Project will improve and signalize the adjacent local roadways and provide off-ramp improvements.
7. Limit idling time for commercial vehicles, including delivery and construction vehicles.	Condition of approval shall require limits on construction traffic idling times and improved circulation will enhance operational deliveries.
Urban Forestry	
8. Plant trees and vegetation near structures to shade buildings and reduce energy requirements for heating/cooling.	The landscape plan has been designed to maximize aspect and reduce albedo.
9. Preserve or replace on-site trees (that are removed due to development) as a means of providing carbon storage.	Project vegetation, especially trees, will be significantly increased over existing condition. Landscaping will be water efficient and utilize water conservancy technology.
Green Buildings	
10. Encourage public and private construction of LEED Leadership in Energy and Environmental Design certified (or equivalent) buildings.	The Project has registered as a certified project.
Energy Conservation Policies and Actions	
11. Recognize and promote energy saving measures beyond Title 24 requirements for residential and commercial projects.	The Project is committed to working with PG&E to participate in their Savings By Design program which exceeds the 24 standards.
12. Where feasible, include in new buildings facilities to support the use of low/zero carbon-fueled vehicles, such as the charging of electric vehicles from green electricity sources.	Hospital vehicles are low carbon fueled vehicles. The Project will provide charging stations for visitors/employees.
13. Educate the public, schools, other jurisdictions, professional associations, business and industry about reducing GHG emissions.	N/A
14. Replace traffic lights, streetlights, and other electrical uses to energy efficient bulbs and appliances.	The Project will upgrade old signals and underground lights and replace these with modern fixtures thereby reducing energy demand.
15. Purchase Energy Star equipment and appliances for public agency use.	All new appliances will be as efficient as feasible given hospital requirements.
16. Incorporate on-site renewable energy production, including installation of photovoltaic cells or other solar options.	The Project is designing into its buildings solar and other energy producing features.
17. Execute an Energy Savings Performance Contract with a private entity to retrofit public buildings. This	N/A

Suggested Mitigation Measures	Project Compliance
type of contract allows the private entity to fund all energy improvements in exchange for a share of the energy savings over a period of time.	
18. Design, build, and operate schools that meet the Collaborative for High Performance Schools (CHPS) best practices.	N/A
19. Retrofit municipal water and wastewater systems with energy efficient motors, pumps and other equipment, and recover wastewater treatment methane for energy production.	N/A
20. Convert landfill gas into energy sources for use in fueling vehicles, operating equipment, and heating buildings	N/A
21. Purchase government vehicles and buses that use alternatives fuels or technology, such as electric hybrids, biodiesel, and ethanol. Where feasible, require fleet vehicles to be low emission vehicles. Promote the use of these vehicles in the general community.	N/A
22. Offer government incentives to private businesses for developing buildings with energy and water efficient features and recycled materials. The incentives can include expedited plan checks and reduced permit fees.	N/A
23. Offer rebates and low-interest loans to residents that make energy saving improvements on their homes.	N/A
24. Create bicycle lanes and walking paths directed to the location of schools, parks and other destination points.	The Project will install bike paths along its frontage and within the site.
Programs to Reduce Vehicle Miles Traveled	
25. Offer government employees financial incentives to carpool, use public transportation, or use other modes of travel for daily commutes.	N/A
26. Encourage large businesses to develop commute trip reduction plans that encourage employees who commute alone to consider alternative transportation modes.	The Project will provide transit opportunities by: • Providing local and regional transit services through its Volunteer Wheels • Constructing at least two sheltered bus stops in convenient locations • Providing shuttle services The Project will encourage carpooling by: • Develop a carpool/vanpool program by providing preferential parking • Coordinate with regional rideshare programs • Notification to future employees of carpool/vanpool opportunities

Suggested Mitigation Measures	Project Compliance
27. Develop shuttle systems around business district parking garages to reduce congestion and create shorter commutes.	N/A
28. Create an online ridesharing program that matches potential Carpoolers immediately through email.	The Project will provide transit opportunities by: • Providing local and regional transit services through its Volunteer Wheels • Constructing at least two sheltered bus stops in convenient locations • Providing shuttle services The Project will encourage carpooling by: • Develop a carpool/vanpool program by providing preferential parking • Coordinate with regional rideshare programs • Notification to future employees of carpool/vanpool opportunities
29. Develop a Safe Routes to School program that allows and promotes bicycling and walking to school.	N/A
Programs to Reduce Solid Waste	
30. Create incentives to increase recycling and reduce generation of solid waste by residential users.	N/A
31. Implement a Construction and Demolition Waste Recycling Ordinance to reduce the solid waste created by new development.	The Project shall prepare and implement a construction recycling program with a 75% diversion goal.
32. Encourage public and private construction of LEED Leadership in Energy and Environmental Design) certified (or equivalent) buildings.	The Project has registered as a certified project.

Source: Office of Planning and Research, CEQA and Climate Change: Addressing Climate Change Through CEQA Review, http://opr.ca.gov/download.php?dl=ceqa/pdfs/june08-ceqa.pdf. 2008.

As Table 9 shows, Sutter's Sustainability goals and policies, which are being implemented in the Project, are consistent with all applicable measures in the AB 32 Scoping Plan. Accordingly, Project is consistent with applicable AB 32 Scoping Plan measures. Further, as Table 10 shows, many of these measures in the Office of Planning and Research's Suggested Mitigation Measures are also incorporated as part of the Project.

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Sources:
* *Excludes emissions/removals from land use, land-use change and forestry (LULUCF)*

APPENDIX D

BIOLOGICAL RESOURCES TECHNICAL REPORTS

Appendix D1

Biological Resource Analysis Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation master Plan, Santa Rosa, Sonoma County, California

**BIOLOGICAL RESOURCE ANALYSIS
SUTTER MEDICAL CENTER OF SANTA ROSA/
LUTHER BURBANK MEMORIAL FOUNDATION MASTER PLAN
SANTA ROSA, SONOMA COUNTY, CALIFORNIA**

January 29, 2008

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Figure 1. Sutter Medical Center Project Site Regional Map.

Figure 2. Sutter Medical Center Project Site Location Map.

Figure 3. Aerial photograph of the Sutter Medical Center Project Site.

Figure 4. Soils on the Sutter Medical Center Project Site.

Figure 5. Closest Known Records for Special-Status Species Within 5 Miles of the Sutter Medical Center Project Site.

TABLES
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Table 1. Plant Species Observed on the Sutter Medical Center Project Site.

Table 2. Wildlife Species Observed on the Sutter Medical Center Project Site.

Table 3. Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site.

Table 4. Special-Status Animal Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site.

1. INTRODUCTION

Monk & Associates, Inc. (M&A) has prepared this biological resource analysis for the proposed Sutter Medical Center project site located at 50 Mark West Springs Road in Santa Rosa, Sonoma County, California (Figures 1, 2 and 3) (referred to herein as the project site). The proposed Sutter Medical Center will be a Master Planned Project titled the Sutter Medical Center Santa Rosa/Luther Burbank Memorial Foundation Master Plan Project (referred to herein as the project). The purpose of our analysis is to provide a description of existing biological resources on the project site and to identify potentially significant impacts that could occur to sensitive biological resources from the construction of a new hospital. A complete project description is provided below.

Biological resources include common plant and animal species, and special-status plants and animals as designated by the U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and other resource organizations including the California Native Plant Society. Biological resources also include waters of the United States and State, as regulated by the U.S. Army Corps of Engineers (Corps), California Regional Water Quality Control Board (RWQCB), and CDFG. It is important to note that our analysis includes an assessment of the potential for impacts to regulated waters, but does not provide the level of detail required for a formal delineation of waters suitable for submittal to the Corps.

This biological resources analysis also provides mitigation measures for “potentially significant” and “significant” impacts that could occur to biological resources. When implemented, the mitigation measures would reduce impacts to levels considered less than significant pursuant to the California Environmental Quality Act (CEQA). Accordingly, this report is suitable for review and inclusion in any review being conducted by Sonoma County for the proposed project pursuant to CEQA.

2. PROPERTY LOCATION AND SETTING

The project site is approximately 53± acres in size. It is located in the southeast quadrant of the U.S. Highway 101/Mark West Springs Road interchange. It is currently under two ownerships: Luther Burbank Memorial Foundation (“LBMF”), and Sutter Medical Center of Santa Rosa or affiliate (“Sutter”) and is comprised of four legal parcels as follows:

Parcel	Assessor’s Parcel No.	Owner	General Plan Land Use	Zoning	Area
1	58-040-058	Sutter	PQP	PF SD; SR	15.0± ac.
2	58-040-059	Sutter	PQP	PF/PF SD; SR	10.0± ac.
3	58-040-060	LBMF	PQP	PF/PF SD; SR	25.01± ac.
4	58-040-061	LBMF	PQP	PF	3.01± ac.
	Total				**53.02± ac.**

As outlined in the table above, LBMF owns 28± acres, while Sutter owns 25± acres. These four parcels are shown on Figure 3, an aerial photograph of the project site, which is located at the back of this report.

The project site is located on and adjacent to the Luther Burbank Center. Figure 3 at the back of this report shows the various land uses within the project site boundary. The largest use of the property is paved parking, paved roads, buildings, and manicured landscaping, totaling approximately 25 acres. Soccer/lacrosse fields and other non-irrigated turf areas that include a tot-lot cover another approximately 10 acres. A large, approximately 15-acre parcel occurs on the west edge of the project site; this parcel has been used in the recent past as a horse pasture. No horses were present at the time of M&A's December 2008 site surveys. This parcel is comprised largely of non-native annual grassland species. On the east side of this parcel there is a single family home and large utility barn. A smaller livestock building also occurs on this parcel (see Figure 3 for parcel locations). Also within the 15-acre parcel and immediately south of the residence and barns, there are two sewage treatment ponds that currently service the Luther Burbank Center. The aforementioned areas will be developed into the Sutter Medical Facility.

3. PROJECT DESCRIPTION

Sutter Medical currently operates one acute care hospital in Santa Rosa, located on Chanate Road. Sutter Medical has determined that replacement of the existing hospital on Chanate Road is needed to achieve long-range compliance with the Hospital Seismic Safety Acts (SB 1953 and 1661). Accordingly, Sutter Medical is proposing to build a new hospital to replace the hospital on Chanate Road. Sutter and LBMF have reached an agreement to prepare a joint Master Plan for the jointly owned properties.

The Sutter facilities would exclusively occupy Parcel #1, the LBMF facilities would exclusively occupy approximately 28 acres (Parcels #3 & 4), and 10 acres± (Parcel #2) would be devoted to shared vehicular parking facilities and a medical office building.

Construction of the various buildings and facilities would occur over time, by phases, generally as outlined below:

PHASE I (2010 - 2012) - Entitlement, Relocation, Replacement of Utilities and Existing Facilities

PHASE II (2010-2013) - Medical Center Construction

PHASE III - Possible Future Expansion

PHASE III(a) (2010 or later): Sutter could expand the hospital by up to 29 beds.

PHASE III(b) (2016 or later): Expansion of LBMF (fly loft) with internal renovation of the Person Theater to include a fly loft that is approximately 60 feet tall.

4. ANALYSIS METHODS

Prior to preparing this biological resource constraints analysis, M&A researched the most recent version of the California Department of Fish and Game's (CDFG) Natural Diversity Database, RareFind 3.2 application (CNDDB) for historic and recent records of special-status plant and animal species (that is, threatened, endangered, rare) known to occur in the region of the project site. In addition, M&A researched CNPS' electronic *Inventory* for records of special-status plants within five miles of the project site. All special-status species records were compiled in tables that are presented in this report. M&A examined all known record locations for special-status species to determine if special-status species could occur on the project site or within an area of affect.

M&A has been involved with this project and project site for a number of years. M&A's initial involvement with the project/project site began in 2004 when M&A conducted a site assessment for California tiger salamander on the project site and followed up this site assessment with a one year California tiger salamander trapping (i.e., drift fence/pitfall study) survey and two years of California tiger salamander larval surveys. Subsequent to the California tiger salamander surveys, on October 17, 2008, M&A's principal biologist Mr. Geoff Monk conducted a site evaluation to determine if there could be areas within the project site that would be regulated as waters of the United States and/or State. Potential wetland areas were mapped with a Trimble Pro GPS. Then, on December 23, 2008, Ms. Isabelle de Geofroy conducted a site evaluation to characterize plant communities and wildlife habitats onsite. Finally, on December 31, 2009 Mr. Geoff Monk and Ms. Sarah Lynch conducted a three parameter wetland delineation on the project site, taking the mapped data Mr. Monk previously collected and combining it with vegetation, soils, and hydrology data, making the delineation suitable for submittal to the resource agencies (that is, the Corps and the RWQCB). The results of our literature research, California tiger salamander surveys, wetland delineation, and general site assessments are provided in the sections below.

5. RESULTS OF RESEARCH AND PROJECT SITE ANALYSES

5.1 Soils

There are three soil types on the project site. These soils are discussed below.

5.1.1 CORTINA VERY GRAVELLY LOAM, 0 TO 2 PERCENT SLOPES

The Cortina series consists of excessively drained, very gravelly and sandy loams formed in recently deposited alluvium from mixed sedimentary and basic rock. Cortina very gravelly loam, 0 to 2 percent slopes (CsA), is derived from nearly level soils close to major stream channels on flood plains. Nearly all places are subject to inundation by runoff from winter rains. This results in minor deposition and removal of various soil material. The A horizon ranges from grayish brown to pale brown in color. The material is gravelly or very gravelly in texture ranges from loamy sand or sandy loam to loam. The lower C horizon ranges from 50 to about 90 percent gravel with little or no soil material other than coarse sandy loam and sand. Stratification is common in many areas. Permeability is very rapid in this Cortina soil, runoff is slow, and the hazard of erosion is slight. Fertility is low, and the available water capacity is 2 to 4 inches.

5.1.2 YOLO CLAY LOAM, 0 TO 2 PERCENT

The Yolo series consists of well drained loams underlain by recent alluvium from sandstone and shale. These soils are on alluvial fans and flood plains. The Yolo clay loam, 0 to 2 percent (YtA), is similar to Yolo loam, 0 to 2 percent slopes, but the surface layer is dark grayish-brown and very dark grayish-brown clay loam. Permeability is moderate, run-off is slow, and the hazard of erosion is slight. The available water capacity is 10 to 12 inches.

5.1.3 YOLO SILT LOAM, 0 TO 2 PERCENT

The Yolo series consists of well drained loams underlain by recent alluvium from sandstone and shale. The Yolo silt loam, 0 to 2 percent (YsA), is generally more stratified than Yolo loam. The silt loam surface layer is a result of the deposition from infrequent overflow and sloughing of finer- textured soil material from areas bordering this soil. Permeability is moderate, run-off is slow, and the hazard of erosion is slight. The available water capacity is 10 to 12 inches.

5.2 Hydrology and Topography

The project site consists of nearly level ground. It contains no natural watercourses or creeks. An old soil borrow pit occurs between the soccer field and the tot-lot immediately north of the existing Luther Burbank Center structures. This borrow pit is approximately 15,000 sq. ft. in size and collects surface water (both storm water and irrigation runoff) collected from the soccer field area of the project site. The “pond” attains a maximum depth of approximately 3 feet and is surrounded by and covered over by Fremont cottonwoods (*Populus fremontii* ssp. *fremontii*) and red willows (*Salix laevigata*). The pond dries sometime in mid-summer.

There are two small ephemeral drainage ways on the project site. Both of these are relatively small, man-made drainage features that were constructed with the Luther Burbank Center to facilitate onsite runoff and drainage. The largest drainage way begins east of the pond and adjacent to a driveway that accesses the Luther Burbank Center’s southeastern parking lot. Its source is a small, concrete lined water collection basin that receives storm event sheet flows that are directed into the basin through man-made upland swales off various parking areas and open fields associated with parking areas. This basin is hydrologically connected via culverts under the access driveway to a concrete lined v-ditch (approximately 2 foot across the top of the “V”) that delivers storm water southwestward before entering a long culvert under the main parking area north of the Luther Burbank Center. On the southern edge of this parking area, the culvert jettisons water into a man-made drainage swale that drains southwest into a culvert under Highway 101 on the western edge of the Luther Burbank Center. This swale is dominated by Himalayan blackberry (*Rubus discolor*) and pampas grass (*Cortaderia jubata*).

A second drainage feature that also is man-made occurs on the south end of the Luther Burbank Center. A culvert from the southern parking lot area provides water to this man-made drainage. The drainage starts at the southern end of the paved parking area and leaves the project site via a culvert that is routed westward under Highway 101. This drainage is also dominated by pampas grass and Himalayan blackberry.

The project site has no significant offsite watershed. Virtually the entire project site drains during storm events via percolation into the soil, into limited onsite collection at the pond, and into the two small drainage ways described above.

5.3 Plant Communities and Associated Wildlife Habitats

The project site's vegetation has been altered through historic and ongoing agricultural and other land use activities. Based on aerial photographs from the 1960s, at one time virtually the entire project site supported orchards. Since then the trees have been removed and the main parcel has been completely altered by the construction and operation of the existing Luther Burbank Center facilities. The main project site parcel contains the Center's buildings and parking lots, and extensive planted (and irrigated) turf areas for picnicking, occasional overflow parking, and special events (including the erection and use of large outdoor tents). In the few undeveloped portions of this parcel ruderal (weedy) vegetation grows. An open, non-native annual grassland field is also present along the western edge of the project site between Highway 101 and the sewage treatment ponds. This plant community and other remnant or existing plant communities present on the project site are described in the paragraphs below.

A complete list of plant species observed on the project site is presented in Table 1. Nomenclature used for plant names follows *The Jepson Manual* (Hickman 1993) and changes made to this manual as published on the Jepson Interchange Project website (http://ucjeps.berkeley.edu/interchange/index.html). Table 2 is a list of wildlife species observed on the project site. Nomenclature for wildlife follows CDFG's *Complete list of amphibian, reptile, bird, and mammal species in California* (2006) and any changes made to species nomenclature as published in scientific journals since the publication of CDFG's list.

5.3.1 Non-Native Annual Grassland

Non-native annual grassland occurs in the field on the west side of the project site. This plant community is dominated by introduced grasses and forbs, including Italian rye grass (*Lolium multiflorum*), soft chess brome (*Bromus hordeaceus*), rip-gut brome (*Bromus diandrus*), medusa head (*Taeniatherum caput-medusae*), spring vetch (*Vicia sativa*), prickly lettuce (*Lactuca serriola*), bindweed (*Convolvulus arvensis*), filarees (*Erodium botrys, E. cicutarium, E. moschatum*) and cut leaf geranium (*Geranium dissectum*). A large patch of Fuller's teasel (*Dipsacus sativus*) grows in the approximate center of this field. Coyote brush (*Baccharis pilularis*) are scattered throughout the field. Along the fenceline of this field are valley oak (*Quercus lobata*) and coast live oak (*Quercus agrifolia)* trees, and Himalayan blackberry bushes.

The project site's grassland habitat provides food and cover for a variety of wildlife species, including amphibians such as western toad (*Bufo boreas*) who will seek seasonal refuge in the grassland and forage there; reptiles such as western fence lizard (*Sceloporus occidentalis*) who will forage in the grassland; and mammals such as red fox (*Vulpes vulpes*), Botta's pocket gopher (*Thomomys bottae*), striped skunk (*Mephitis mephitis*), Virginia opossum (*Didelphis virginiana*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), and ornate shrew (*Sorex ornatus*). The grasses and forbs provide seeds for passerine birds (perching birds) such as white-crowned sparrow (*Zonotrichia leucophrys*) and lesser goldfinch (*Carduelis* *psaltria*). All these species were detected on the project site during M&A's 2004 and 2008 site visits.

5.3.2 Ornamental Landscaping

The Luther Burbank Center and the grounds surrounding the single family home have been planted with ornamental trees and shrubs, including redwood (*Sequoia sempervirens*), deodar cedar (*Cedrus deodara*), Monterey pine (*Pinus radiata*), liquidambar (*Liquidambar styraciflua*), camphor (*Cinnamomum camphora*), olive (*Olea europaea*), persimmon (*Diospyros kaki*), strawberry tree (*Arbutus unedo*), rose (*Rosa* sp.) and juniper (*Juniperus* sp.). Large lawns are located north and southwest of the Luther Burbank Center. A few mature valley oaks, including a 48-inch diameter oak, are found within the parcel that now supports the single family home.

Ornamental landscape plants provide urban adapted species with a food source and nesting opportunities. Birds observed in the residential areas of the project site include American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), brown-headed cowbird (*Molothrus ater*), California towhee (*Sitta carolinensis*), cedar waxwing (*Bombycilla cedrorum*), house finch (*Carpodacus mexicanus*), yellow-rumped warbler (*Dendroica coronata*), and northern mockingbird (*Mimus polyglottos*). Also detected was western fence lizard.

5.3.3 Pond habitat/borrow pit

The borrow pit/pond on the project site supports an assemblage of riparian tree species commonly associated with ponds and drainages, including valley oak, Fremont cottonwood, red willow, and narrow-leaved willow (*Salix exigua*). Olive trees (*Olea europaea*), likely a remnant of the project site's orchard days, are also growing in this area. This dense growth of vegetation completely encircles the pond, providing wildlife with dense cover. Understory species include coyote brush, cotoneaster (*Cotoneaster pannosa*), and fennel (*Foeniculum vulgare*).

Wildlife species associated with the borrow pit/pond on the project site include bird species who forage insects from the willow leaves and branches, such as ruby-crowned kinglet (*Regulus calendula*), and oak titmouse (*Baeolophus inornatus*), and larger bird species that hunt for insects in the trees bark such as the Nuttall's woodpecker (*Picoides nuttallii*) and northern flicker (*Colaptes auratus*). Black phoebes (*Sayornis nigricans*) were observed sallying for insects near the pond surface. Arboreal salamander (*Aneides lugubris*), California slender salamander (*Batrachoseps attenuatus*), and Pacific tree frog (*Pseudacris regilla*) were all found in the pitfall traps encircling the pond as part of the California tiger salamander drift fence survey.

5.3.4 Ruderal Habitat

Ruderal (weedy) communities are assemblages of plants that thrive in waste areas, roadsides and other sites that have been disturbed by human activity. On the project site, ruderal habitat occurs around the sewage treatment ponds, the single family home, in undeveloped areas south and northeast of the Luther Burbank Center, and along the edges of the project site and the parking lots. Ruderal species detected in these areas include wild oats (*Avena fatua*), soft chess, ripgut brome, common velvet grass (*Holcus lanatus*), Harding grass (*Phalaris aquatica*), English plantain (*Plantago lanceolata*), sharp-point fluellin (*Kickxia elatine*), and short-podded mustard

(*Hirschfeldia incana*). Monterey pines have been planted around the perimeter of sewage treatment pond area, with coyote brush and Himalayan blackberry scattered throughout the area.

Typically, ruderal communities provide habitat for those animal species adapted to man. Examples of animals associated with these communities include house finch (*Carpodacus mexicanus*), killdeer (*Charadrius vociferus*), white-crowned sparrow, California towhee, American robin, American crow (*Corvus brachyrhynchos*), raccoon, and opossum, all of which have been observed (either by sight or sign) on the project site.

6. SPECIAL-STATUS SPECIES DEFINITION

6.1 Definitions

For purposes of this analysis, special-status species are plants and animals that are legally protected under the California and Federal Endangered Species Acts (CESA and FESA, respectively) or other regulations, and species that are considered rare by the scientific community (for example, the CNPS). Special-status species are defined as:

- plants and animals that are listed or proposed for listing as threatened or endangered under the CESA (Fish and Game Code §2050 *et seq*.; 14 CCR §670.1 *et seq.*) or the FESA (50 CFR 17.12 for plants; 50 CFR 17.11 for animals; various notices in the Federal Register [FR] for proposed species);

- plants and animals that are candidates for possible future listing as threatened or endangered under the FESA (50 CFR 17; FR Vol. 64, No. 205, pages 57533-57547, October 25, 1999); and under the CESA (California Fish and Game Code §2068);

- plants and animals that meet the definition of endangered, rare, or threatened under the California Environmental Quality Act (CEQA) (14 CCR §15380) that may include species not found on either State or Federal Endangered Species lists;

- Plants occurring on Lists 1A, 1B, 2, 3, and 4 of CNPS' *Electronic Inventory* (CNPS 2001). The California Department of Fish and Game (CDFG) recognizes that Lists 1A, 1B, and 2 of the CNPS inventory contain plants that, in the majority of cases, would qualify for State listing, and CDFG requests their inclusion in EIRs. Plants occurring on CNPS Lists 3 and 4 are "plants about which more information is necessary," and "plants of limited distribution," respectively (CNPS 2001). Such plants may be included as special-status species on a case by case basis due to local significance or recent biological information;

- migratory nongame birds of management concern listed by U.S. Fish and Wildlife Service (Migratory Nongame Birds of Management Concern in the United States: The list 1995; Office of Migratory Bird Management; Washington D.C.; Sept. 1995);

- animals that are designated as "species of special concern" by CDFG (2008);

- Animal species that are "fully protected" in California (Fish and Game Codes 3511, 4700, 5050, and 5515).

In the paragraphs below we provide further definitions of legal status as they pertain to the special-status species discussed in this report or in the attached tables.

Federal Endangered or Threatened Species. A species listed as Endangered or Threatened under the FESA is protected from unauthorized "take" (that is, harass, harm, pursue, hunt, shoot, trap) of that species. If it is necessary to take a Federal listed Endangered or Threatened species as part of an otherwise lawful activity, it would be necessary to receive permission from the USFWS prior to initiating the take.

State Threatened Species. A species listed as Threatened under the state Endangered Species Act (§2050 of California Fish and Game Code) is protected from unauthorized "take" (that is, harass, pursue, hunt, shoot, trap) of that species. If it is necessary to "take" a state listed Threatened species as part of an otherwise lawful activity, it would be necessary to receive permission from CDFG prior to initiating the "take."

California Species of Special Concern. These are species in which their California breeding populations are seriously declining and extirpation from all or a portion of their range is possible. This designation affords no legally mandated protection; however, pursuant to the CEQA Guidelines (14 CCR §15380), some species of special concern could be considered "rare." Pursuant to its rarity status, any unmitigated impacts to rare species could be considered a "significant effect on the environment" (§15382). Thus, species of special concern must be considered in any project that will, or is currently, undergoing CEQA review, and/or that must obtain an environmental permit(s) from a public agency.

CNPS List Species. The California Native Plant Society (CNPS) maintains an inventory of special status plant species. This inventory has four lists of plants with varying rarity. These lists are: List 1, List 2, List 3, and List 4. Although plants on these lists have no formal legal protection (unless they are also state or federal listed species), the California Department of Fish and Game requests the inclusion of List 1 species in environmental documents. In addition, other state and local agencies may request the inclusion of species on other lists as well. List 1 species have the highest priority: List 1A species are thought to be extinct, and List 1B species are known to still exist but are considered "rare, threatened, and endangered in California and elsewhere." All of the plants constituting List 1B meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2062 and 2067 (California Endangered Species Act) of the CDFG Code, and are eligible for state listing (CNPS 2001). List 2 species are rare in California, but more common elsewhere. Lists 3 and 4 contain species about which there is some concern, and are review and watch lists, respectively. Additionally, in 2006 CNPS updated their lists to include "threat code extensions" for each list. For example, List 1B species would now be categorized as List 1B.1, List 1B.2, or List 1B.3. These threat codes are defined as follows: .1 is considered "seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat)"; .2 is "fairly endangered in California (20-80% of occurrences threatened)"; .3 is "not very endangered in California (less than 20% of occurrences threatened or no current threats known)."

Under the CEQA review process only CNPS List 1 and 2 species are considered since these are the only CNPS species that meet CEQA's definition of "rare" or "endangered." Impacts to List 3 and 4 species are not regarded as significant pursuant to CEQA.

Fully Protected Birds. Fully protected birds, such as the white-tailed kite and golden eagle, are protected under California Fish and Game Code (§3511). Fully protected birds may not be "taken" or possessed (i.e., kept in captivity) at any time.

Protected Amphibians. Under Title 14 of the California Code of Regulations (14 CCR 41), protected amphibians, such as the California tiger salamander, may only be taken under special permit from California Department of Fish and Game issued pursuant to Sections 650 and 670.7 of these regulations.

6.2 Potential Special-Status Plants on the Project Site

Figure 5 provides a graphical illustration of the closest known records for special-status species within 5 miles of the project site and helps readers visually understand the number of sensitive species that occur in the vicinity of the project site. Table 3, at the back of this report, lists the special-status plants of concern for the proposed project site. No special-status plants have been mapped on or adjacent the project site.

Surveys for special-status plants were conducted on the project site over four years: 1993, 1998, 1999, and 2004 by plant ecologist, Mr. Charlie Patterson (Patterson 2004). The 1993 surveys focused on the approximately 15-acre, undeveloped, grassland parcel (APN 058-040-058) located in the northern portion of the project site. The other three survey years focused on the entire project site. Surveys for special-status plants were appropriately timed during the known blooming periods of the four federally listed plant species known from the Santa Rosa Plain: Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), Baker's blennosperma (*Blennosperma bakeri*), and many-flowered navarretia (*Navarretia plieantha*). To coincide with these species' blooming periods, Mr. Patterson conducted his field surveys on March 16, April 14, May 10, and June 15, 1993, May 6 and June 9, 1998 (a very wet and late spring), and again in 1999 and 2004 on March 29, April 27, May 15 and 30. These survey dates were also appropriate for identifying other special-status plant species known from the region (see Table 3).

Based on the focused surveys conducted over multiple years, the marginal native plant habitat present on the site, the lack of any nearby historic rare plant locations, and Mr. Patterson's experience conducting special-status plant surveys in the Santa Rosa Plain, it was Mr. Patterson's conclusion that the surveys for the project site were adequate to reliably determine the absence of the potential plant species of concern. Based on M&A biologists' experience conducting surveys for special-status plants on the Santa Rosa Plain, we concur with Mr. Patterson's findings.

6.3 Potential Special-Status Animals on the Project Site

Figure 5 provides a graphical illustration of the closest known records for special-status species within 5 miles of the project site and helps readers visually understand the number of sensitive species that occur in the vicinity of the project site. No special-status animals have been mapped on or adjacent to the project site (CNDDB records). However, a total of 10 special-status animal species are known to occur in the region of the project site (CNDDB records and M&A's experience; see Table 4). Based on an absence of suitable habitat onsite, focused studies onsite, and M&A biologists' knowledge of special-status species issues in the Santa Rosa area, we determined that the project site does not provide suitable habitat for any federal or state listed animal species, or state species of special concern. However, the trees on the project site may provide suitable nesting habitat for raptors (birds of prey) and passerine birds (perching birds). Raptors that could nest on the project site are discussed below. Also, because of the sensitivity of one of the listed special-status animal species known to occur in the area, but not on the project site, the California tiger salamander (*Ambystoma californiense*), is discussed in the section below. All other special-status animals known from the region are summarily dismissed for the reasons presented in Table 4 and are not discussed further in this report.

6.3.1 California Tiger Salamander

6.3.1.1 CTS Legal Status

The California tiger salamander (CTS) has different state and federal legal protections. All distinct populations of the CTS are federally listed as endangered (that is, the Sonoma County *Distinct Population Segment* (DPS), the Santa Barbara DPS, and the Central California DPS). The USFWS designated Critical Habitat for the Central California DPS; however, chose not to designate Critical Habitat for the Sonoma County DPS since the USFWS concluded that the designation of critical habitat for the Sonoma County DPS would have negative impacts on the finalization and implementation of the Santa Rosa Plain Conservation Strategy (Federal Register Notice 70: 74137).

To cushion ranchers from any impacts of the salamander protective listing, the USFWS has launched a special rule, authorized under the Endangered Species Act, to work cooperatively with ranchers to save the species. The rule strives to conserve salamander habitat while helping keep ranching viable. The rule allows some traditional ranching activities to continue without additional regulation, such as stock pond construction and maintenance.

The CTS is also a California "species of special concern." This title affords the CTS no legally mandated protection; however, pursuant to CEQA (14 CCR §15380), this species must be considered in any project that will undergo, or is currently undergoing CEQA review, and/or any project that must obtain an environmental permit(s) from a public agency (e.g., the U.S. Army Corps of Engineers). In addition, in December 2008, a Court of Appeal, Third Appellate District struck down a decision by the California Fish and Game Commission ("Commission") to deny listing the California tiger salamander as a candidate species for listing under the California Endangered Species Act ("CESA"). In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal. App. 4th 597, the court ruled that the Commission must accept a listing petition of a candidate species if the information would "lead a reasonable person to conclude there is a substantial possibility" that the species could be listed. Placing a species on the candidate list triggers a review by the Department of Fish and Game to determine whether permanent listing under the CESA is required. Prior to impacting designated candidate species a State Endangered Species Act permit is required or a consistency determination with a federal incidental take permit must be made by CDFG pursuant to Section 2080.1 of the CESA. While the Court of Appeal overturned the Commission's decision not to list the CTS, at this date (December 30, 2008), the CTS has not yet been reclassified as a Candidate for Listing by the CDFG although this decision is surely to come in the next month or two.

Finally, under Title 14, CCR 41 (1996), CTS is a protected amphibian that may only be taken or possessed under a special permit issued by the California Department of Fish and Game (CDFG) pursuant to sections 650 and 670.7 of these regulations, or Section 2081 of the Fish and Game Code.

6.3.2 PROJECT SITE SURVEYS

M&A received an amendment to its federal 10(A)(1)(a) permit TE-776608 authorizing M&A to conduct drift fence surveys for the Sonoma County "distinct population segment" of the CTS. Authorization to conduct drift fence surveys was confirmed by Mr. Vincent Griego in a September 7, 2005 email. Field surveys were conducted by M&A 10(A)(1)(a) authorized biologists according to permit conditions.

The field surveys were conducted following guidelines prescribed in the USFWS' October 2003 *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander*. The guidelines required the use of drift fencing in combination with pitfall traps as a means of determining the presence of CTS at sites where they may be affected by development projects.

In the 2005/2006 trapping season drift fences were installed by October 15, 2005 prior to the onset of heavy seasonal rains. Trapping was completed on March 15, 2006, and trap line removal began immediately thereafter with full removal accomplished by April 1, 2006. The drift fence was approximately 6,550 feet in length and contained a total of 218 pitfall traps.

Authorization to conduct spring larval surveys at the project site was granted by Mr. Vincent Griego of the USFWS in a March 22, 2005 email correspondence. The project site contains one man-made pond that could provide CTS breeding habitat. The first dip net larval survey was conducted on March 29, 2005; at that time we determined that it was necessary to also funnel trap the detention basin. Larval surveys were conducted using wire funnel traps in accordance with the survey protocol. Funnel traps were approved for use by Mr. Griego and installed for 2, 3-day trapping periods in 2005, and 3, 3-day periods in 2006. Traps were set and monitored April 12-15 and May 26-29, 2005. During spring 2006, funnel traps were set and monitored March 5-8, April 1-4, May 11-14. Additionally, all aquatic habitats were dip-netted according to survey protocols for a total of 6 dip net surveys at the project site. With the exception of the man-made pond, standing water on the site lasted only during heavy storm events and receded within a few day of dry, warm weather.

No CTS were captured in pitfall traps on the project site during the 2005/2006 survey period. During the 2005/2006 season pitfall traps were opened/checked a total of 58 times. The total number of days traps were set during the months of October, November, December, January, February and March was 3, 8, 13, 14, 9 and 11, respectively. A complete report showing weather data and animal captures was provided to the USFWS (Monk & Associates 2006).

A total of twelve vertebrate species (6 mammals, 2 reptiles, and 4 amphibians) were captured in pitfall traps set at the project site. Animals captured included: California meadow voles (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), Western harvest mouse (*Reithrodontomys megalotis*), deer mouse, black rat (*Rattus rattus*), ornate shrew (*Sorex ornata*), western fence lizard, alligator lizard (*Elgaria coerulea),* Northern Pacific tree frog, arboreal salamander, western toad and California slender salamander. A total of 729 animals were captured during the 2005/2006 trapping season.

No CTS adult, larvae, or eggs were observed during aquatic trap check visual surveys or protocol level dip net surveys. The only amphibian found in the pond was the Northern Pacific tree frog. Larvae, eggs, and metamorphs of this frog were found in all survey years. All other captures were limited to Notonectids, Corixids, dragonfly larvae, snails, Dytiscids, and scuds.

Based on the results of M&A's protocol level pitfall trapping and aquatic surveys (dip-netting and minnow trapping), the USFWS, Sacramento Field Office, concurred with M&A's survey findings that the CTS does not occur on the project site and development of the project site would not result in "take" of this federal listed species. *A letter of "no effect" for this project and project site was written by USFWS and submitted to M&A (email correspondence between Mr. V. Griego of USFWS with Mr. G. Thomas and Mr. G. Monk of M&A, December 20, 2006).* Pursuant to CEQA, the project would have no significant adverse impacts to CTS.

6.3.3 RED SHOULDERED HAWK

Red shouldered hawk (*Buteo lineatus*) is protected under the Migratory Bird Treaty Act (50 CFR 10.13) and under California Fish and Game Code Sections 3503, 3503.5, 3800, and 3513 which protect nesting raptors and their eggs/young. This medium-sized raptor prefers the largest trees in a particular area for nest construction. Blue gum eucalyptus (*Eucalyptus globulus*) trees have become favorite nesting trees for this species in California. A stick nest is constructed and usually two to four eggs are laid in the spring. Incubation lasts about 27 days. Usually two or three nests are built over a several year period by a nesting pair and then are reused year after year. Prey consists of reptiles and small rodents.

The project site provides suitable nesting and foraging habitat for red shouldered hawk. Monterey pines, coast live oaks, and valley oaks are suitable nesting habitat for this species. Hence, until nesting surveys are conducted that confirms or negates this species' presence on the project site impacts to nesting red shouldered hawks from the proposed project are considered potentially significant pursuant to CEQA.

Surveys should be conducted in the late winter and early spring the year project construction is scheduled to commence. If the construction would start later in the spring, t*he optimal time to survey for nesting red shouldered hawks in the San Francisco Bay Area is between April 15 and*

May 15. If red shouldered hawks are identified nesting on the project site a nesting buffer would have to be established. The nesting buffer could be as large as small as 75 feet or as large as 300-feet around the nest tree until the hawks are finished nesting. It is imperative to have a qualified biologist determine the size of the buffer. In this fashion the minimal area necessary to protect the nest site can be identified. This will allow the project to proceed with the minimum avoidance requirements while otherwise ensuring that direct take of the nesting birds is minimized and that the project otherwise remains in compliance with the federal Migratory Bird Treaty Act and California Fish and Game Code. Nesting is finished when the young have left the nest, typically in August. However, completion of the nesting cycle should be determined by a qualified raptor biologist. It is unlikely that mitigation would be required by the resource agencies for impacts to red-shouldered hawk nesting territory after or prior to actual nesting.

6.3.4 RED-TAILED HAWK

The red-tailed hawk (*Buteo jamaicensis*) is protected under the Migratory Bird Treaty Act (50 CFR 10.13) and under California Fish and Game Code §3503.5, 3800, and 3513 which protect nesting raptors and their eggs/young. This raptor species has an extremely wide tolerance for habitat variation, which can be attributed to its very broad spectrum of prey (Johnsgard 1990). Some clear habitat preferences do exist, however, and have been analyzed by a variety of studies. Habitat preferences in the winter for both sexes are oriented toward upland pasture, grassland, and hardwood habitats, with females also using lowland hardwoods and males using marsh–shrub communities. In the spring, females continue to use mainly upland and lowland hardwoods, probably as a reflection of their orientation toward a nest site. M&A has observed red-tailed hawks nesting in a variety of tree species including eucalyptus, coast live oak, and valley oak trees.

The project site's Monterey pines, coast live oaks, and valley oak trees provide suitable nesting habitat for red-tailed hawks. The ruderal field provides suitable foraging habitat. Hence, until nesting surveys are conducted that confirms or negates this species' presence on the project site impacts to nesting red-tailed hawks from the proposed project are considered potentially significant pursuant to CEQA.

Preconstruction nesting surveys should be conducted prior to grading the project site to ensure that direct take of this species would not occur. *Surveys should be conducted in the late winter and early spring the year project construction is scheduled to commence. If the construction would start later in the spring, the optimal time to survey for nesting red-tailed hawks is between April 15 and May 15.* If red-tailed hawks are identified nesting on the project site, a construction buffer would have to be temporarily established until the hawks are finished nesting. The nesting buffer could be as small as 100 feet or as large as 300 feet around the nest tree. It is imperative to have a qualified biologist determine the size of the buffer. In this fashion the minimal area necessary to protect the nest site can be identified. This will allow the project to proceed with the minimum avoidance requirements while otherwise ensuring that direct take of the nesting birds is minimized and that the project otherwise remains in compliance with the federal Migratory Bird Treaty Act and California Fish and Game Code. After the nesting cycle ends, and the young have fledged, typically in late-July or early August, there would be no further requirements for avoidance of the nesting tree.

6.3.5 WHITE-TAILED KITE

The white-tailed kite (*Elanus caeruleus*) is fully protected under the California Fish and Game Code. Fully protected birds may not be "taken" or possessed (i.e., kept in captivity) at any time (§3511). It is also protected under the Federal Migratory Bird Treaty Act (50 CFR 10.13). The white-tailed kite is typically found foraging in grassland, marsh, or cultivated fields where there are dense-topped trees or shrubs for nesting and perching. They nest in a wide variety of trees of moderate height and sometimes in tall bushes, such as coyote bush (*Baccharis pilularis*). Native trees used are live and deciduous oaks (*Quercus* spp.), willows (*Salix* spp.), cottonwoods (*Populus* spp.), sycamores (*Platanus* spp.), maples (*Acer* spp.), toyon (*Heteromeles arbutifolia*), and Monterey cypress (*Cupressus macrocarpa*). Although the surrounding terrain may be semiarid, kites often reside near water sources, where prey is more abundant. The particular characteristics of the nesting site do not appear to be as important as its proximity to a suitable food source (Shuford 1993). Kites primarily hunt small mammals, with California meadow voles (*Microtus californicus*) accounting from between 50-100% of their diet (Shuford 1993).

The Monterey pines, coast live oaks, and valley oaks on the project site provide suitable nesting habitat for white-tailed kites. The ruderal field provides suitable foraging habitat. Preconstruction nesting surveys should be conducted prior to grading the project site to ensure that direct take of this species would not occur. Hence, until nesting surveys are conducted that confirms or negates this species' presence on the project site impacts to nesting white-tailed kites from the proposed project are considered potentially significant pursuant to the CEQA.

Surveys should be conducted in the late winter and early spring the year project construction is scheduled to commence. If the construction would start later in the spring, the optimal time to survey for nesting whit-tailed kites in the San Francisco Bay Area is between April 15 and May 15. If white-tailed kites are identified nesting on the project site, a construction buffer would have to be temporarily established until the kites are finished nesting. The nesting buffer could be as large as a 300-foot radius around the nest tree. It is imperative to have a qualified biologist determine the size of the buffer. In this fashion the minimal area necessary to protect the nest site can be identified. This will allow the project to proceed with the minimum avoidance requirements while otherwise ensuring that direct take of the nesting birds is minimized and that the project otherwise remains in compliance with the federal Migratory Bird Treaty Act and California Fish and Game Code. After the nesting cycle ends, and the young have fledged, typically in late-July or early August, there would likely be no further requirements for avoidance of the nesting tree.

7. REGULATORY FRAMEWORK FOR NATIVE WILDLIFE, FISH, AND PLANTS

This section provides a discussion of those laws and regulations that are in place to protect native wildlife, fish, and plants. Under each law we discuss their pertinence to the proposed development.

7.1 Federal Endangered Species Act

The primary focus of the FESA of 1973 is that all federal agencies must seek to conserve threatened and endangered species through their actions. FESA has been amended several times in the past to correct perceived and real shortcomings. FESA contains three key sections. Section

4 (16 USCA §1533) outlines the procedure for listing endangered plants and wildlife. Section 7 (§1536) imposes limits on the actions of federal agencies that might impact listed species. Section 9 (§1538) prohibits the "taking" of a listed species by anyone, including private individuals, and State and local agencies. In the case of salt water fish and other marine organisms, the requirements of FESA are enforced by the National Marine Fisheries Service (NMFS). The USFWS enforces all other cases. Below, Sections 7, 9, and 10 of FESA are discussed since they are the two sections most relevant to the proposed project.

Section 9 of FESA as amended, prohibits the "take" of any fish or wildlife species listed under FESA as endangered. Under Federal regulation, "take" of fish or wildlife species listed as threatened is also prohibited unless otherwise specifically authorized by regulation. "Take," as defined by FESA, means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harm" includes not only the direct taking of a species itself, but the destruction or modification of the species' habitat resulting in the potential injury of the species. As such, "harm" is further defined to mean "an act which actually kills or injures wildlife; such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" (50 CFR 17.3). A recent (December 2001) decision by the 9th Circuit Court of Appeals (*Arizona Cattle Growers' Association, Jeff Menges, vs. the U.S. Fish and Wildlife Service and Bureau of Land Management, and the Southwest Center for Biological Diversity*) ruled that the USFWS must show that a threatened or endangered species is present on a project site and that it would be taken by the project activities. According to this ruling, the USFWS can no longer require mitigation based on the probability that the species could use the site. Rather they must show that it is actually present.

The project site is located in an area that is regulated by the USFWS' Sacramento Endangered Species Office. This office believes the above case was narrowly focused on federal grazing leases and the affects of these leases on federal listed species. Due to this narrow focus, the Sacramento office believes that this case has little bearing in northern California. This office claims that probable use of habitat by a federal listed species would still be subject to the provisions of FESA.

Section 9 applies not only to federal agencies but also to any local or State agency, and to any individual. If "take" of a listed species is necessary to complete an otherwise lawful activity, this triggers the need for consultation under Section 7 of FESA (for Federal agencies and projects with a federal "nexus" (that is, an authorized, funded or carried out by a federal agency)), or requires preparation of a Habitat Conservation Plan (HCP) pursuant to Section 10 of FESA (for state and local agencies, or individuals, and projects without a federal "nexus").

Section 7(a)(2) of the Act requires that each Federal agency shall, in consultation with and with the assistance of the USFWS, insure that any action authorized, funded or carried out by such agency is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of critical habitat. Critical habitat identifies specific areas, both occupied and unoccupied, that are essential to the conservation of a listed species and that may require special management considerations or protection. Section 4 of the

Act requires USFWS to consider economic and other relevant impacts of specifying any particular area as critical habitat.

Federal actions include permitting, funding, and entitlements for both federal projects, as well as private projects facilitated by federal actions (for example, a private landowner applying to the Corps for a permit). As an example, if a federally listed endangered species is present in "waters of the United States" on a project site, prior to authorizing impacts to “waters of the United States,” the U.S. Army Corps of Engineers (who administers the Clean Water Act) would be required to initiate “formal consultation” with USFWS pursuant to Section 7 of FESA. As part of the formal consultation, the USFWS would then be required to prepare a Biological Opinion based on a review and analysis of the project applicant’s avoidance and mitigation plan. The Biological Opinion will either state that the project will or will not result in “take” or threaten the continued existence of the species (not just that population). If an endangered species could be harmed by a proposed project, USFWS has to be in complete concurrence with the proposed avoidance and mitigation plan. If USFWS is not in complete concurrence with the mitigation plan, they will submit a Biological Opinion to the Corps containing a “jeopardy decision” and state that a Corps’ permit should not be issued for the pending project. The applicant would then have an opportunity to submit a revised mitigation plan that provides greater protection for the species.

In the 1982 amendments to FESA, Congress established a provision in Section 10 that allows for the "incidental take" of endangered and threatened species of wildlife by non-federal entities (for example, project applicants, state and local agencies). "Incidental take" is defined by FESA as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." Under Section 10 of FESA, the applicant for an "incidental take permit" is required to submit a "conservation plan" to USFWS or NMFS that specifies, among other things, the impacts that are likely to result from the taking, and the measures the permit applicant will undertake to minimize and mitigate such impacts, and the funding that will be available to implement those steps. Conservation plans under FESA have come to be known as "habitat conservation plans" or "HCPs" for short. The terms incidental take permit, Section 10 permit, and Section 10(a)(1)(B) permit are used interchangeably by USFWS. Section 10(a)(2)(B) of FESA provides statutory criteria that must be satisfied before an incidental take permit can be issued.

7.1.1 Responsible Agency

FESA gives regulatory authority over terrestrial species and non-anadromous fish to the USFWS. The NMFS has authority over marine mammals and anadromous fish.

7.1.2 Applicability to the Proposed Project

The California tiger salamander is the only federal listed animal species with a probability of occurring on the project site. After receiving written authorization from the USFWS to proceed, M&A conducted two years of protocol surveys for the California tiger salamander on the project site and did not identify this species onsite. Based on the results of M&A’s protocol level pitfall trapping surveys and aquatic surveys (dip-netting and minnow trapping), the USFWS, Sacramento Field Office, concurred with M&A’s survey findings that the CTS does not occur on the project site and that development of the project site would not result in “take” of this federal listed species. A letter of “no effect” for this project and project site was written by USFWS and submitted to M&A (email correspondence between Mr. V. Griego of USFWS with Mr. G. Thomas and Mr. G. Monk of M&A, December 20, 2006).

Four federally listed plant species are known to occur within the Santa Rosa Plain (Burke’s goldfields, Baker’s blennosperma, many-flowered navarretia, and Sebastopol meadowfoam). The project site lies within the Santa Rosa Plain. Plant ecologist, Mr. Charlie Patterson, conducted four years of appropriately timed surveys for federally listed plants, and other plant species of special concern, on the project site. These surveys were conducted in the spring and summer of 1993, 1998, 1999, and 2004. No federally listed plants or other special-status plant species were identified on the project site during the course of these surveys. Please see the discussion on special-status plants in the sections above.

Based on M&A’s background research, knowledge of biological resource issues in Sonoma County, field studies conducted on the project site to date, and the presence of only marginal habitat for native plants and wildlife onsite, it is safe to conclude that a project on this project site would not result in take of any federal listed species. Similarly, pursuant to CEQA, there would be no significant adverse impacts to federally listed animal or plant species.

7.2 Federal Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 (16 U.S.C. §§ 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989) makes it unlawful to “take” (kill, harm, harass, shoot, etc.) any migratory bird listed in Title 50 of the Code of Federal Regulations, Section 10.13, including their nests, eggs, or young. Migratory birds include geese, ducks, shorebirds, raptors, songbirds, wading birds, seabirds, and passerine birds (such as warblers, flycatchers, swallows, etc.).

Executive Order 13186 for conservation of migratory birds (January 11, 2001) requires that any project with federal involvement address impacts of federal actions on migratory birds. The order is designed to assist federal agencies in their efforts to comply with the MBTA and does not constitute any legal authorization to take migratory birds. The order also requires federal agencies to work with the USFWS to develop a memorandum of understanding (MOU). Protocols developed under the MOU must promote the conservation of migratory bird populations through the following means:

- avoid and minimize, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions;
- restore and enhance habitat of migratory birds, as practicable; and prevent or abate the pollution or detrimental alteration of the environment for the benefit of migratory birds, as practicable.

7.2.1 Applicability to Proposed Project

The project site provides suitable nesting habitat for the white-tailed kite, red-tailed hawk, and red shouldered hawk. These raptors (birds of prey) would be protected by the Migratory Bird Treaty Act. Also, the common songbirds that could occur on the site would be protected pursuant to this Act. As long as there is no direct mortality of species protected pursuant to this Act caused by development of the site, there would be no constraints to development of the site. To comply with the Migratory Bird Treaty Act, all active nest sites would have to be avoided while such birds were nesting. Upon completion of nesting, the project could commence as otherwise planned. Preconstruction nesting surveys for nesting birds should be conducted prior to breaking ground for the project if it would occur between February 1st and September 31st.

7.3 State Endangered Species Act

7.3.1 Section 2081 of the State Endangered Species Act

In 1984, the state legislated the California Endangered Species Act (CESA) (Fish and Game Code §2050). The basic policy of CESA is to conserve and enhance endangered species and their habitats. State agencies will not approve private or public projects under their jurisdiction that would jeopardize threatened or endangered species if reasonable and prudent alternatives are available.

CESA requires that all state lead agencies (as defined under CEQA) conduct an endangered species consultation with CDFG if their actions could affect a state listed species. The state lead agency and/or project applicants must provide information to CDFG on the project and its likely impacts. CDFG must then prepare written findings on whether the proposed action would jeopardize a listed species, or would result in the direct take of a listed species. Because CESA does not have a provision for "harm" (see discussion of FESA, above), CDFG considerations pursuant to CESA are limited to those actions that would result in the direct take of a listed species.

If CDFG determines that a proposed project could impact a State listed threatened or endangered species, CDFG will provide recommendations for "reasonable and prudent" project alternatives. The CEQA lead agency can only approve a project if these alternatives are implemented, unless it finds that the project's benefits clearly outweigh the costs, reasonable mitigation measures are adopted, there has been no "irreversible or irretrievable" commitment of resources made in the interim, and the resulting project would not result in the extinction of the species. In addition, if there would be impacts to threatened or endangered species, the lead agency typically requires project applicants to demonstrate that they have acquired "incidental take" permits from CDFG and/or USFWS (if it is a Federal listed species) prior to allowing/permitting impacts to such species.

If proposed projects would result in impacts to a State listed species, an "incidental take" permit pursuant to §2081 of the Fish and Game Code would be necessary (versus a Federal incidental take permit for Federal listed species). CDFG will issue an incidental take permit only if:

1) The authorized take is incidental to an otherwise lawful activity;
2) the impacts of the authorized take are minimized and fully mitigated;
3) measures required to minimize and fully mitigate the impacts of the authorized take:
    a) are roughly proportional in extent to the impact of the taking on the species;
    b) maintain the project applicant’s objectives to the greatest extent possible; and,
    c) capable of successful implementation; and,

4) adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with, and the effectiveness of, the measures.

If an applicant is preparing a habitat conservation plan (HCP) as part of the federal 10(a) permit process, the HCP might be incorporated into the §2081 permit if it meets the substantive criteria of §2081(b). To ensure that an HCP meets the mitigation and monitoring standards in Section 2081(b), an applicant should involve CDFG staff in development of the HCP. If a final Biological Opinion (federal action) has been issued for the project pursuant to Section 7 of the federal Endangered Species Act, it might also be incorporated into the §2081 permit if it meets the standards of §2081(b).

No §2081 permit may authorize the take of a species for which the Legislature has imposed strict prohibitions on all forms of "take." These species are listed in several statutes that identify "fully protected" species and "specified birds." *See* Fish and Game Code §§ 3505, 3511, 4700, 5050, 5515, and 5517. If a project is planned in an area where a "fully protected" species or a "specified bird" occurs, an applicant must design the project to avoid all take.

In September 1997, Assembly Bill 21 (Fish and Game Code §2080.1) was passed. This bill allows an applicant who has obtained a "non-jeopardy" federal Biological Opinion pursuant to Section 7, or who has received a federal 10(a) permit (federal incidental take permit), to submit the federal opinion or permit to CDFG for a determination as to whether the federal document is "consistent" with CESA. If after 30 days CDFG determines that the federal incidental take permit is consistent with state law, and that all state listed species under consideration have been considered in the federal Biological Opinion, then no further permit or consultation is required under CESA for the project. However, if CDFG determines that the federal opinion or permit is not consistent with CESA, or that there are state listed species that were not considered in the federal Biological Opinion, then the applicant must apply for a state permit under Section 2081(b). The process provided in Fish and Game Code §2080.1 (Assembly Bill 21) may be of use when the incidental take would occur to species that are listed under both the federal and state endangered species acts. Assembly Bill 21 is of no use if an affected species is state-listed, but not federally listed.

State and federal incidental take permits are issued on a discretionary basis, and are typically only authorized if applicants are able to demonstrate that impacts to the listed species in question are unavoidable, and can be mitigated to an extent that the reviewing agency can conclude that the proposed impacts would not jeopardize the continued existence of the listed species under review. Typically, if there would be impacts to a listed species, mitigation that includes habitat avoidance, preservation, and creation of endangered species habitat is necessary to demonstrate that projects would not threaten the continued existence of a species. In addition, management endowment fees are usually collected as part of the agreement for the incidental take permit(s). The endowment is used to manage any lands set-aside to protect listed species, and for biological mitigation monitoring of these lands over (typically) a five-year period.

7.3.2 Applicability to Proposed Project

No State listed animal species or plant species are known to occur or are expected to occur onsite. Focused surveys for special-status plant species were conducted over a four year period and none were identified onsite. The project site does not provide habitat for state listed animal species. As such, no significant adverse impacts to State listed animal or plant species, or candidates for listing, are expected from project implementation.

7.4 Applicable CEQA Regulations

Section 15380 of CEQA defines "endangered" species as those whose survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors. "Rare" species are defined by CEQA as those who are in such low numbers that they could become endangered if their environment worsens; or the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the FESA. The CEQA Guidelines also state that a project will normally have a significant effect on the environment if it will "substantially affect a rare or endangered species of animal or plant or the habitat of the species." The significance of impacts to a species under CEQA, therefore, must be based on analyzing actual rarity and threat to that species despite its legal status or lack thereof.

7.4.1 Applicability to Proposed Project

This document addresses impacts to species that would be defined as endangered or rare pursuant to Section 15380 of the CEQA. This document is suitable for use by the CEQA lead agency (in this case the County of Sonoma) for preparation of any CEQA review document prepared for the proposed project. This report has been prepared as a Biology Section that is suitable for incorporation into an initial study or the biology section of an Environmental Impact Report.

7.5 California Fish and Game Code § 3503, 3503.5, 3511, and 3513

California Fish and Game Code §3503, 3503.5, 3511, and 3513 prohibit the "take, possession, or destruction of birds, their nests or eggs." Disturbance that causes nest abandonment and/or loss of reproductive effort (killing or abandonment of eggs or young) is considered "take." Such a take would also violate federal law protecting migratory birds (Migratory Bird Treaty Act).

All raptors (that is, hawks, eagles, owls) their nests, eggs, and young are protected under California Fish and Game Code (§3503.5). Additionally, "fully protected" birds, such as the white-tailed kite (*Elanus leucurus*) and golden eagle (*Aquila chrysaetos*), are protected under California Fish and Game Code (§3511). "Fully protected" birds may not be taken or possessed (that is, kept in captivity) at any time.

7.5.1 Applicability to the Project

Raptors that could be impacted by the project include white-tailed kite, red-tailed hawk, and red-shouldered hawk. Preconstruction surveys would have to be conducted for these species to ensure that there is no direct take of these birds including their eggs, or young. Any active nests that were found during preconstruction surveys would have to be avoided by the project. Suitable non-disturbance buffers would have to be established around nest sites until the nesting cycle is complete. More specifics on the size of buffers are provided in the special-status species section above by each species that could be affected by the project.

7.6 Protected Amphibians

Under Title 14 of the California Code of Regulations (CCR 14, Division 1, Subdivision 1, Chapter 5, §41. Protected Amphibians), protected amphibians, such as the California tiger salamander may only be taken under special permit from California Department of Fish and Game issued pursuant to Sections 650 and 670.7 of these regulations.

7.6.1 Applicability to the Project

Protocol level surveys for the California tiger salamander have been conducted on the project site and none were found. The U.S. Fish and Wildlife Service concurred with Monk & Associates' negative survey findings (see discussion on the California tiger salamander in the special-status species section above). No special-status amphibians would be found on or adjacent to the project site. As such, no significant adverse impacts are expected to occur to special-status amphibians from implementation of the proposed project.

7.7 Sonoma County Tree Ordinance

The Sonoma County Zoning Regulations, Chapter 26, has two articles that pertain to the protection of native trees. These two articles, Article 88 and Article 67, and their applicability to the project site are provided below.

7.7.1.1 Article 88 – General Use and Bulk Exceptions – Building Lines.

Article 88 has provisions that protect native trees. At the project site, native trees that are protected in accordance with Chapter 26, Article 2, Section 26-02-140 "Definitions" of the Sonoma County Zoning regulations are valley oak trees and coast live oak trees. Below we provide the section of Article 88 that discusses protection of native trees.

Section 26-88-010. General Use Provisions and Exceptions:

(m) Tree Protection Ordinance.

General Provisions. Projects shall be designed to minimize the destruction of protected trees. With development permits, a site plan shall be submitted that depicts the location of all protected trees greater than nine inches (9") in diameter at breast height and that depicts their protected perimeters in areas that will be impacted by the proposed development, such as the building envelopes, access roads, leachfields, etc. Lot line adjustments, zoning permits and agricultural uses are exempt from this requirement. The provisions of this section shall not apply to trees which are the subject of a valid timber harvesting permit approved by the state of California. This section shall not be applied in a manner that would reduce allowable density lower than that permitted as a result of CEQA or by other county ordinances or render a property undevelopable. To achieve this end, adjustments may be made.

Agricultural uses exempt from the tree protection ordinance are as follows: the raising, feeding, maintaining and breeding of confined and unconfined farm animals, commercial aquaculture,

commercial mushroom farming, wholesale nurseries, greenhouses, wineries and agricultural cultivation.
Construction Standards. Applicants are encouraged to use a qualified specialist to establish tree protection methods.

(1) Protected trees, their protected perimeters and whether they are to be retained or removed are to be clearly shown on all improvement plans. A note shall be placed on the improvement plans that "Construction is subject to requirements established by Sonoma County to protect certain trees."

(2) Before the start of any clearing, excavation, construction or other work on the site, every tree designated for protection on the approved site plan shall be clearly delineated with a substantial barrier (steel posts and barbed wire or chain link fencing) at the protected perimeter, or limits established during the permit process. The delineation markers shall remain in place for the duration of all work. All trees to be removed shall be clearly marked. A scheme shall be established for the removal and disposal of brush, earth and other debris as to avoid injury to any protected tree.

(3) Where proposed development or other site work must encroach upon the protected perimeter of a protected tree, special measures shall be incorporated to allow the roots to obtain oxygen, water and nutrients. Tree wells or other techniques may be used where advisable. No changes in existing ground level shall occur within the protected perimeter unless a drainage and aeration scheme approved by a certified arborist is utilized. No burning or use of equipment with an open flame shall occur near or within the protected perimeter (except for authorized controlled burns).

(4) No storage or dumping of oil, gasoline, chemicals or other substances that may be harmful to trees shall occur within the drip line of any tree, or any other location on the site from which such substances might enter the drip line.

(5) If any damage to a protected tree should occur during or as a result of work on the site, the county shall be promptly notified of such damage. If a protected tree is damaged so that it cannot be preserved in a healthy state, the planning director shall require replacement in accordance with the *arboreal value chart*. If on-site replacement is not feasible, the applicant shall pay the in-lieu fee to the tree replacement fund.

(6) The following design standards for protected trees shall be adhered to:

(i) Underground trenching for utilities should avoid tree roots within the protected perimeter. If avoidance is impractical, tunnels should be made below major roots. If tunnels are impractical and cutting roots is required, it shall be done by hand-sawn cuts after hand digging trenches. Trenches should be consolidated to serve as many units as possible.

(ii) Compaction within the drip line or protected perimeter shall be avoided.

(iii) Paving with either concrete or asphalt over the protected perimeter should be avoided. If paving over the protected perimeter cannot be avoided, affected trees shall be treated as removed for purposes of calculating arboreal values.

(iv) Wherever possible, septic systems and/or leach lines shall not be located on the uphill side of a protected tree.

(7) Security posted for the purpose of insuring the proper construction of public or private improvements shall also include an amount sufficient to secure any requirements imposed pursuant to this section. In addition, security for potential tree damage shall be twenty-five percent (25%) of the amount posted for planned tree replacement. In lieu fees shall be paid prior to recording any maps. Such security shall not be released until protection requirements, including planting replacement trees, and any long term maintenance requirements have been satisfactorily discharged. The initial bond amount may be reduced to cover only the maintenance and replacement of trees after construction is completed.

(8) The Valley Oak (*Quercus lobata*) shall receive special consideration in the design review process to the extent that mature specimens shall be retained to the fullest extent feasible. Valley Oaks contribute greatly to Sonoma County's visual character, landscape and they provide important visual relief in urban settings. On existing parcels created without the benefit of an accompanying EIR, design review shall focus on the preservation of valley oaks to the fullest extent feasible. Where such preservation would render a lot unbuildable, partial protection with accompanying appropriate mitigations developed by a certified arborist shall be incorporated into the project design. In such cases where only partial protection can be achieved, full replacement in accordance with the arboreal value chart shall be required.

Arboreal Value Charts. One of the following charts is to be used for determining arboreal values. The applicant shall indicate at time of application which chart is to be used. Chart No. 1 requires analysis to be done only in the development areas (building envelopes, access roads, etc.) and requires one hundred percent (100%) replacement or in-lieu fees. Chart No. 2 requires analysis of the entire site but allows for removal of up to fifty percent (50%) of the arboreal value. Compensation for the loss of greater than fifty percent (50%) arboreal value will require replacement by using the chart.

7.7.1.2 Article 67 - Valley Oak Habitat Combining District

The purpose of this Article is to protect and enhance valley oaks and valley oak woodlands and to implement the provisions of Section 5.1 of the general plan resource conservation element (Ord. No. 4991 § 1(h), 1996.). Under this Article it is necessary to mitigate for impacts to protected valley oaks. According to Section 26-67-030: Mitigation required-Exceptions: (a) Except as provided in subsection (b), when any person cuts down or removes any large valley oak, or any small valley oaks having a cumulative diameter at breast height greater than sixty inches (60"), on any property within the *VOH district*, such person shall mitigate the resulting valley oak loss by one of the following measures: (1) retaining other valley oaks on the subject property, (2) planting replacement valley oaks on the subject property or on another site in the county having the geographic, soil, and other conditions necessary to sustain a viable population of valley oaks, (3) a combination of measures (1) and (2), or (4) paying an in-lieu fee, which shall be used exclusively for valley oak planting programs in the county. Such person shall have the sole discretion to determine which mitigation measure to use to mitigate the valley oak loss. The requirements for each mitigation measure are specified in Table 26-67-030. The selected mitigation measure shall be undertaken and completed within one (1) year after the valley oak or valley oaks are cut down or removed in accordance with guidelines established by resolution or ordinance of the board of supervisors.

(b) This section shall not apply to the cutting down or removal of any valley oak within the VOH district that is (1) determined necessary by emergency personnel engaged in emergency procedures, (2) dead or irretrievably damaged or destroyed by causes beyond the property owner's control, including, without limitation, fire, flood, wind, lightning, or earth movement, or (3) part of a development project subject to the provisions of Section 26-67-040.

7.7.2 Applicability to the Proposed Project

According to the arborist contracted for the project, Mr. John Meserve, the project site supports 143 native trees, and approximately 340 ornamental (non-protected trees). Since coast redwoods were planted on the site as part of the landscaping they are categorized as ornamental trees even though they are a native species in other parts of Sonoma County (Meserve 2006). The Site Plan dated January 18, 2009 shows a 48-inch valley oak[1] in the northern portion of the project site and the trees adjacent to this valley oak being preserved onsite, as well as some trees around the existing Luther Burbank Center. However, the Site Plan also shows that many of the trees will be removed to allow room for the proposed project facilities. In accordance with Articles 88 and 67, valley oaks and coast live oaks on the project site are protected trees. In accordance with Article 88, mitigation compensation for protected trees is pursuant to the arboreal value chart. Chart No. 2 requires analysis of the entire site but allows for removal of up to fifty percent (50%) of the arboreal value. In accordance with Article 67, loss of valley oaks can be mitigated by one of the following measures: (1) retaining other valley oaks on the subject property, (2) planting replacement valley oaks on the subject property or on another site in the county having the geographic, soil, and other conditions necessary to sustain a viable population of valley oaks, (3) a combination of measures (1) and (2), or (4) paying an in-lieu fee, which shall be used exclusively for valley oak planting programs in the county. As such, mitigation would be required for the project's proposed impact to protected trees. See the Impacts and Mitigations section for details.

7.8 Sonoma County General Plan

Under the policies pertaining to "Biotic Habitat Areas" in the Open Space and Resource Conservation Element of the Sonoma County General Plan 2020 (approved September 23, 2008), the following policies apply:

Policy OSRC-7f: Support acquisition of conservation easements or fee title by the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD) of designated Biotic Habitat Areas.

[1] This 48-inch diameter valley oak tree does not meet the County's definition of a "heritage tree." A heritage tree is defined as: a tree or grove of trees so designated by the Sonoma County board of supervisors because of historical interest or significance. The 48-inch valley oak tree onsite has not been officially designated by the Board of Supervisors as a heritage tree.

Policy OSRC-7k: Require the identification, preservation and protection of native trees and woodlands in the design of discretionary projects, and, to the maximum extent practicable, minimize the removal of native trees and fragmentation of woodlands, require any trees removed to be replaced, preferably on the site, and provide permanent protection of other existing woodlands where replacement planting does not provide adequate mitigation.

Policy OSRC-7o: Encourage the use of native plant species in landscaping. For discretionary projects, require the use of native or compatible non-native species for landscaping where consistent with fire safety. Prohibit the use of invasive exotic species.

7.8.1 APPLICABILITY TO THE PROPOSED PROJECT

Applicability of Policy OSRC-7k: While the project site does not provide any native woodland habitat (the site currently is mostly developed and was a planted orchard in the past), it does support many native trees, including two large (greater than 30 inches dbh) valley oak trees. Under the current project design, the 48-inch valley oak tree will be avoided by the project. Removal of native trees for the proposed project would be mitigated for by replanting of the same species or another appropriate tree species native to the Santa Rosa area somewhere on the project site or, in accordance with Article 67, Valley Oak Habitat Combining District, by paying an in-lieu fee, or a combination of planting and paying a fee. See the Impacts and Mitigations section of this report for details.

Applicability of Policy OSRC-7o: Native plant species for landscaping will be recommended to the project applicant at the time landscaping plans are designed.

8. REGULATORY REQUIREMENTS PERTAINING TO WATERS OF THE UNITED STATES AND STATE

This section presents an overview of the criteria used by the U.S. Army Corps of Engineers, the California Regional Water Quality Control Board, the State Water Resources Control Board, and CDFG to determine those areas within a project area that would be subject to their regulation.

8.1 U.S. Army Corps of Engineers Jurisdiction and General Permitting

8.1.1 SECTION 404 OF THE CLEAN WATER ACT

Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged or fill material into "waters of the United States" (33 CFR Parts 328 through 330). This requires project applicants to obtain authorization from the Corps prior to discharging dredged or fill material into any water of the United States. In the Federal Register "waters of the United States" are defined as, “...all interstate waters including interstate wetlands...intrastate lakes, rivers, streams (including intermittent streams), wetlands, [and] natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce...” (33 CFR Section 328.3).

Limits of Corps’ jurisdiction.

(a) Territorial Seas. The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)

(b) Tidal Waters of the United States. The landward limits of jurisdiction in tidal waters:
(1) Extends to the high tide line, or
(2) When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.

(c) Non-Tidal Waters of the United States. The limits of jurisdiction in non-tidal waters:
(1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
(2) When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
(3) When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

Section 404 jurisdiction in "other waters" such as lakes, ponds, and streams, extends to the upward limit of the ordinary high water mark (OHWM) or the upward extent of any adjacent wetland. The OHWM on a non-tidal water is the "line on shore established by the fluctuations of water and indicated by physical characteristics such as a clear natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter or debris; or other appropriate means that consider the characteristics of the surrounding areas" (33 CFR Section 328.3[e]). Wetlands are defined as "...those areas that are inundated or saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation adapted for life in saturated soil conditions" (33 CFR Section 328.8 [b]). Wetlands usually must possess hydrophytic vegetation (i.e., plants adapted to inundated or saturated conditions), wetland hydrology (e.g., topographic low areas, exposed water tables, stream channels), and hydric soils (i.e., soils that are periodically or permanently saturated, inundated or flooded) to be regulated by the Corps pursuant to Section 404 of the Clean Water Act.

It should be noted that the extent of the Corps jurisdiction pursuant to Section 404 of the Clean Water Act was recently modified. In Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, the U.S. Supreme Court [148 L. Ed. 2d 576 (2001) (SWANCC)] ruled that the Corps exceeded its authority under the Clean Water Act when it regulated discharges of fill material into "isolated" waters used as habitat by migratory birds. Accordingly, waters (including wetlands) that are not connected hydrologically to navigable waters are not subject to regulation by the Corps.

Another recent Supreme Court decision also significantly changes how the Corps defines waters of the United States. On June 19, 2006 the United States Supreme Court, in a "four-one-four" decision, addressed the extent of Clean Water Act jurisdiction over wetlands adjacent to tributaries of navigable waters. In two consolidated cases, *Rapanos v. United States* and *Carabell v. U.S. Army Corps of Engineers*, a five-Justice majority of the Court remanded the case to the Sixth circuit for further consideration. The Court was unable to produce a majority vote in favor of any one jurisdictional standard for the Sixth Circuit to apply (or for the regulated community to follow). Instead, Justice Scalia authored a plurality opinion that would significantly narrow the reach of federal wetlands jurisdiction, while Justice Kennedy, concurring in the judgment only, concluded that the appropriate test for jurisdiction over wetlands was the presence of a "significant nexus" between wetlands and "navigable waters" in the traditional sense. The remaining four Justices, in a dissenting opinion by Justice Stevens, would have upheld the Corps of Engineers' assertion of jurisdiction and would have affirmed the Sixth Circuit's decision. When no opinion garners at least five votes, lower courts follow the concurrence that reached the result on the narrowest grounds. Here, that is Justice Kennedy's opinion. Unfortunately, Justice Kennedy did not provide specific guidance about the extent of federal jurisdiction over wetlands that are adjacent to tributaries of navigable waters.

Justice Kennedy concluded that the Clean Water Act applies only to those wetlands with a "significant nexus" to "navigable waters in the traditional sense." A significant nexus exists when a wetland, "either alone or in combination with similarly situated lands in the region, significantly affect[s] the chemical, physical, and biological integrity" of factually navigable waters. Under Supreme Court precedent, wetlands adjacent to navigable waters meet this test. For wetlands located near tributaries of navigable waters, however, each wetland demands a case-by-case jurisdictional inquiry. We know that a "mere hydrological connection" is not enough in all cases, and that "speculative or insubstantial" effects on water quality will not suffice to satisfy the test. [Preceding text excerpted from a news letter prepared by Briscoe, Ivester, and Bazel LLP].

To remain in compliance with Section 404 of the Clean Water Act, project proponents and property owners (applicants) are required to acquire authorization from the Corps prior to discharging or otherwise impacting “waters of the United States”. In many cases, the Corps must visit a proposed project area to confirm the extent of area falling under their jurisdiction (to conduct a “jurisdictional determination”) prior to authorizing any permit for that project. Typically, at the time the jurisdictional determination is conducted, applicants (or their representative) will discuss the appropriate permit application that would be filed with the Corps for permitting the proposed impact(s) to “waters of the United States.”

Pursuant to Section 404 of the Clean Water Act, the Corps normally provides two alternatives for permitting impacts to “waters of the United States.” The first alternative would be to use Nationwide Permit(s). The second alternative is to apply to the Corps for an Individual Permit (33 CFR Section 235.5(2)(b)). The application process for Individual Permits is extensive and includes a public review (i.e., public notice and receipt of public comments) and must contain an “alternatives analysis” that is prepared pursuant to Section 404(b) of the Clean Water Act (33 U.S.C. 1344(b)). The alternatives analysis is also typically reviewed by the federal Environmental Protect Agency (EPA), and thus brings another resource agency into the permitting framework. Both the Corps and EPA take the initial viewpoint that there are practical alternatives to any proposed project there would not result in impacts to waters of the U.S., if the proposed permitted action is not a water dependent project (e.g. a pier or a dredging project). Alternative analyses therefore must provide convincing reasons that the proposed impacts are unavoidable.

Nationwide Permit(s) (NWP) are a type of general permit administered by the Corps and issued on a nationwide basis that authorize <u>minor</u> activities that affect Corps regulated waters. Under the NWP program, if certain conditions are met, the specified activities can take place without the need for an individual or regional permit from the Corps (33 CFR, Section 235.5[c][2]). In order to use NWP(s), a project must meet 27 general nationwide permit conditions, and all specific conditions pertaining to the NWP being used (as presented at 33 CFR Section 330). It is also important to note that pursuant to 33 CFR Section 330.4(e), there may be special regional conditions or modifications to NWPs that could have relevance to individual proposed projects. Finally, pursuant to 33 CFR Section 330.6(a), Nationwide permittees may, and in some cases, request from the Corps confirmation that an activity complies with the terms and conditions of the NWP intended for use (*i.e.,* must receive "verification" from the Corps).

Prior to finalizing design plans, the applicant needs to be aware that the Corps maintains a policy of "no net loss" of wetlands (waters of the United States). Therefore, it is incumbent upon applicants that propose to impact Corps regulated areas to submit a mitigation plan that demonstrates that impacted regulated areas would be recreated (*i.e.*, impacts would be mitigated). Typically, the Corps requires mitigation to be "in-kind" (i.e., if a stream channel would be filled, mitigation would include replacing it with a new stream channel), and at a minimum of a 1:1 replacement ratio (i.e., one acre or fraction thereof recreated for each acre or fraction thereof lost). Often a 2:1 replacement ratio is required. Usually the 2:1 ratio is met by recreation or enhancement of an equivalent amount of wetland that is impacted, in addition to preserving an equivalent amount of wetland. In some cases, the Corps allows "out-of-kind" mitigation if the compensation/mitigation has greater value than the impacted area. Finally, there are many Corps approved wetland mitigation banks where wetland mitigation credits can be purchased by applicants to meet their mitigation requirements. Mitigation banks have limited distribution and the Corps typically only allows their use when projects have limited impacts. If a project meets conditions of Nationwide Permits, and an Individual Permit is not required by the Corps, then typically the Corps allows use of wetland mitigation banks (if available) to meet its no net loss requirement and to otherwise mitigate the impacts to waters of the United States resulting from the proposed project.

8.1.2 APPLICABILITY TO THE PROPOSED PROJECT

In 2005, Mr. Charlie Patterson conducted a wetland delineation on the project site. This delineation was verified in the field by the Corps on October 7, 2005. On October 24, 2005, the Corps submitted to Mr. Patterson an official map of their jurisdiction over waters of the U.S. on the project site. This jurisdictional determination expired three years after the date of the October 24, 2005 letter (that is, it expired on October 24, 2008). Hence, in late-2008 and early 2009, M&A biologists conducted a new wetland delineation for the project site so that this map could be submitted to the Corps for this agency's confirmation. With a Corps confirmed map the applicant would have a valid map of waters of the U.S. on the project site that could be relied upon for project planning purposes.

In total, M&A delineated 0.46-acre of potential waters of the United States on the project site. Please note that this acreage figure has not been confirmed by the Corps and could change (be greater or less than this amount). The project will avoid all waters of the U.S. and State on the project site except the 0.36-acre man-made borrow pit "pond" and a small, isolated wetland (0.0057-acre) along the project site's western edge. Hence, all impacts to waters of the U.S. will be less than 0.5-acre. Prior to impacting the man-made pond and the isolated wetland it will be necessary to obtain confirmed map and a Nationwide Permit authorization from the Corps.

8.2 State Water Resources Control Board (SWRCB) / California Regional Water Quality Control Board (RWQCB)

8.2.1 Section 401 of the Clean Water Act

The SWRCB and RWQCB regulate activities in "waters of the State" (which includes wetlands) through Section 401 of the Clean Water Act. While the Corps administers a permitting program that authorizes impacts to waters of the United States, including wetlands and other waters, any Corps permit authorized for a proposed project would be invalid unless it is a NWP that has been certified for use in California by the SWRCB, or if the RWQCB has issued a project specific certification or waiver of water quality. Certification of NWPs requires a finding by the SWRCB that the activities permitted by the NWP will not violate water quality standards individually or cumulatively over the term of the permit (the term is typically for five years). Certification must be consistent with the requirements of the federal Clean Water Act, the California Environmental Quality Act, the California Endangered Species Act, and the SWRCB's mandate to protect beneficial uses of waters of the State. Any denied (i.e., not certified) NWPs, and all Individual Corps permits, would require a project specific RWQCB certification of water quality.

Additionally, if a proposed project would impact waters of the State, including wetlands, the project applicant must demonstrate that the project is unable to avoid these adverse impacts, or water quality certification will most likely be denied. Section 401 Certification may also be denied based on significant adverse impacts to waters of the United States/State, including wetlands. The RWQCB has also adopted the Corps' policy that there shall be "no net loss" of wetlands. Thus, prior to certifying water quality, the RWQCB will impose avoidance mitigation requirements on project proponents that impact waters of the State.

8.2.2 Applicability to the Proposed Project

In 2005, Mr. Charlie Patterson conducted a wetland delineation on the project site. This delineation was verified in the field by the Corps on October 7, 2005. On October 24, 2005, the Corps submitted to Mr. Patterson an official map of their jurisdiction over waters of the U.S. on the project site. This jurisdictional determination expired three years after the date of the October 24, 2005 letter (that is, it expired on October 24, 2008). Hence, in late-2008 and early 2009, M&A biologists conducted a new wetland delineation for the project site so that this map could be submitted to the Corps for this agency's confirmation. With a Corps confirmed map the applicant would have a valid map of waters of the U.S. on the project site that could be relied upon for project planning purposes.

In total, M&A delineated 0.46-acre of potential waters of the United States on the project site. Please note that this acreage figure has not been confirmed by the Corps and could change (be greater or less than this amount). Any Section 404 permit authorized by the Corps for the project would be inoperative without also obtaining authorization from the RWQCB pursuant to Section 401 of the Clean Water Act (i.e., without obtaining a certification of water quality). Since the RWQCB does not have a formal method for technically defining what constitutes waters of the state, M&A expect that the RWQCB should remain consistent with the Corps' determination. Therefore, if the Corps determines there are a specified number of acres of wetland or other waters within the project site boundaries, the RWQCB will likely concur.

Any impacts to waters of the State would have to be mitigated to the satisfaction of the RWQCB prior to the time this resource agency would issue a permit for impacts to such features. The RWQCB requirements for issuance of a "401 Permit" typically parallel the Corps requirements for permitting impacts to Corps regulated areas pursuant to Section 404 of the Clean Water Act. Please refer to the Corps Applicability Section above for likely mitigation requirements for impacts to RWQCB regulated wetlands. Also, please refer to the applicability section of the Porter-Cologne Water Quality Control Act below for other applicable actions that may be imposed on the project by the RWQCB prior to the time any certification of water quality is authorized for the project. Please note that any isolated wetlands or other waters that are determined to be on the project site that are not regulated by the Corps pursuant to the SWANCC decision, would still be regulated by the RWQCB pursuant to the Porter-Cologne Water Quality Control Act (see below).

8.2.3 PORTER-COLOGNE WATER QUALITY CONTROL ACT

The Porter-Cologne Water Quality Control Act, Water Code § 13260, requires that "any person discharging waste, or proposing to discharge waste, that could affect the waters of the State to file a report of discharge" with the RWQCB through an application for waste discharge (Water Code Section 13260(a)(1). The term "waters of the State" is defined as any surface water or groundwater, including saline waters, within the boundaries of the State (Water Code § 13050(e)). It should be noted that pursuant to the Porter-Cologne Water Quality Control Act, the RWQCB also regulates "isolated wetlands," or those wetlands considered to be outside of the Corps' jurisdiction pursuant to the SWANCC decision (see Corps Section above).

The RWQCB generally considers filling in waters of the State to constitute "pollution." Pollution is defined as an alteration of the quality of the waters of the state by waste that unreasonably affects its beneficial uses (Water Code §13050(1)). The RWQCB litmus test for determining if a project should be regulated pursuant to the Porter-Cologne Water Quality Control Act is if the action could result in any "threat" to water quality.

The RWQCB requires complete pre- and post-development Best Management Practices Plan (BMPs) of any portion of the project site that is developed. This means that a water quality treatment plan for the pre- and post-developed project site must be prepared and implemented. Preconstruction requirements must be consistent with the requirements of the National Pollutant Discharge Elimination System (NPDES). That is, a *Stormwater Pollution Prevention Plan* (SWPPP) must be developed prior to the time that a site is graded (see NPDES section below). In addition, a post construction BMPs plan, or a Stormwater Management Plan (SWMP) must be developed and incorporated into any site development plan.

While SWMPs are complex, some of the basics include that 85 percent or greater of all stormwater falling on impervious surfaces must be treated prior to being discharged into features that will carry the stormwater off site. Also, beginning in 2005, the RWQCB changed their policies to include a requirement that the first 2/10ths of an inch of any storm event be treated prior to the time it is discharged from a project site. Flows above those generated on a project site during the first 2/10ths-inch of rainfall may be discharged from the project site without water quality treatment, although the project must still demonstrate that peak storm event discharges from the project site are ameliorated, or do not exceed pre-project levels. Above ground pretreatment water quality basins can be designed into the site development plan to accommodate this requirement. Peak flow amelioration can be achieved any number of other ways such as over sized piping with metered release points. Again though, water should be treated prior to entering any peak flow amelioration feature. Treatment can occur by having stormwater flow into and through “bioswales” or similar treatment facilities. The current standard the RWQCB is looking for is not necessarily flow-through swales as much as features that provide vertical percolation. The RWQCB has expressed a desire to see two feet of vertical percolation capacity in any created water treatment swale. If soils are not suitable, the RWQCB suggests the swale feature be over-excavated and the base soils in the first two feet of the soil profile be replaced below the swale with well-drained soils. Swale-like features can also be constructed in a sense similar to linear detention basins. These basins should be landscaped or otherwise vegetated. Irrigation systems, necessary to sustain vegetation in the dry periods of the year, are often a component of linear bioswale basins. Finally, typically roof leaders would be diverted into splash blocks that then drain through grassy swales in side and front yards. These measures are now standard policies that the RWQCB looks for prior to issuing any discretionary permit(s) for a development project.

Please note that post construction BMPs is a relatively new science, and the RWQCB continually updates its requirements to remain consistent with evolving technologies. Hence, it will be important that applicants contract with an engineering firm that has direct experience working with the RWQCB and its recent BMP requirements.

8.2.4 APPLICABILITY TO PROPOSED PROJECT

In 2005, Mr. Charlie Patterson conducted a wetland delineation on the project site. This delineation was verified in the field by the Corps on October 7, 2005. On October 24, 2005, the Corps submitted to Mr. Patterson an official map of their jurisdiction over waters of the U.S. on the project site. This jurisdictional determination expired three years after the date of the October 24, 2005 letter (that is, it expired on October 24, 2008). Hence, in late-2008 and early 2009, M&A biologists conducted a new wetland delineation for the project site so that this map could be submitted to the Corps for this agency’s confirmation. With a Corps confirmed map the applicant would have a valid map of waters of the U.S. on the project site that could be relied upon for project planning purposes.

In total, M&A delineated 0.46-acre of <u>potential</u> waters of the United States on the project site. Please note that this acreage figure has not been confirmed by the Corps and could change (be greater or less than this amount). The Corps would need to verify M&A’s wetland map to confirm the extent of this agency’s jurisdiction onsite and to confirm the acreage of jurisdictional waters onsite. These areas would also be regulated by the RWQCB pursuant to the Porter-Cologne Water Quality Control Act. Since any “threat” to water quality could conceivably be regulated pursuant to the Porter-Cologne Water Quality Control Act, care will be required when constructing the proposed project to be sure that adequate pre and post construction Best Management Practices Plan (BMPs) are incorporated into the project implementation plans.

Please note that any isolated wetlands defined by the Corps on the project site, that are not regulated by the Corps pursuant to the SWANCC decision, would still be regulated by the RWQCB pursuant to the Porter-Cologne Water Quality Control Act.

It should also be noted that prior to issuance of any permit from the RWQCB this agency will require submittal of a Notice of Determination from the County of Sonoma, indicating that the proposed project has completed a review conducted pursuant to CEQA. The pertinent sections of the CEQA document (typically the biology section) are often submitted to the RWQCB for review prior to the time this agency will issue a permit for a proposed project.

Finally, it should be noted that any SWMP prepared to meet Sonoma County's Standard Urban Storm Water Mitigation Plan (SUSMP) guidelines, would also meet the RWQCB's SWMP requirements. For greater detail please review the SUSMP requirements presented below.

8.2.5 National Pollutant Discharge Elimination System (NPDES)

In 1972 the Clean Water Act was amended to state that the discharge of pollutants to waters of the United States from any point source is unlawful unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the Clean Water Act added Section 402(p) which establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES Program. On November 16, 1990, the U.S. Environmental Protection Agency (EPA) published final regulations that establish stormwater permit application requirements for specified categories of industries. The regulations provide that discharges of stormwater to waters of the United States from construction projects that encompass five (5) or more acres of soil disturbance are effectively prohibited unless the discharge is in compliance with an NPDES Permit. EPA regulations that became final on December 8, 1999 (known as Phase II) expand the existing NPDES program to address stormwater discharges from small MS4s and from construction sites disturbing between 1 and 5 acres of land.

While federal regulations allow two permitting options for stormwater discharges (individual permits and General Permits), the SWRCB has elected to adopt only one statewide General Permit at this time that will apply to all stormwater discharges associated with construction activity, except from those on Tribal Lands, in the Lake Tahoe Hydrologic Unit, and those performed by the California Department of Transportation (CalTrans). The General Permit requires all dischargers where construction activity disturbs greater than one acre of land to:

1. Develop and implement a Storm Water Pollution Prevention Plan (SWPPP) which specifies Best Management Practices (BMPs) that will prevent all construction pollutants from contacting stormwater with the intent of keeping all products of erosion from moving off site into receiving waters.

2. Eliminate or reduce non-stormwater discharges to storm sewer systems and other waters of the nation.

3. Perform inspections of all BMPs.

This General Permit is implemented and enforced by the nine California Regional Water Quality Control Boards (RWQCBs).

Types of Construction Activity Covered by the General Permit

Construction activity subject to this General Permit includes clearing, grading, and disturbances to the ground such as stockpiling, or excavation that results in soil disturbances of at least one acre or more of total land area. Construction activity that results in soil disturbances to a smaller area would still be subject to this General Permit if the construction activity is part of a larger common plan of development that encompasses greater than one acre of soil disturbance, or if there is significant water quality impairment resulting from the activity. Construction activity does not include routine maintenance to maintain original line and grade, hydraulic capacity, or original purpose of the facility, nor does it include emergency construction activities required to protect public health and safety. Project proponents (landowners) should confirm with the local RWQCB whether or not a particular routine maintenance activity is subject to this General Permit.

8.2.6 APPLICABILITY TO PROPOSED PROJECT

Surface grading and excavation of the project site will exceed one acre and thus would be regulated pursuant to the NPDES program. It is the responsibility of the applicant to obtain coverage under the General Permit prior to commencement of construction activities that disturb greater than one acre of area. To obtain coverage, the project proponent (landowner) must file an NOI with a vicinity map and the appropriate fee with the SWRCB. In addition, coverage under this permit shall not occur until the applicant develops an adequate SWPPP for the project. Section A of the General Permit outlines the required contents of a SWPPP. For proposed construction activity on easements or on nearby property by agreement or permission, the entity responsible for the construction activity shall file an NOI and filing fee and shall be responsible for development of the SWPPP, all of which must occur prior to commencement of construction activities. The NOI must be sent to the following address:

State Water Resources Control Board
Division of Water Quality
Storm Water Permit Unit
1001 I Street, 15th floor
Sacramento, CA 95814
(916) 341-5455

8.3 RWQCB Municipal Storm Water Permitting Program

The Municipal Storm Water Permitting Program regulates storm water discharges from municipal separate storm sewer systems (MS4s). MS4 permits were issued in two phases. Under Phase I, which started in 1990, the RWQCBs have adopted NPDES storm water permits for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. These permits are reissued as the permits expire.

The City of Santa Rosa, Sonoma Water Agency and County of Sonoma entered into an interagency agreement for a Phase I MS4 Permit for municipalities serving more than 100,000 people and is administered by the North Coast RWQCB coverage under an NPDES permit for storm water discharges. The County of Sonoma is a co-permittee with the City of Santa Rosa and the Sonoma County Water Agency for the Phase I boundary which includes the City of Santa Rosa and unincorporated areas near the cities of Healdsburg, Windsor, Santa Rosa, Rohnert Park, Cotati, and Sebastopol. The California Regional Water Quality Control Board, North Coast Region, issued Waster Discharge Requirements, Order No. 97-3 NPDES Permit No. CA0025038; WDID No. 1B96074SSON for the City of Santa Rosa, Sonoma Water Agency and County of Sonoma in 1997. In June 2003, these Waste Discharge Requirements were revised and updated.

The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the Clean Water Act. The management programs specify what best management practices (BMPs) will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination; construction and post-construction; and good housekeeping for municipal operations. In general, medium and large municipalities are required to conduct chemical monitoring, though small municipalities are not.

Permittees, including the City of Santa Rosa, that operate an MS4 that serves 50,000 people or more, or that serve an area of high growth (which is defined as more than 25% over 10 years), must comply with the Supplemental Provisions contained in Attachment 4 of the Small MS4 General Permit. Regulated Small MS4s subject to this requirement must adopt an ordinance or other document to ensure implementation of Design Standards for certain new development/re-development projects as specified in Attachment 4 to the permit.

9. STANDARD URBAN STORM WATER MITIGATION PLAN (SUSMP),

To comply with their MS4 permit, the City of Santa Rosa, Sonoma Water Agency and County prepared *Guidelines for the Standard Urban Storm Water Mitigation Plan (SUSMP), Storm Water Best Management Practices for New Development and Redevelopment for the Santa Rosa Area and Unincorporated Areas around Petaluma and Sonoma were released by Sonoma County* on June 3, 2005. The SUSMP guidelines were developed to assist project sponsors and municipal staff to implement the Santa Rosa Area requirements that were adopted by the North Coast Regional Water Quality Control Board in June 2003. Since the SUSMP requirements apply to both privately sponsored projects and public capital improvement projects, these Guidelines are required to be used by development project applicants, municipal development project review staff, and municipal staff responsible for capital improvement projects. The SUSMP requirements are part of the Storm Water Management Plan that has become an enforceable part of the reissued municipal storm water National Pollutant Discharge Elimination System (NPDES) permit for the City of Santa Rosa, the County of Sonoma, and the Sonoma County Water Agency. The SUSMP guidelines also have been created to comply with the municipal storm water NPDES permit requirement for the City of Santa Rosa and County of Sonoma to develop a SUSMP Guidance Document.

The SUSMP goals for new and redevelopment projects are to manage, as close to the point of origin as possible, 1) storm water quality, 2) storm water quantity, and 3) to conserve natural areas of the development site. These three goals are described further below. It should be noted that the concept of "maximum extent practical" (MEP) applies to each of the goals. The MEP requirement is a technology based standard established by Congress in the Clean Water Act U.S.C. S 1342 (p)(3)(B)(iii) that municipal dischargers of storm water must meet. To achieve the maximum extent practicable standard, municipalities must employ whatever Best Management Practices (BMPs) are technically feasible (i.e., are likely to be effective) and are not cost prohibitive. The major emphasis is on technical feasibility. Reducing pollutants to the maximum extent practicable means choosing effective BMPs, and rejecting applicable BMPs only where other effective BMPs will serve the same purpose, or the BMPs would not be technically feasible, or the cost would be prohibitive.

The SUSMP goals for new and redevelopment projects are as follows:

Storm Water Quality. The first goal is to prevent pollutants generated at development and redevelopment projects from reaching storm drains. Projects covered by the SUSMP must be designed to minimize the introduction of pollutants.

Storm Water Quantity. The second goal is to prevent increases in storm water runoff from the two-year 24 hour storm event for Sonoma County. SUSMP projects should incorporate best management practices to limit the post-development runoff to pre-development conditions to the MEP. Best management practices are methods used to minimize pollutants in storm water and the quantity of runoff. One of the objectives of these guidelines is to provide more specific information about how MEP will be achieved.

Conserve Natural Areas. The third goal is to conserve natural areas of a development site. This goal supports the other two goals by preserving areas where storm water runoff can be purified naturally by infiltration into the soil and flow over vegetated areas. SUSMP projects should strive to maximize the amount of land left in a natural, undisturbed condition, preserve riparian areas and wetlands, limit clearing of native vegetation, and maximize trees and vegetation.

This SUSMP applies to applicable projects that require a discretionary permit, including any ministerial permits that are based on the discretionary permit. Source controls will be recommended for all discretionary projects.

Projects that must comply with the SUSMP include:

a) Development projects that create one acre (43,560 square feet) or more of new impervious surface. This category includes development of any type on public or private land, which falls under the planning and building authority of Sonoma County or City of Santa Rosa, where one acre or more of new impervious surface, collectively over the entire project site, will be created.
b) Streets, roads, highways and freeways that create one acre (43,560 square feet) or more of new impervious surface. This category includes any newly constructed impervious surface used for the transportation of pedestrians, bicycles, and motorized vehicles.

c) Redevelopment projects that are located on an already developed site and result in the addition of and/or reconstruction of one acre (43,560 square feet) or more of new impervious surface. Only the additional and/or reconstructed portion(s) of the site must be included in treatment design. Excluded from this category are interior remodels and routine maintenance or repair, including roof or exterior surface replacement and resurfacing.
d) Development and redevelopment projects located directly adjacent to a natural waterway, modified natural waterway, or constructed channel or that require a new storm drain outfall to such waterway, regardless of project size or impervious surface. This requirement is intended to protect environmentally sensitive areas. For redevelopment projects, excluded from this category are interior remodels and routine maintenance or repair, including roof or exterior surface replacement and resurfacing.

Regarding phased projects, new development or redevelopment activity that is part of a larger common plan of development that results in less than one acre of impervious surface must comply with SUSMP requirements. (For example, if 50% of a subdivision is constructed and results in 0.9 acre of impervious surface and the remaining 50% of the subdivision is to be developed at a future date, the property owner must comply with SUSMP requirements.

9.1 Source and Treatment Control Requirements

Source control and treatment control BMPs are intended to reduce runoff and keep pollutants out of storm water throughout the life of the project. They may be described as post-construction BMPs or “post-development” control measures. Post-construction BMPs differ from construction BMPs, which are used during the construction phase to prevent erosion and keep construction-related pollutants from reaching storm water.

The SUSMP recognizes two types of post-development BMPs for storm water pollution control – source controls and treatment controls. Source controls include BMPs that are designed to prevent pollutants from reaching storm water runoff and minimize site runoff. Source controls include a large variety of BMPs that range from minimizing the amount of impervious surface used at a project site to specific pollution prevention BMPs such as providing a roof over waste storage areas. The municipal storm water NPDES permit characterizes source control as the first line of defense at a project site and storm water treatment as a backup or additional line of defense. Source controls will be recommended for all discretionary projects.

Storm water treatment controls are engineered systems that are designed to remove pollutants from storm water. The SUSMP and NPDES permit have specific hydraulic design criteria for sizing storm water treatment controls to assure that an optimum amount of storm water receives treatment. Examples of storm water treatment controls include vegetated swales, extended detention basins, and bioretention areas. These are described in more detail in Chapter 4.

Source and treatment controls require long-term maintenance to continue to function effectively and avoid the creation of nuisance conditions. The SUSMP requires the project applicant to provide to the City or County a signed statement accepting responsibility for maintenance until the responsibility is legally transferred. The SUSMP further requires property owners to conduct maintenance inspection of all source and treatment control BMPs at least once a year or as specified by the designer or manufacturer.

9.2 Post-Construction Sediment and Erosion Control

Sediment is an important pollutant of concern in the North Coast Region. During construction sediment and erosion control BMPs must be implemented in accordance with the Statewide Construction Activity NPDES General Permit and the City of Santa Rosa or County of Sonoma grading permit programs. The design of projects must also consider potential sedimentation and erosion issues during long-term project operations and incorporate appropriate sediment and erosion controls in the project design.

Source Controls includes the need to select and maintain vegetation in landscaped pervious areas to prevent runoff from contacting bare earth and conveying sediment into the storm drain system. Similarly, pervious paving materials must also be selected, designed and maintained to avoid sedimentation and erosion.

9.3 Enforceability

The Santa Rosa Area municipal storm water NPDES permit requires the City of Santa Rosa, County of Sonoma and Sonoma County Water Agency to implement legal authority to control pollutant discharges to their respective storm drain systems. At a minimum, this legal authority empowers the agencies to use enforcement mechanisms, including monetary fines, to require compliance by private entities within their jurisdictions. In the event that a project applicant fails to comply with the SUSMP requirements, the City or County may determine that it is necessary to undertake enforcement actions, which may include a monetary fine.

9.4 Applicability to the Proposed Project

The project would create greater than one acre (43,560 square feet) of new impervious surface. The project could be considered in part a redevelopment project since it is partially located on an already developed site. Regardless it would result in the addition of and/or reconstruction of one acre (43,560 square feet) or more of new impervious surface. Thus the project must comply with the SUSMP and a complete SWMP would have to be provided to the County of Sonoma prior to the time a grading permit would be authorized for the project.

10. CALIFORNIA DEPARTMENT OF FISH AND GAME PROTECTIONS

10.1 Section 1602 of California Fish and Game Code

Pursuant to Section 1602 of the California Fish and Game Code, California Department of Fish and Game (CDFG) regulates activities that divert, obstruct, or alter stream flow, or substantially modify the bed, channel, or bank of a stream which CDFG typically considers to include its riparian vegetation. Any proposed activity in a natural stream channel that would substantially adversely affect an existing fish and/or wildlife resource, would require entering into a Streambed Alteration Agreement (SBAA) with CDFG prior to commencing with work in the stream. However, prior to authorizing such permits, CDFG typically reviews an analysis of the expected biological impacts, any proposed mitigation plans that would be implemented to offset biological impacts and engineering and erosion control plans.

10.1.1 Applicability to Proposed Project

Two man-made drainages were excavated on the project site when the Luther Burbank Center was originally constructed. These drainages drain parking areas and other ancillary landscaped and non-landscaped areas. Neither of these drainages would be impacted by the proposed project. A third drainage, a man-made roadside ditch that runs along Mark West Springs Road just north of the property line, would be effected by this project. Because technically it could be reasoned there is a bed and bank along this ditch, CDFG may want to regulate impacts to this ditch, and the other drainages if any impacts were proposed. CDFG should confirm or deny their intent to regulate impacts to the roadside ditch prior to the time that it would be impacted by the project. If CDFG chooses to regulate impacts to this ditch, a SBAA application would have to be submitted to the CDFG for this project.

11. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REGULATIONS

A CEQA lead agency must determine if a proposed activity constitutes a project requiring further review pursuant to the CEQA. Pursuant to CEQA, a lead agency would have to determine if there could be significant adverse impacts to the environment from a proposed project. Typically, if within the city limits, the city would be the CEQA lead agency. If a discretionary permit (i.e., conditional use permit) would be required for a project (e.g. an occupancy permit must be issued), the lead agency typically must determine if there could be significant environmental impacts. This is usually accomplished by an “initial study.” If there could be significant environmental impacts, the lead agency must determine an appropriate level of environmental review prior to approving and/or otherwise permitting the impacts. In some cases, there are “Categorical Exemptions” that apply to the proposed activity; thus the activity is exempt from CEQA. The Categorical Exemptions are provided in CEQA. There are also Statutory Exemptions in CEQA that must be investigated for any proposed project. If the project is not exempt from CEQA, the lowest level of review typically reserved for projects with no significant affects on the environment would be for the lead agency to prepare a “Negative Declaration.” If a proposed project would have only minimal impacts that can be mitigated to a level of no significance pursuant to the CEQA, then a “Mitigated Negative Declaration” is typically prepared by the lead agency. Finally those projects that may have significant affects on the environment, or that have impacts that can’t be mitigated to a level considered less than significant pursuant to the CEQA, typically must be reviewed via an Environmental Impact Report (EIR). All CEQA review documents are subject to public circulation, and comment periods.

Section 15380 of CEQA defines “endangered” species as those whose survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors. “Rare” species are defined by CEQA as those who are in such low numbers that they could become endangered if their environment worsens; or the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered “threatened” as that term is used in FESA. The CEQA Guidelines also state that a project will normally have a significant effect on the environment if it will "substantially affect a rare or endangered species of animal or plant or the habitat of the species." The significance of impacts to a species under CEQA, therefore, must be based on analyzing actual rarity and threat of extinction to that species despite its legal status or lack thereof.

11.1.1 Applicability to the Proposed Project

This report has been prepared to assist the EIR consultant with preparation of a Biological Resources section of a CEQA document. This report addresses the proposed project's impacts to significant biological resources and provides mitigation measures that, when implemented, would reduce those impacts to a less than significant level.

12. IMPACT ANALYSIS

In this section we discuss potential impacts to sensitive biological resources including special-status animal species and waters of the United States and/or State. We follow each impact with a mitigation prescription that when implemented would reduce impacts to the greatest extent possible. This impact analysis is based on a Site Plan prepared on December 10, 2008 by Quadriga Landscape Architecture and Planning, Inc.

12.1 Significance Criteria

A significant impact is determined using CEQA and CEQA Guidelines. Pursuant to CEQA §21068, a significant effect on the environment means a substantial, or potentially substantial, adverse change in the environment. Pursuant to CEQA Guideline §15382, a significant effect on the environment is further defined as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. Other Federal, State, and local agencies' considerations and regulations are also used in the evaluation of significance of proposed actions.

Direct and indirect adverse impacts to biological resources are classified as "significant," "potentially significant," or "less than significant." Biological resources are broken down into four categories: vegetation, wildlife, threatened and endangered species, and regulated "waters of the United States" and/or stream channels. "Significant" impacts as they pertain to these four categories are discussed under the appropriate heading below.

A "potentially significant" designation is used under circumstances where the presence of a special-status species or resource is uncertain and project construction could result in its loss. This designation is also used if it is unclear if the proposed project would result in a significant adverse impact, but the likelihood is great. "Less than significant" impacts are those impacts not put into either significant or potentially significant categories. Impacts would be generally considered less than significant if the habitats and species affected were common and widespread in the region and in the State.

12.1.1 Thresholds of Significance

12.1.1.1 Plants, Wildlife, Waters

In accordance with Appendix G (Environmental Checklist Form) of the CEQA Guidelines, implementing the project would have a significant biological impact if it would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.

- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.

- Have a substantial adverse effect on federally protected "wetlands" as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

12.1.1.2 Waters of the United States and State.

Pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344), the U.S. Army Corps of Engineers (Corps) regulates the discharge of dredged or fill material into waters of the United States, which includes wetlands, as discussed in the bulleted item above, and also includes "other waters" (stream channels, rivers) (33 CFR Parts 328 through 330). Substantial impacts to Corps regulated areas on a project site would be considered a significant adverse impact. Similarly, pursuant to Section 401 of the Clean Water Act, and to the Porter-Cologne Water Quality Control Act, the RWQCB regulates impacts to waters of the state. Thus, substantial impacts to RWQCB regulated areas on a project site would also be considered a significant adverse impact.

12.1.1.3 Stream Channels

Pursuant to Section 1602 of the California Fish and Game Code, CDFG regulates activities that divert, obstruct, or alter stream flow, or substantially modify the bed, channel, or bank of a stream which CDFG typically considers to include riparian vegetation. Any proposed activity that would result in substantial modifications to a natural stream channel would be considered a significant adverse impact.

13. IMPACT ASSESSMENT AND PROPOSED MITIGATION

13.1 Impact 1. Trees

The project site supports 143 native trees, many of which are valley oaks and coast live oaks. Both valley oak and coast live oak trees are "protected trees" under Sonoma County's Zoning Regulations. It is estimated that approximately 60 coast live oak and valley oak trees could be removed for the proposed project (J. Meserve, Arborist, pers. comm. with S. Lynch of M&A). In accordance with Sonoma County's Zoning Regulations, Chapter 26, Article 88, mitigation compensation is required for impacts to protected trees. Mitigation is based on one of the County's Arboreal Value Charts (Chart No. 1 or Chart No. 2). Another mitigation option available for impacts to valley oak trees, in accordance with Article 67, loss of valley oaks can be mitigated by one of the following measures: (1) retaining other valley oaks on the subject property, (2) planting replacement valley oaks on the subject property or on another site in the county having the geographic, soil, and other conditions necessary to sustain a viable population of valley oaks, (3) a combination of measures (1) and (2), or (4) paying an in-lieu fee, which shall be used exclusively for valley oak planting programs in the county.

Under the Sonoma County General Plan 2020, Policy OSRC-7k requires the identification, preservation and protection of native trees in the design of discretionary projects, and, to the maximum extent practicable, minimize the removal of native trees, require any trees removed to be replaced, preferably on the site. Additionally, Chapter 26 of the Sonoma County Zoning Regulations requires mitigation for the removal of protected trees. Hence, based on all of the above zoning regulations, removal of native, protected trees onsite without compensatory mitigation would be a s**ignificant, adverse impact pursuant to CEQA**. This impact could be mitigated to a level considered less than significant.

13.2 Mitigation Measure 1 - Trees

In order to offset the impact of removing native, protected valley oak and coast live oak trees onsite, the applicant shall mitigate by planting replacement trees or paying an in-lieu fee. If replacement planting is the mitigation option chosen, replacement trees shall be the same species as the trees removed.

To determine mitigation for coast live oaks and valley oaks removed, it shall be necessary for the applicant to implement Sonoma County's "arboreal value" method, which is a mathematical evaluation of the arboreal component of a site for the purposes of establishing a plan for tree preservation. Under this method one of two available methods can be used for determining arboreal values, based on Chart #1 or Chart #2 contained in the Sonoma County Tree Ordinance. Chart #1 requires analysis be done only in the development areas and requires 100% replacement or in-lieu fees. Chart #2 requires analysis of the whole site but allows for removal up to 50% of the arboreal value. Compensation for the loss of greater than 50% arboreal value will require replacement by using the chart. Replacement shall include the replanting of coast live oaks and valley oaks on the project site in accordance with the arboreal value and Chart 2 or by paying in in-lieu fee.

The applicant's arborist calculated the number of protected trees to be removed on the entire property, breaking the trees down by size class (diameter at breast height) consistent with the Arboreal Value Charts. Using Chart No. 2, it has been determined that greater than 50% of the arboreal value onsite will be removed. (That is, the existing arboreal value is 103, and the removed arboreal value is 95). Hence, mitigation by replacement planting or in-lieu fee payment using the County's arboreal valuations shall be required for the project.

This mitigation measure when implemented would reduce the project's impact to native oak trees to a level considered less than significant pursuant to CEQA.

13.3 Impact 2. Nesting Raptors

No large stick nests or tree cavities were found on the project site suggesting that raptors have nested on the project site in the recent past. However, red-tailed hawks, red shouldered hawks, and white-tailed kites are all known from the area, and conceivably they could nest on the project site in future years. All of these raptors (that is, birds of prey) are protected under the Migratory Bird Treaty Act (50 CFR 10.13) and their eggs and young are protected under California Fish and Game Codes Sections 3503, 3503.5. Any project-related impacts to these species would be considered a significant adverse impact. Potential impacts to these species from the proposed project include disturbance to nesting birds, and possibly death of adults and/or young. No nesting raptors (birds of prey) have been identified on the proposed project site; however, no specific surveys for nesting raptors have been conducted. As such, in the absence of survey results, it must be concluded that impacts to nesting raptors from the proposed project would be **potentially significant pursuant to CEQA.** This impact could be mitigated to a level considered less than significant.

13.4 Mitigation Measure 2. Nesting Raptors

In order to avoid impacts to nesting raptors, a nesting surveys shall be conducted prior to commencing with grading or construction work if this work would commence between February 1st and August 31st. The raptor nesting surveys shall include examination of all trees within 500 feet of the entire project site, not just trees slated for removal.

If nesting raptors are identified during the surveys, the dripline of the nest tree must be fenced with orange construction fencing (provided the tree is on the project site), and a 300-foot radius around the nest tree must be staked with bright orange lath or other suitable staking. If the tree is located off the project site, then the buffer shall be demarcated per above where the buffer occurs on the project site. *The size of the buffer may be altered if a qualified raptor biologist conducts behavioral observations and determines the nesting raptors are well acclimated to disturbance.* If this occurs, the raptor biologist shall prescribe a modified buffer that allows sufficient room to prevent undue disturbance/harassment to the nesting raptors. No construction or earth-moving activity shall occur within the established buffer until it is determined by a qualified raptor biologist that the young have fledged (that is, left the nest) and have attained sufficient flight skills to avoid project construction zones. This typically occurs by July 15th. This date may be earlier or later, and would have to be determined by a qualified raptor biologist. If a qualified biologist is not hired to watch the nesting raptors then the buffers shall be maintained in place through the month of August and work within the buffer can commence September 1st.

Implementation of this mitigation measure would reduce impacts to nesting raptors to a level considered less than significant.

13.5 Impact 3. Impacts to Waters of the United States and/or State

The proposed project may result in impacts to areas that are likely within the Corps' and RWQCB jurisdiction pursuant to Sections 404 and 401 of the Clean Water Act, respectively. Areas subject to potential jurisdiction by these two agencies include the seasonal pond/borrow pit wetland adjacent to the soccer field on the project site, and possibly to an isolated wetland on the western edge of the site. Impacts to less than 0.5-acre of "waters of the United States/State" would occur from implementation of the proposed project. This impact would be regarded as a **significant adverse impact.** Such an impact could be mitigated to a level considered less than significant.

13.6 Mitigation Measure 3. Impacts to Waters of the United States and/or State

Impacts to potential waters of the United States and/or State can be reduced to less-than-significant levels through various means, including avoidance, minimization of impacts, and mitigation compensation. Because only the Corps can determine the extent of its jurisdiction on any site, and because the existing delineation is now expired, a current wetland delineation is currently in preparation using the 1987 Corps' Wetland Delineation Manual (U.S. Army Corps of Engineers 1987) and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (U.S. Army Corps of Engineers 2006). A preliminary wetland delineation map shall be prepared and submitted to the Corps for confirmation. *A currently valid delineation map shall be provided to the County of Sonoma.* Since the RWQCB does not have a formal method for technically defining what constitutes waters of the state, M&A expects that the RWQCB should remain consistent with the Corps' determination.

Waters of the U.S. and State will be avoided by the project where possible. Because full avoidance of waters of the United States and State is not possible, impacts will be minimized to the extent practicable. In addition, use of Best Management Practices to protect preserved wetlands and ensure water quality in wetlands and other waters within the watershed will be employed. These practices can include installing orange construction fencing, hay or gravel waddles, and other protective measures to protect preserved jurisdictional waters of the U.S. and State.

Since the man-made pond cannot be avoided by the project as it play a pivotal role in providing adequate parking spaces for hospital patrons and personnel, it shall be compensated for at a 2:1 ratio. That is the 15,857 square feet (0.36-acre) of man-made seasonal pond shall be compensated for via purchase of approximately 0.72-acre of mitigation credits from a Corps and RWQCB approved Wetland Conservation Bank. For example, the Hale Mitigation Bank in Santa Rosa (at Arlington Avenue, south of Todd Road) was fully approved as a wetland mitigation bank in 2006. This mitigation bank is available to mitigate impacts to waters of the U.S./State associated with this project site (H. Rich, pers. comm. with S. Lynch of M&A). Purchase of mitigation credits is deemed acceptable since the onsite pond is a man-made pond that does not support high quality seasonal wetland herbaceous vegetation owing to a dense overstory of red willows and Fremont cottonwoods. The functions and values of the pond in its setting between a soccer field and the Luther Burbank Center are low and accordingly purchase of mitigation credits is deemed appropriate. Purchase of such credits shall be made a condition of project approval; however, this condition may be altered in the future to otherwise comply with and be consistent with any Corps or RWQCB permit authorized for the proposed project. If mitigation compensation is not required by the Corps and/or RWQCB for the project, then this condition of project approval shall be deemed unnecessary.

Implementation of the measures just described above would reduce potentially significant impacts to waters of the United States/State to a level considered less-than-significant pursuant to the CEQA. Any other conditions that are stipulated for wetland impacts by the Corps and/or RWQCB shall also become conditions of project approval.

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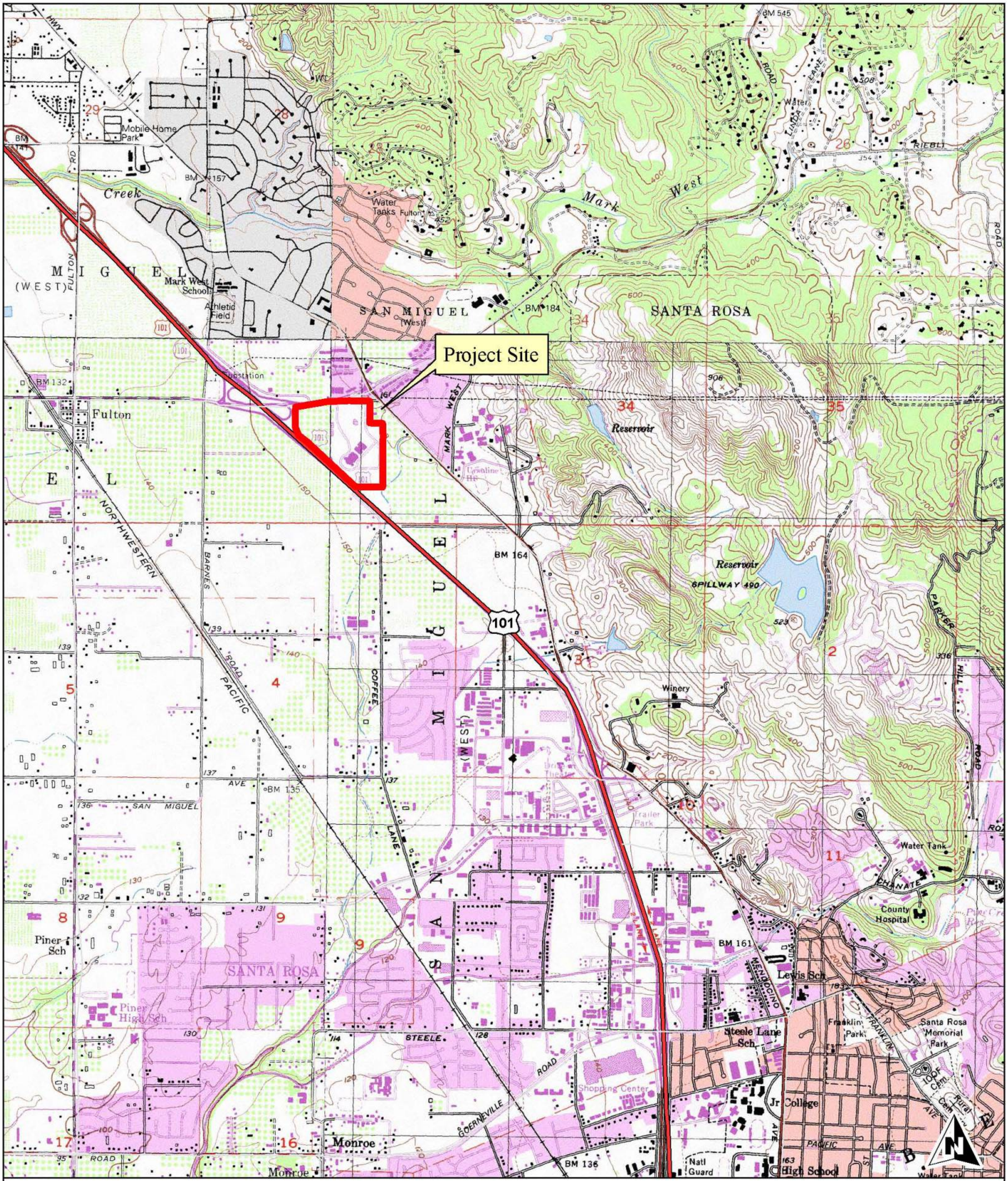
Figure 1. Sutter Medical Center Project Site Regional Map
Santa Rosa, California

County: Sonoma
Map Preparation Date: December 18, 2008



Miles
0 0.15 0.3 0.6 0.9 1.2 1.5

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Figure 2. Sutter Medical Center Project Location Map
Santa Rosa, California

County: Sonoma
7.5-Minute Santa Rosa, Mark West Springs, Healdsburg, Sebastopol quadrangles
Topography Source: http://gis.ca.gov
Map Preparation Date: December 29, 2008

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Figure 3. Aerial Photograph of the Sutter Medical Center Project Site
Santa Rosa, Sonoma County, California

Map Revision Date: December 29, 2008
Aerial Photograph Source: http://gdw.apfo.usda.gov

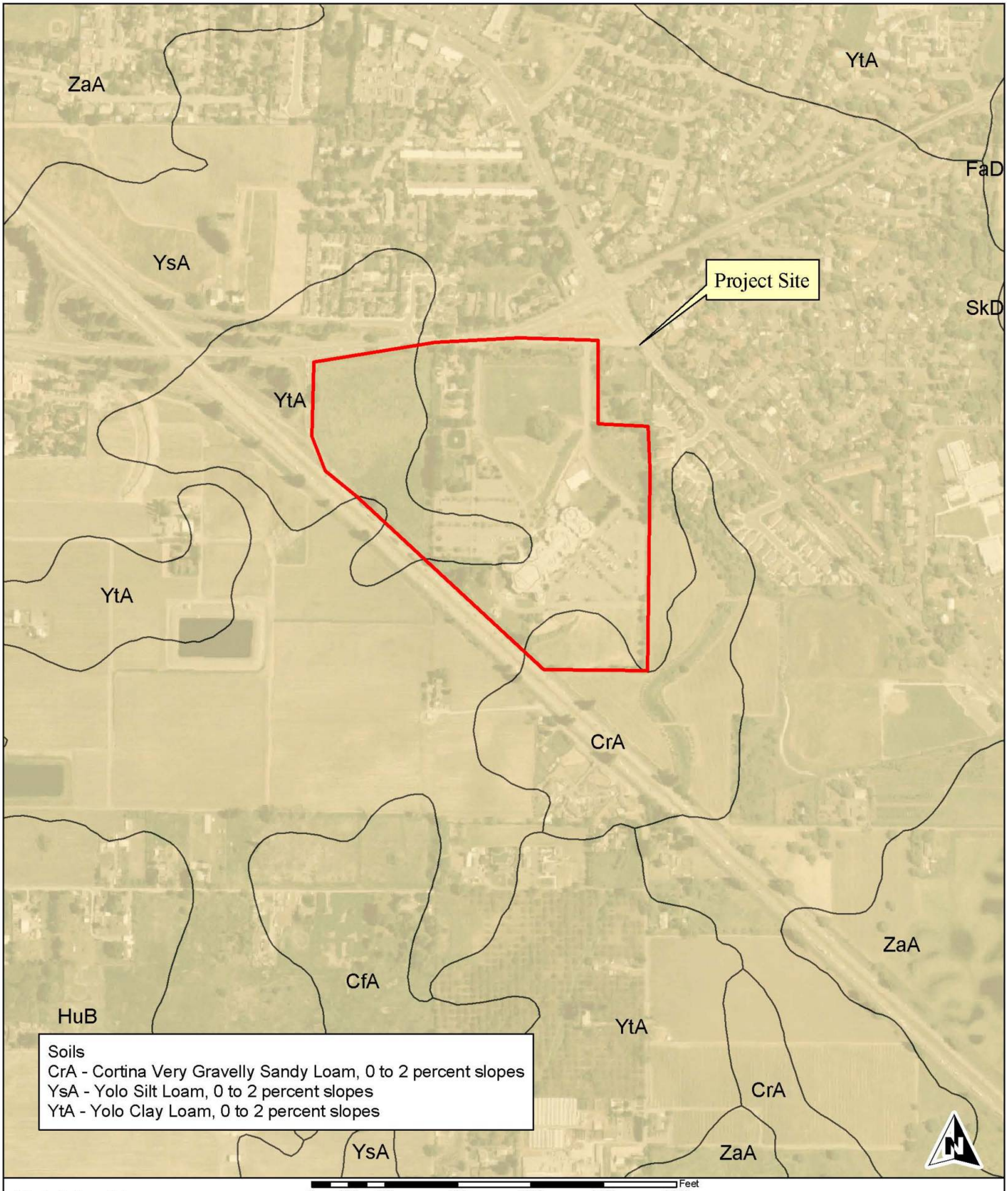

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Figure 4. Soils on the Sutter Medical Center Project
Santa Rosa, California

Map Revision Date: December 29, 2008
Aerial Photograph Source: http://gdw.apfo.usda.gov
Soils Data Source: http://soildatamart.nrcs.usda.gov

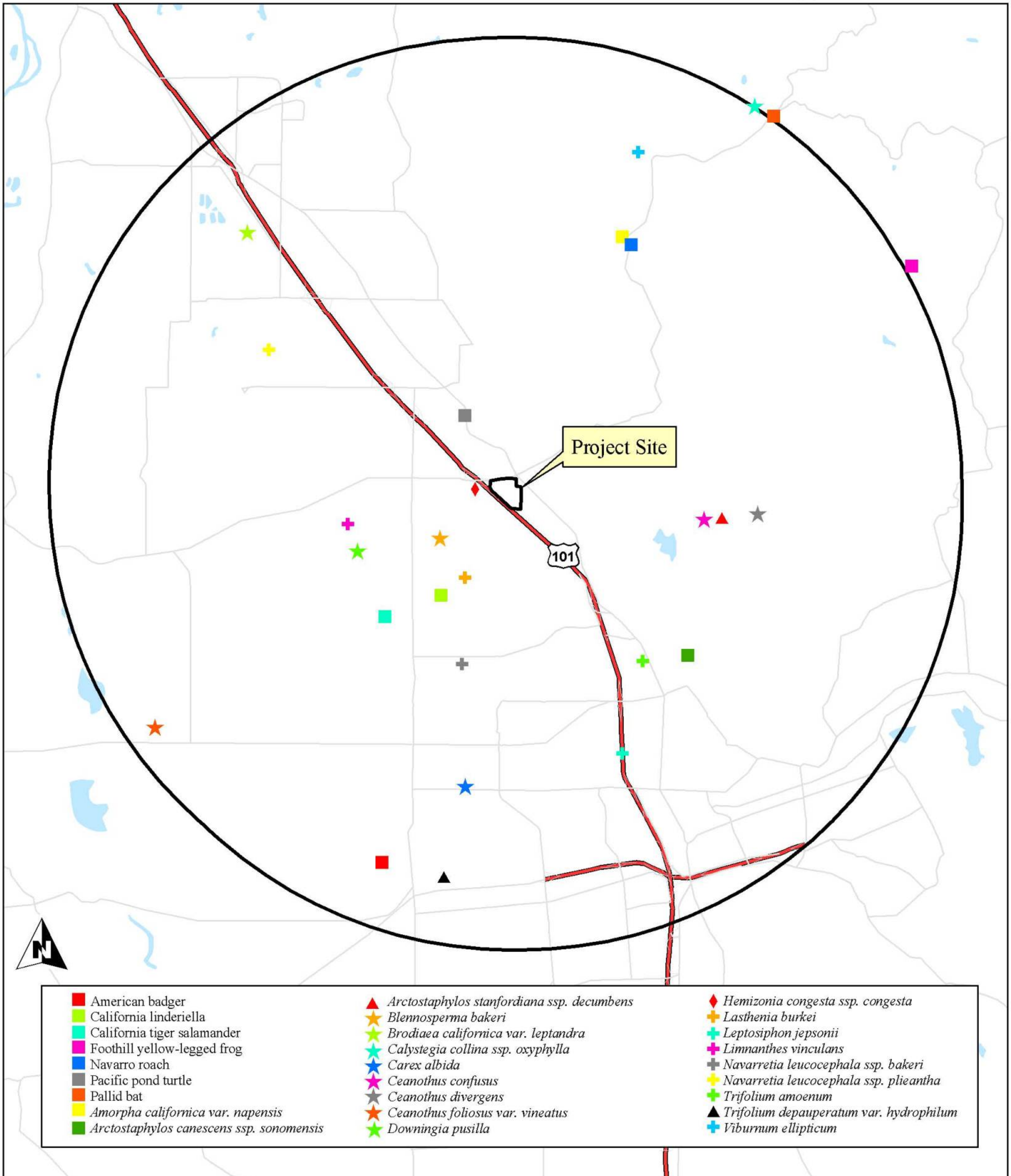

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Figure 5: Closest Known Records for Special-Status Species Within 5 Miles of the Sutter Medical Center Project Site

Map Preparation Date: January 7, 2009
Source: CDFG,
California Natural Diviersity Data Base, 2009

Table 1

Plants Observed on the Sutter Medical Center Project Site

Gymnosperms

Cupressaceae

Juniperus sp.	Juniper
Sequoia sempervirens	Redwood

Pinaceae

**Cedrus deodara*	Deodar cedar
Pinus radiata	Monterey pine

Angiosperms - Dicots

Araliaceae

**Hedera helix*	English ivy

Asteraceae

Baccharis pilularis	Coyote brush
**Carduus pycnocephalus*	Italian thistle
**Cirsium vulgare*	Bull thistle
Conyza canadensis	Horseweed
**Helminthotheca echioides*	Bristly ox-tongue
**Lactuca serriola*	Prickly lettuce
Taraxacum californicum	California dandelion

Brassicaceae

**Hirschfeldia incana*	Short-podded mustard
**Raphanus sativus*	Wild radish

Convolvulaceae

**Convolvulus arvensis*	Bindweed

Dipsacaceae

**Dipsacus sativus*	Fuller's teasel

Ebenaceae

**Diospyros kaki*	Persimmon

Ericaceae

**Arbutus unedo*	Strawberry tree

Fabaceae

**Trifolium sp.*	Clover
**Vicia sativa*	Common vetch

Fagaceae

Quercus agrifolia var. agrifolia	Coast live oak
Quercus lobata	Valley oak

Geraniaceae

**Erodium botrys*	Broad-leaf filaree
**Erodium cicutarium*	Red-stem filaree
**Erodium moschatum*	White-stem filaree
**Geranium dissectum*	Cut-leaf geranium

* Indicates a non-native species

Hamamelidaceae

Liquidambar styraciflua	Liquidambar

Lauraceae

**Cinnamomum camphora*	Camphor tree

Oleaceae

**Olea europaea*	Olive

Onagraceae

Epilobium ciliatum	Hairy willow-herb

Oxalidaceae

**Oxalis pes-caprae*	Bermuda buttercup

Papaveraceae

Eschscholzia californica	California poppy

Plantaginaceae

**Kickxia elatine*	Sharppoint fluvellin
**Plantago lanceolata*	English plantain

Polygonaceae

**Rumex crispus*	Curly dock

Rosaceae

**Cotoneaster pannosa*	Cotoneaster
**Rosa sp.*	Wild rose
**Rubus discolor*	Himalayan blackberry

Salicaceae

Populus fremontii ssp. fremontii	Fremont cottonwood
Salix exigua	Narrow-leaved willow
Salix laevigata	Red willow

Sapindaceae

**Acer sp.*	Maple

Angiosperms -Monocots

Arecaceae

Washingtonia filifera	California fan palm

Cyperaceae

Cyperus eragrostis	Tall flatsedge

Liliaceae

**Yucca sp.*	Yucca

Poaceae

**Avena fatua*	Wild oat
**Bromus hordeaceus*	Soft chess
**Cortaderia jubata*	Pampas grass
**Holcus lanatus*	Common velvet grass
**Hordeum marinum ssp. gussoneanum*	Mediterranean barley
**Lolium multiflorum*	Italian ryegrass
Paspalum distichum	Joint paspalum
**Phalaris aquatica*	Harding grass
**Poa annua*	Annual bluegrass
**Taeniatherum caput-medusae*	Medusahead

* Indicates a non-native species

Table 2
Wildlife Observed on the Sutter Medical Center Project Site

Amphibians

Arboreal salamander	*Aneides lugubris*
California slender salamander	*Batrachoseps attenuatus*
Western toad	*Bufo boreas*
Pacific tree frog	*Hyla regilla*

Reptiles

Western fence lizard	*Sceloporus occidentalis*
Northern alligator lizard	*Elgaria coerulea*

Birds

Great egret	*Ardea alba*
Turkey vulture	*Cathartes aura*
Mallard	*Anas platyrhynchos*
Red-shouldered hawk	*Buteo lineatus*
Red-tailed hawk	*Buteo jamaicensis*
Killdeer	*Charadrius vociferus*
Anna's hummingbird	*Calypte anna*
Nuttall's woodpecker	*Picoides nuttallii*
Northern flicker	*Colaptes auratus*
Black phoebe	*Sayornis nigricans*
Western scrub jay	*Aphelocoma californica*
American crow	*Corvus brachyrhynchos*
Oak titmouse	*Baeolophus inornatus*
Bushtit	*Psaltriparus minimus*
Bewick's wren	*Thryomanes bewickii*
Marsh wren	*Cistothorus palustris*
Ruby-crowned kinglet	*Regulus calendula*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
Cedar waxwing	*Bombycilla cedrorum*
Yellow-rumped warbler	*Dendroica coronata*
California towhee	*Pipilo crissalis*
Song sparrow	*Melospiza melodia*
White-crowned sparrow	*Zonotrichia leucophrys*
Brown-headed cowbird	*Molothrus ater*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*

Mammals

Virginia opossum	*Didelphis virginiana*
Ornate shrew	*Sorex ornatus*
Botta's pocket gopher	*Thomomys bottae*
Western harvest mouse	*Reithrodontomys megalotis*
Deer mouse	*Peromyscus maniculatus*
Norway rat	*Rattus norvegicus*

Table 2

Wildlife Observed on the Sutter Medical Center Project Site

California meadow vole	*Microtus californicus*
Red fox	*Vulpes vulpes*
Raccoon	*Procyon lotor*
Striped skunk	*Mephitis mephitis*

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Apiaceae					
Eryngium constancei Loch Lomand button-celery	Fed: FE State: CE CNPS: List 1B.1	April-June	Vernal pools. Elevation 460-855.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Asteraceae					
Balsamorhiza macrolepis macrolepis Big-scale balsam-root	Fed: - State: - CNPS: List 1B.2	March-June	Chaparral; cismontane woodland; valley and foothill grassland; [sometimes serpentinite]. Elevation 90-1400 meters.	On CNPS 9-quad list.	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Blennosperma bakeri Sonoma sunshine	Fed: FE State: CE CNPS: List 1B.1	March-May	Valley and foothill grassland (mesic); vernal pools. Elevation 10-110 m.	Record for this species located 0.7 miles southwest of the project site (Occurrence No. 25).	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Centromadia parryi parryi Pappose tarplant	Fed: - State: - CNPS: List 1B.2	May-November	Chaparral; coastal prairie; meadows and seeps; marshes and swamps; valley and foothill grassland (vernally mesic/often alkaline). Elevation 2-420 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Erigeron biolettii Streamside daisy	Fed: - State: - CNPS: List 3	June-October	Broad-leaved upland forest; cismontane woodland; northern coniferous forest [rocky, mesic]. Elevation 30-1100 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Erigeron serpentinus Serpentine daisy	Fed: - State: - CNPS: List 1B.3	May-August	Chaparral (serpentinite). Elevation 60-670 meters	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Hemizonia congesta congesta Hayfield tarweed	Fed: State: CNPS: List 1B.2	April-November	Valley and foothill grassland (VFGrs)/sometimes roadsides. Elevation 20-560 meters.	Record for this species located approximately 1.1 mile east of the project site (Occurrence No. 22).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lasthenia burkei Burke's goldfields	Fed: FE State: CE CNPS: List 1B.1	April-June	Meadows (mesic); vernal pools. Elevation 15 to 600 meters.	Record for this species located 0.9-mile southwest of the project site (CNDDB Occurrence No. 19).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lasthenia californica bakeri Baker's goldfields	Fed: State: CNPS: List 1B.2	April-October	Closed-cone coniferous forest, coastal scrub, meadows and seeps, marshes and swamps. Elevation 60-520 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lasthenia conjugens Contra Costa goldfields	Fed: FE State: - CNPS: List 1B.1	March-June	Valley and foothill grassland (mesic); vernal pools; cismontane woodlands; playas. Elevation 0-470 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Layia septentrionalis Colusa layia	Fed: - State: - CNPS: List 1B.2	April-May	Chaparral; cismontane woodland, valley and foothill grassland; [sandy, serpentinite]. Elevation 100-1095 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lessingia hololeuca Woolly-headed lessingia	Fed: - State: - CNPS: List 3	June-October	Broad-leaved upland forest; coastal scrub; lower montane coniferous forest; valley and foothill grassland; [clay, serpentinite]. Elevation 15-305 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Microseris paludosa Marsh silverpuffs	Fed: - State: - CNPS: List 1B.2	April-July	Closed-cone coniferous forest; cismontane woodland; coastal scrub; valley and foothill grassland. Elevation 5-300 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Boraginaceae					
Mertensia bella Oregon lungwort	Fed: - State: - CNPS: List 2.2	May-July	Meadows; upper montane coniferous forest; [mesic]. Elevation 1500-2000 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Campanulaceae					
Downingia pusilla Dwarf downingia	Fed: - State: - CNPS: List 2.2	March-May	Valley and foothill grassland (mesic); vernal pools. Elevation 1-445 meters.	Record for this species located 1.6 miles west of the project site (Occurrence No. 85).	None. Marginally suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Legenere limosa Legenere	Fed: - State: - CNPS: List 1B.1	April-June	Vernal pools. Elevation 1-880 m.	On CNPS 9-quad list.	None. Marginally suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Caprifoliaceae					
Viburnum ellipticum Western viburnum	Fed: - State: - CNPS: List 2.3	May-June	Chaparral; cismontane woodland; lower montane coniferous forest. Elevation 215-1400 meters.	Record for this species located 4.0 miles northeast of the project site (Occurrence No. 11).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Convolvulaceae					
Calystegia collina oxyphylla Mt. Saint Helena morning-glory	Fed: - State: - CNPS: List 4	May-June	Chaparral (serpentinite).	Record for this species located 4.9 miles northeast of the project site (Occurrence No. 5).	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Cyperaceae					
Carex albida White sedge	Fed: FE State: CE CNPS: List 1B.1	May-July	Bogs and fens; marshes and swamps (freshwater). Elevation 15-90 meters.	Record for this species located 3.2 miles south of the project site (Occurrence No. 2).	None. Marginally suitable habitat on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Rhynchospora alba White beaked-rush	Fed: - State: - CNPS: List 1B.1	July-August	Bogs and fens; marshes and swamps (freshwater). Elevation 45-1010 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Rhynchospora californica California beaked-rush	Fed: - State: - CNPS: List 1B.1	May-July	Bogs & fens, lower montane coniferous forest; seeps; freshwater marshes and swamps. Elevation 45-1010 m.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Rhynchospora capitellata Brownish beakrush	Fed: - State: - CNPS: List 2.2	July-August	Lower montane coniferous forest, meadows and seeps, marshes/swamps, upper montane conif. forest /mesic; elev. range 455 - 2000 M (1,493 - 6,652 feet).	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Rhynchospora globularis globularis Roundheaded beaked-rush	Fed: - State: - CNPS: List 2.1	July-August	Marshes and swamps (freshwater). Elevation 45-60 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Ericaceae					
Arctostaphylos canescens sonomensis Sonoma manzanita	Fed: - State: - CNPS: List 1B.2	January-June	Chaparral; lower montane coniferous forest (sometimes serpentinite). Elevation 180-1675 m.	Record for this species located 2.5 miles northeast of the project site (Occurrence No. 20).	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Arctostaphylos densiflora Vine Hill manzanita	Fed: - State: CE CNPS: List 1B	February-April	Chaparral (acid marine sand). Elevation 50-120 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Arctostaphylos stanfordiana decumbens Rincon manzanita	Fed: - State: - CNPS: List 1B.1	February-April	Chaparral (rhyolitic), cismontane woodland. Elevation 75 to 370 meters.	Record for this species located 2.3 miles east of the project site (Occurrence No. 5).	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Fabaceae					
Amorpha californica napensis Napa false indigo	Fed: - State: - CNPS: List 1B.2	April-July	Broadleaved upland forest (openings); chaparral, cismontane woodland. Elevation 120-2000 m.	Record for this species located 3 miles north of the project site (Occurrence No. 23).	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Astragalus claranus Clara Hunt's milkvetch	Fed: FE State: CT CNPS: List 1B.1	March-May	Cismontane woodland; valley and foothill grassland; [serpentinite, volcanic clay]. Elevation 75-275 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lupinus sericatus Cobb Mountain lupine	Fed: - State: - CNPS: List 1B.2	March-June	Broadleaved upland forest; chaparral; cismontane woodland; lower montane coniferous forest. Elevation 275-1525 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*		Flowering Period	Habitat	Area Locations	Probability on Project Site
Trifolium amoenum Showy Indian clover	Fed: State: CNPS:	FE - List 1B.1	April-June	Valley and foothill grassland (sometimes serpentinite) and coastal bluff scrub. Elevation 5 -415 meters.	Record for this species located 2.2 miles southeast of the project site (Occurrence No. 21).	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Trifolium buckwestiorum Santa Cruz clover	Fed: State: CNPS:	 - List 1B.1	May-July	Broadleaf upland forest; coastal prairie; [margins]. Elevation 105-610 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Trifolium depauperatum hydrophilum Saline clover	Fed: State: CNPS:	- - List 1B.2	April-June	Marshes and swamps; valley and foothill grassland (mesic, alkaline); vernal pools. Elevation 0-300 m.	Record for this species located 4.2 miles south of the project site (Occurrence No. 16).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Lamiaceae						
Monardella villosa globosa Robust monardella	Fed: State: CNPS:	- - List 1B.2	June-August	Chaparral (openings); cismontane woodland; broadleafed upland forest (openings), coastal scrub, valley and foothill grassland. Elevation 100-915 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Liliaceae						
Allium peninsulare franciscanum Franciscan onion	Fed: State: CNPS:	- - List 1B.2	May-June	Cismontane woodland; valley and foothill grassland [clay, volcanic, often serpentine]. Elevation 52-300 m.	On CNPS 9-quad list.	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Fritillaria liliacea Fragrant fritillary	Fed: State: CNPS:	- - List 1B.2	February-April	Cismontane woodland, coastal prairie; coastal scrub; valley and foothill grassland; [often serpentinite]. Elevation 3-410 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Lilium pardalinum pitkinense Pitkin Marsh lily	Fed: FE State: CE CNPS: List 1B.1	June-July	Cismontane woodland (mesic); marshes and swamps (freshwater). Elevation 35 to 65 meters.	Known from Pitikin Marsh which is greater than 5 miles west of the project site (this known locality is approximately 1 mile south of Forestville. R. Bittman, CDFG, pers. comm.).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Limnanthaceae					
Limnanthes vinculans Sebastopol meadowfoam	Fed: FE State: CE CNPS: List 1B.1	April-May	Meadows (mesic); vernal pools. Elevation 15-305 meters.	Record for this species located 1.7 miles west of the project site (Occurrence No. 28).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Malvaceae					
Sidalcea hickmanii viridis Marin checkerbloom	Fed: - State: - CNPS: List 1B.3	May-June	Chaparral (serpentinite). Elevation 50-430 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Sidalcea oregana valida Kenwood Marsh checkerbloom	Fed: FE State: CE CNPS: List 1B.1	June-September	Marshes and swamps (freshwater). Elevation 115-150 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Onagraceae					
Clarkia imbricata Vine Hill clarkia	Fed: FE State: CE CNPS: List 1B	June-August	Chaparral; meadows; cismontane woodland. Elevation 50-75 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*		Flowering Period	Habitat	Area Locations	Probability on Project Site
Orobanchaceae						
Castilleja uliginosa Pitkin Marsh Indian paintbrush	Fed: State: CNPS:	- CE List 1A	June-July	Marshes and swamps (freshwater).	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Cordylanthus tenuis capillaris Pennell's bird's-beak	Fed: State: CNPS:	FE CR List 1B.2	June-September	Closed-cone coniferous forest; chaparral; [serpentinite]. Elevation 45-305 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Plantaginaceae						
Penstemon newberryi sonomensis Sonoma beardtongue	Fed: State: CNPS:	- - List 1B.3	April-August	Chaparral (rocky).	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Poaceae						
Alopecurus aequalis sonomensis Sonoma alopecurus	Fed: State: CNPS:	FE - List 1B.1	May-July	Marshes & swamps (freshwater); riparian scrub. Elevation 5-365 m.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Calamagrostis crassiglumis Thurber's reed grass	Fed: State: CNPS:	- - List 2.1	May-July	Coastal scrub (mesic); marshes and swamps (freshwater). Elevation 10-45 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Pleuropogon hooverianus North coast semaphore grass	Fed: State: CNPS:	- CT List 1B.1	April-August	Broadleaved upland forest; meadows; north coast coniferous forest; vernal pools; [mesic]. Elevation 10-671 m.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Poa napensis Napa bluegrass	Fed: FE State: CE CNPS: List 1B.1	May-August	Meadows (alkaline, near hot springs). Elevation 100-200 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Polemoniaceae					
Gilia capitata tomentosa Woolly-headed gilia	Fed: - State: - CNPS: List 1B.1	May-July	Coastal bluff scrub (rocky, outcrops). Elevation 15-155 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Leptosiphon jepsonii Jepson's linanthus	Fed: - State: - CNPS: List 1B.2	March-May	Chaparral; cismontane woodland (usually volcanic). Elevation 100-500 meters.	Record for this species located 3.0 miles southeast of the project site (Occurrence No. 3).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Navarretia leucocephala bakeri Baker's navarretia	Fed: - State: - CNPS: List 1B.1	April-July	Cismontane woodland; lower montane coniferous forest; meadows; valley and foothill grassland; vernal pools (mesic). Elevation 5-1740 m.	Record for this species located 1.9 miles south of the project site (Occurrence No. 20).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Navarretia leucocephala plieantha Many-flowered navarretia	Fed: FE State: CE CNPS: List 1B.2	May-June	Vernal pools (can be volcanic ash flow). In the S. R. Plain; it is extant on one remaining site (Occ. 7). This occ. is a claypan v. pool (no volcanic substrate). Elev. 30 to 950 M.	Record for this species located 4.9 miles northwest of the project site (Occurrence No. 9).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Polygonaceae					
Chorizanthe valida Sonoma spineflower	Fed: FE State: CE CNPS: List 1B.1	June-August	Coastal prairie (sandy). Elevation 10-305 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family / Taxon / Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Ranunculaceae					
Delphinium luteum Yellow larkspur	Fed: FE State: CR CNPS: List 1B.1	March-May	Chaparral; coastal prairie; coastal scrub (rocky). Elevation 0-100 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Rhamnaceae					
Ceanothus confusus Rincon Ridge ceanothus	Fed: - State: - CNPS: List 1B.1	February-June	Closed-cone coniferous forest; chaparral; cismontane woodland; [volcanic or serpentinite]. Elevation 75-1065 m.	Record for this species located 2.0 miles east of the project site (Occurrence No. 1).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Ceanothus divergens Calistoga ceanothus	Fed: - State: - CNPS: List 1B.2	February-March	Chaparral (serpentinite or volcanic, rocky). Elevation 170 to 950 meters.	Record for this species located 2.7 miles east of the project site (Occurrence No. 4).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Ceanothus foliosus vineatus Vine Hill ceanothus	Fed: - State: - CNPS: List 1B.1	March-May	Chaparral. Elevation 45 - 305 meters	Record for this species located 4.6 miles southwest of the project site (Occurrence No. 3).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Ceanothus purpureus Holly-leaf ceanothus	Fed: - State: - CNPS: List 1B.2	February-June	Chaparral; cismontane woodland (volcanic, rocky). Elevation 120-640 m.	On CNPS 9-quad list.	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Ceanothus sonomensis Sonoma ceanothus	Fed: - State: - CNPS: List 1B.2	February-April	Chaparral (sandy, serpentinite, or volcanic). Elevation 215-800 meters.	On CNPS 9-quad list.	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 3

Special-Status Plant Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Rosaceae					
Horkelia tenuiloba Thin-lobed horkelia	Fed: - State: - CNPS: List 1B.2	May-July	Broadleaved upland forest; valley and foothill grassland; chaparral (mesic openings, sandy). Elevation 50-500 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Potentilla hickmanii Hickman's cinquefoil	Fed: FE State: CE CNPS: List 1B.1	April-August	Coastal bluff scrub; closed-cone coniferous forest; meadows (vernally mesic); marshes and swamps (freshwater). Elevation 10-149 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Themidaceae					
Brodiaea californica leptandra Brodiaea	Fed: - State: - CNPS: List 1B.2	May-July	Broadleaved upland forest; cismontane woodland; chaparral; lower montane coniferous forest; valley & foothill grassland (volcanic). Elevation 110-915 m.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

***Status**

Federal:
FE - Federal Endangered
FT - Federal Threatened
FPE - Federal Proposed Endangered
FPT - Federal Proposed Threatened
FC - Federal Candidate

State:
CE - California Endangered
CT - California Threatened
CR - California Rare
CC - California Candidate
CSC - California Species of Special Concern

CNPS:
List 1A - Presumed extinct in California
List 1B - Plants rare, threatened, or endangered in California and elsewhere
List 1B.1 - Seriously endangered in California (over 80% occurrences threatened/ high degree and immediacy of threat)
List 1B.2 - Fairly endangered in California (20-80% occurrences threatened)
List 1B.3 - Not very endangered in California (<20% of occurrences threatened or no current threats known)

CNPS Continued:
List 2 - Plants rare, threatened, or endangered in California, but more common elsewhere
List 2.1 - Seriously endangered in California, but more common elsewhere
List 2.2 - Fairly endangered in California, but more common elsewhere
List 2.3 - Not very endangered in California, but more common elsewhere
List 3 - Plants about which we need more information (Review List)
List 3.1 - Plants about which we need more information (Review List) Seriously endangered in California
List 3.2 - Plants about which we need more information (Review List) Fairly endangered in California
List 4 - Plants of limited distribution - a watch list

Table 4

Special-Status Animal Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Species	*Status	Habitat	Closest Locations	Probability on Project Site
Invertebrates				
California linderiella *Linderiella occidentalis*	Fed: -- State: - Other: -	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and tds.	Record for this species located 1.2 miles south of the project site (Occurrence No. 133).	None. No vernal pools or seasonal wetlands onsite that provide habitat. No impact expected.
Fish				
Navarro roach *Lavinia symmetricus navarroensis*	Fed: - State: CSC Other: -	California roach generally found in small, warm intermittent streams. This subspecies is reported by CDFG to be extremely numerous in the warmer reaches of the Russian and Navarro Rivers in Sonoma County.	Record for this species located 2.8 miles north of the project site (Occurrence No. 2).	None. No creek channels or streams onsite. No fish habitat. No impact expected.
Amphibians				
California tiger salamander *Ambystoma californiense*	Fed: FT State: CSC Other:	Found in grassland habitats of the valleys and foothills. Requires burrows for aestivation and standing water until late spring (May) for larvae to metamorphose.	Record for this species located 1.8 miles southwest of the project site (Occurrence No. 360).	None. Two years of protocol surveys did not detect CTS. USFWS issued a "no effect" to CTS letter for the project (see text).
Foothill yellow-legged frog *Rana boylii*	Fed: -- State: CSC Other:	Found in partially shaded, shallow streams with rocky substrates. Needs some cobble-sized rocks as a substrate for egg laying. Requires water for 15 weeks for larval transformation.	Record for this species located 5 miles northeast of the project site (Occurrence No. 293).	None. No creeks onsite. No impact expected.
Reptiles				
Pacific pond turtle (=western pond turtle) *Actinemys marmorata (=Clemmys m.)*	Fed: -- State: CSC Other:	Inhabits ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Needs suitable basking sites and upland habitat for egg laying. Occurs in the Central Valley and Contra Costa County.	Record for this species located 0.8 miles northwest of the project site (Occurrence No. 283).	None. No creeks onsite. Only an isolated man-made pond exists that was surveyed for 3 years. No turtles were found. No impact expected.

Table 4

Special-Status Animal Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Species	*Status	Habitat	Closest Locations	Probability on Project Site
Birds				
White-tailed kite *Elanus leucurus*	Fed: State: Other: *	Found in lower foothills and valley margins with scattered oaks and along river bottomlands or marshes adjacent to oak woodlands. Nests in trees with dense tops.	Known from Sonoma County and the Santa Rosa area. Nests locally.	Moderate. Oak trees and redwood trees onsite provide suitable nesting habitat. Nesting surveys necessary. See text.
Red-shouldered hawk *Buteo lineatus*	Fed: - State: - Other: *	Found in a wide variety of habitats. Nest in oaks, eucalyptus, cypress trees, riparian woodland. Forages over grasslands, agricultural fields, woodlands.	Known from Sonoma County and the Santa Rosa area. Nests locally.	Moderate. Oak trees and redwood trees onsite provide suitable nesting habitat. Nesting surveys necessary. See text.
Red-tailed hawk *Buteo jamaicensis*	Fed: - State: - Other: *	Found in a wide variety of habitats. Nests in oaks, eucalyptus, cypress trees, among others. Forages over grasslands, agricultural fields, woodlands, marshes.	Known from Sonoma County and the Santa Rosa area. Nests locally.	Moderate. Oak trees and redwood trees onsite provide suitable nesting habitat. Nesting surveys necessary. See text.
Mammals				
Pallid bat *Antrozous pallidus*	Fed: - State: CSC Other:	Occurs in deserts, grasslands, shrublands, woodlands, and forests. Most common in dry habitats with rocky areas for roosting.	Record for this species located 5 miles west of the project site (Occurrence No. 62).	None. All structures onsite have been recently constructed and are in use. No vacant buildings or structures present. No suitable habitat. No impact expected.
American badger *Taxidea taxus*	Fed: - State: CSC Other:	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Need sufficient food, friable soils & open, uncultivated ground. Prey on burrowing rodents. Dig burrows.	Record for this species located 4.3 miles south of the project site (Occurrence No. 28).	None. No suitable habitat. No sign of badger burrows. No impact expected.

Table 4

Special-Status Animal Species Known to Occur in the Vicinity of the Sutter Medical Center Project Site

Species	*Status	Habitat	Closest Locations	Probability on Project Site

***Status**

Federal:	State:	*Other:
FE - Federal Endangered	CE - California Endangered	Most birds have protection under the Migratory Bird Treaty Act. Raptors and their nests are protected by provisions of the California Fish and Game Code. A few species, such as the monarch butterfly and "California Fully Protected Animals," may be protected by policies of the California Department of Fish and Game.
FT - Federal Threatened	CT - California Threatened	
FPE - Federal Proposed Endangered	CR - California Rare	
FPT - Federal Proposed Threatened	CC - California Candidate	
FC - Federal Candidate	CSC - California Species of Special Concern	
FPD - Federally Proposed for delisting	WL - Watch List. Not protected persuant to CEQA	

Appendix D2

Special Status Plant Survey Report, Sutter Medical Center

July 7, 2009

Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, California 95405

Attention: Ms. Nadin Sponamore

RE: Special-Status Plant Survey Report
Sutter Medical Center
Santa Rosa, Sonoma County, California
APNs 58-040-058, -059, 060, 061

Dear Ms. Sponamore:

1. INTRODUCTION

In the spring of 2009, Monk & Associates, Inc. (M&A) completed focused surveys for special-status (that is, rare, threatened, or endangered) plants for the proposed Sutter Medical Center project site located at 50 Mark West Springs Road in the City of Santa Rosa, Sonoma County, California (herein referred to as the project site) (Figures 1 and 2). These focused surveys supplement rare plant surveys conducted by Mr. Charlie Patterson in 1993, 1998, 1999, and 2004. No special-status plants were identified during either M&A's surveys or Mr. Patterson's surveys conducted on this project site. Below we provide our survey methods, a description of the project site's plant communities, and the results of our surveys.

2. PROJECT SITE LOCATION AND DESCRIPTION

The 53-acre project site consists of 4 parcels located in the southeast quadrant of the U.S. Highway 101/Mark West Springs Road interchange in the City of Santa Rosa (Figure 2). Figure 3 shows the various land uses within the project site boundary. The project site consists of nearly level ground. The largest use of the property is paved parking, paved roads, buildings, and manicured landscaping, totaling approximately 25 acres. Soccer/lacrosse fields and other non-irrigated turf areas that include a tot-lot cover another approximately 10 acres. The remaining land is comprised largely of non-native annual grassland. The project site contains no natural watercourses or creeks. Two small, man-made drainage features have been constructed to facilitate onsite runoff and drainage. Two sewage treatment ponds currently service the Luther Burbank Center. An old soil borrow pit collects surface water runoff from the soccer field area of the project site during the winter months. A single family home, large utility barn, and a livestock building are also on the project site.

3. PRIOR RARE PLANT SURVEYS

Surveys for special-status plants were conducted on the project site in 1993, 1998, 1999, and 2004 by plant ecologist, Mr. Charlie Patterson. A copy of his report is attached to this document as Appendix A. The 1993 surveys focused on the approximately 15-acre, undeveloped, grassland parcel (APN 058-040-058) located in the northern portion of the project site. The other three survey years focused on the entire project site. Surveys for special-status plants were appropriately timed during the known blooming periods of the four federally listed plant species known from the Santa Rosa Plain: Burke's goldfields (*Lasthenia burkei*), Sebastopol meadowfoam (*Limnanthes vinculans*), Baker's blennosperma (*Blennosperma bakeri*), and many-flowered navarretia (*Navarretia plieantha*). To coincide with these species' blooming periods, Mr. Patterson conducted his field surveys on March 16, April 14, May 10, and June 15, 1993, May 6 and June 9, 1998 (a very wet and late spring), and again in 1999 and 2004 on March 29, April 27, May 15 and 30. These survey dates were also appropriate for identifying other special-status plant species known from the region. No special-status plant species were identified on the project during Mr. Patterson's surveys.

4. SURVEY METHODOLOGY

Prior to conducting the 2009 surveys on the project site, M&A searched California Department of Fish and Game's (CDFG) Natural Diversity Database[1] for occurrences of special-status plants within five miles of the project site. M&A also reviewed the most current electronic version of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (CNPS 2001)[2] for special-status plants in the Santa Rosa quadrangle plus the surrounding eight quadrangles (CNPS Nine Quad Search). Drawings, photographs and written descriptions of all special-status plants were reviewed prior to or during the survey period. Table 1, attached, lists the target special-status plant species M&A looked for during the 2009 surveys.

Special-status plant surveys were conducted on the project site by Ms. Sarah Lynch and Mr. Jessie Fujikawa on March 23, 2009, by Ms. Stephanie Tornberg and Mr. Fujikawa on April 23, 2009, and by Ms. Isabelle de Geofroy and Mr. Fujikawa on May 22, 2009. The surveys followed USFWS[3], CDFG[4] and CNPS[5] published survey guidelines. These guidelines state that special-status plant surveys should be conducted at the proper time of year when special-status and locally significant plants are both evident and identifiable. These guidelines also state that the surveys be floristic in nature with every plant observed identified to species, subspecies, or variety as necessary to determine their rarity status. Finally, these surveys must be conducted in a manner that is consistent with conservation ethics and accepted plant collection and

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[1] California Natural Diversity Data Base (CNDDB). 2009. RareFind 3. Computer printout for special-status species within a 5-mile radius of the project site. California Natural Heritage Division, California Department of Fish and Game, Sacramento, CA.

[2] CNPS (California Native Plant Society). 2001. Inventory of rare and endangered plants of California (sixth edition). Rare plant scientific advisory committee, David P. Tibor, convening editor. California Native Plant Society. Sacramento, CA. x+338 pps.

[3] USFWS (U.S. Fish & Wildlife Service) et. al. 2005. Santa Rosa Plain Conservation Strategy. Appendix D-Guidelines for conducting and reporting botanical inventories for federally listed plants on the Santa Rosa Plain (modified from the September 23, 1996 Service *g*uidelines for conducting and reporting botanical inventories for federally listed, proposed and candidate plants.) INTERNET (http://www.fws.gov/sacramento/es/santa_rosa_conservation.html).

[4] California Department of Fish and Game. 2000. Guidelines for assessing the effects of proposed developments on rare and endangered plants and plant communities. May 4, 1984; revised May 8, 2000. 2 pps.

[5] CNPS 2001. *op. cit.*

documentation techniques. Following these guidelines, surveys were conducted during the months when special-status plant species from the region are known to be evident and flowering.

A reference rare plant population was monitored to ensure that potentially-occurring federally listed plant species such as Sonoma sunshine (*Blennosperma bakeri*), Burke's goldfields (*Lasthenia burkei*), and Sebastopol meadowfoam (*Limnanthes vinculans*) were visible during survey periods. The local reference site used was the Alton Lane Mitigation Bank. Visits to the reference site were made prior to project site surveys to determine if the federally listed plants were flowering and otherwise visible at the time of the surveys. Figure 4, attached, illustrates the proximity of the reference site to the Sutter Hospital project site.

During surveys, all areas of the project site were examined by walking systematic transects through potential habitat, and by closely examining any existing microhabitats that could support special-status plants. Nearly all plant species found on the project site were identified to species. All plants were identified to the level required to determine rarity status. A list of all vascular plant taxa encountered within the project site was recorded in the field. Plants that needed further evaluation were collected and keyed in the lab. Final determinations for collected plants were made by keying specimens using standard references such as *The Jepson Manual*[6] and *A Flora of Sonoma County*[7].

5. PLANT COMMUNITIES

The project site's vegetation has been altered through historic and ongoing agricultural and other land use activities. Based on aerial photographs from the 1960s, at one time virtually the entire project site supported orchards. Since then the trees have been removed and the main parcel has been completely altered by the construction and operation of the existing Luther Burbank Center facilities.

Four plant communities occur within the project site. Non-native annual grassland is present in a field on the west side of the project site. Ornamental landscaping and an extensive planted (and irrigated) turf area are located in and around the Center's buildings and parking lots. In the few undeveloped portions of this parcel, ruderal (weedy) vegetation grows. A borrow pit/man-made pond on the project site supports an assemblage of riparian species. These four plant communities are discussed below. Plants listed in the community descriptions below were observed onsite during M&A's 2009 spring surveys.

5.1.1 NON-NATIVE ANNUAL GRASSLAND

Non-native annual grassland occurs in the field on the west side of the project site. This plant community is dominated by introduced grasses and forbs, including Italian rye grass (*Lolium multiflorum*), soft chess brome (*Bromus hordeaceus*), rip-gut brome (*Bromus diandrus*), medusa head (*Taeniatherum caput-medusae*), spring vetch (*Vicia sativa*), prickly lettuce (*Lactuca serriola*), bindweed (*Convolvulus arvensis*), filarees (*Erodium botrys, E. cicutarium, E.*

[6] Hickman, J. (Ed.). 1993. The Jepson manual: higher plants of California. University of California Press, Berkeley. 1400 pp.

[7] Best, C., J.T. Howell, W. & I. Knight, and M. Wells. 1996. A Flora of Sonoma County: Manual of the Flowering Plants and Ferns of Sonoma County, California. California Native Plant Society. First edition. 347 pps.

moschatum) and cut leaf geranium (*Geranium dissectum*). A large patch of Fuller's teasel (*Dipsacus sativus*) grows in the approximate center of this field. Coyote brush (*Baccharis pilularis*) are scattered throughout the field. Along the fenceline of this field are valley oak (*Quercus lobata*) and coast live oak (*Quercus agrifolia)* trees, and Himalayan blackberry bushes.

5.1.2 ORNAMENTAL LANDSCAPING

The Luther Burbank Center and the grounds surrounding the single family home/barn located on the project site have been planted with ornamental trees and shrubs, including redwood (*Sequoia sempervirens*), deodar cedar (*Cedrus deodara*), Monterey pine (*Pinus radiata*), liquidambar (*Liquidambar styraciflua*), camphor (*Cinnamomum camphora*), olive (*Olea europaea*), persimmon (*Diospyros kaki*), strawberry tree (*Arbutus unedo*), rose (*Rosa* sp.) and juniper (*Juniperus* sp.). Large lawns are located north and southwest of the Luther Burbank Center. A few mature valley oaks are found within the parcel that supports the single family home. Recently, one large, mature valley oak was removed from this parcel because two large branches tore off, destabilizing the tree and rendering it a potential hazard to the public.

5.1.3 POND HABITAT/BORROW PIT

The borrow pit/pond on the project site supports an assemblage of riparian tree species commonly associated with ponds and drainages, including valley oak, Fremont cottonwood, red willow, and narrow-leaved willow (*Salix exigua*). Olive trees (*Olea europaea*), likely a remnant of the project site's orchard days, are also growing in this area. This dense growth of vegetation completely encircles the pond. Understory species include coyote brush, cotoneaster (*Cotoneaster pannosa*), and fennel (*Foeniculum vulgare*).

5.1.4 RUDERAL HABITAT

Ruderal (weedy) communities are assemblages of plants that thrive in waste areas, roadsides and other sites that have been disturbed by human activity. On the project site, ruderal habitat occurs around the sewage treatment ponds, the single family home, in undeveloped areas south and northeast of the Luther Burbank Center, and along the edges of the project site and the parking lots. Ruderal species detected in these areas include wild oats (*Avena fatua*), soft chess, ripgut brome, common velvet grass (*Holcus lanatus*), Harding grass (*Phalaris aquatica*), English plantain (*Plantago lanceolata*), sharp-point fluellin (*Kickxia elatine*), and short-podded mustard (*Hirschfeldia incana*). Monterey pines have been planted around the perimeter of sewage treatment pond area, with coyote brush and Himalayan blackberry (*Rubus discolor*) scattered throughout the area.

SURVEY RESULTS AND CONCLUSION

All plants observed on the project site during the 2009 surveys are listed in Table 2, attached. No special-status plant species were observed on the project site during the appropriately-timed field surveys. M&A's survey results corroborate Mr. Patterson's negative findings based on four years of surveys he conducted in 1993, 1998, 1999, and 2004. Due to the project site's history as an orchard, and years of disturbance to the vegetation (disking, mowing, etc.), a large number of non-native species were observed during our surveys. Native species also occur; however, their total percent cover and frequency is much lower than the non-native species present. Overall, a total of 136 plant species were observed on the project site. Of these 136 species, 39 plants (or 29%) were native, and 97 plants (or 71%) were non-native.

Based upon the prior surveys conducted in 1993, 1998, 1999, and 2004, and M&A’s 2009 survey results, it is M&A’s conclusion that development of the Sutter Medical Center project site will not impact any special-status plant species. If you have any questions regarding M&A’s special-status plant surveys or this survey report please do not hesitate to contact me at (925) 947-4867 extension 211, or Ms. Sarah Lynch at extension 203.

Sincerely,

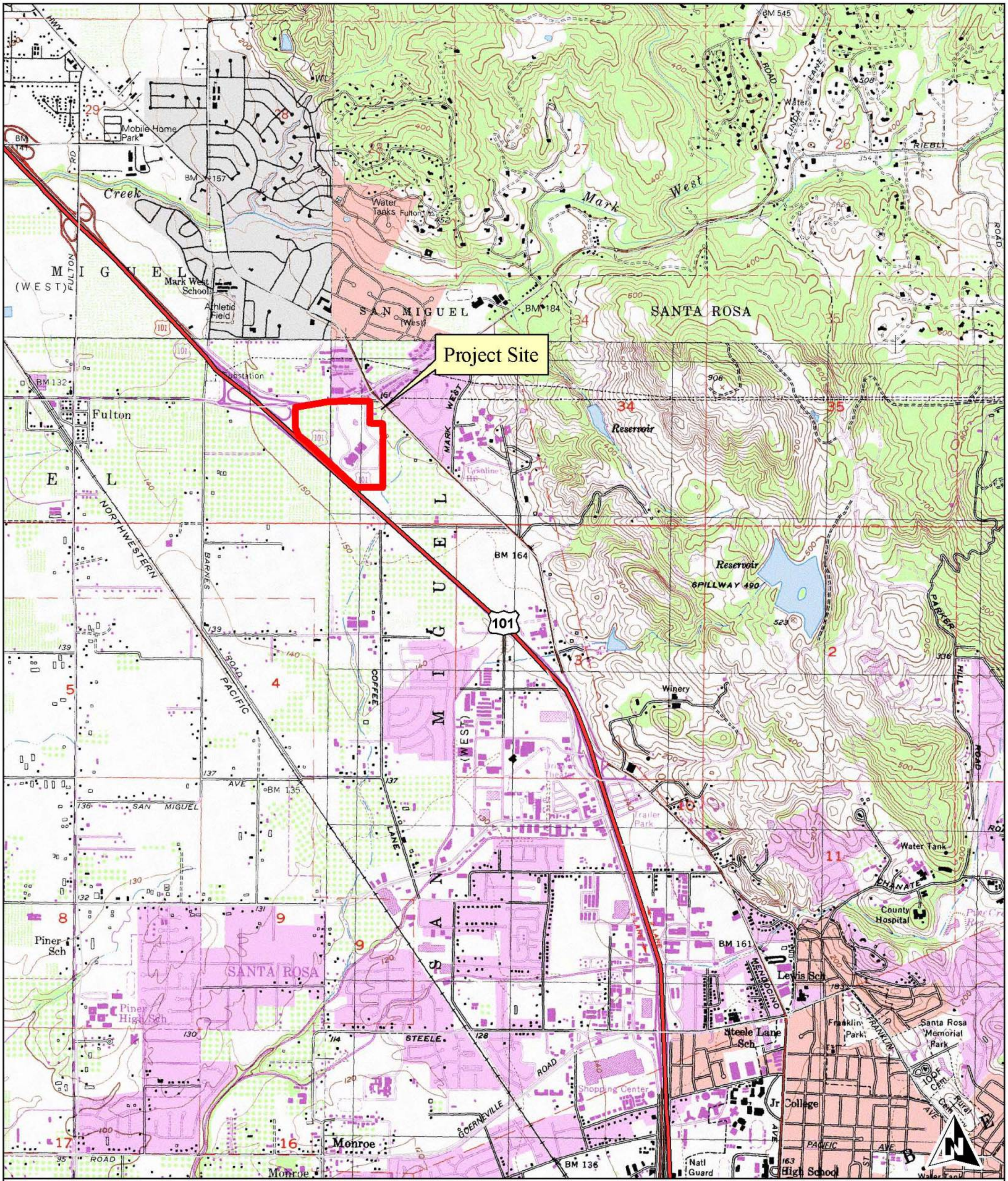
Isabelle de Geofroy
Project Biologist

Attachments: Figure 1. Sutter Medical Center Project Site Regional Map
Figure 2. Sutter Medical Center Project Site Locational Map
Figure 3. Aerial Photograph of the Sutter Medical Center Project Site
Figure 4. Proximity of Alton Lane Reference Site to Project Site
Table 1. Special-Status Plants Known to Occur in the Vicinity of the Sutter Medical Center Project Site
Table 2. Plants Observed on the Sutter Medical Center Project Site
Appendix A. Biological Resources Report for the Sutter Medical Center and Luther Burbank Center for the Arts. Charles A. Patterson, Plant Ecologist. December 8, 2004.

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 1. Sutter Medical Center Project Site Regional Map
Santa Rosa, California

County: Sonoma
Map Preparation Date: December 18, 2008



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0 0.15 0.3 0.6 0.9 1.2 1.5 Miles

Figure 2. Sutter Medical Center Project Location Map
Santa Rosa, California

County: Sonoma
7.5-Minute Santa Rosa, Mark West Springs, Healdsburg, Sebastopol quadrangles
Topography Source: http://gis.ca.gov
Map Preparation Date: December 29, 2008

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Figure 3. Aerial Photograph of the Sutter Hospital Project Site Santa Rosa, Sonoma County, California

Map Revision Date: July 7, 2009
Aerial Photograph Source: http://gdw.apfo.usda.gov

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Environmental Consultants
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Figure 4. Proximity of Alton Lane Rare Plant Mitigation Site to the Sutter Hospital Project Site
Santa Rosa, Sonoma County, California

Map Preparation Date: July 7, 2009
Aerial Photograph Source: http://gdw.apfo.usda.gov

Table 2

Plants Observed on the Sutter Hospital Project Site

Gymnosperms

Cupressaceae

**Juniperus sp.*	Juniper
Sequoia sempervirens	Redwood

Pinaceae

**Cedrus deodara*	Deodar cedar
Pinus radiata	Monterey pine

Angiosperms - Dicots

Anacardiaceae

Toxicodendron diversilobum	Western poison-oak

Apiaceae

**Foeniculum vulgare*	Sweet fennel
**Torilis arvensis*	Field hedge-parsley

Apocynaceae

Apocynum androsaemifolium	Bitter dogbane

Araliaceae

**Hedera helix*	English ivy

Asteraceae

**Anthemis cotula*	Mayweed
Baccharis pilularis	Coyote brush
**Carduus pycnocephalus*	Italian thistle
**Cirsium vulgare*	Bull thistle
Conyza canadensis	Horseweed
**Helminthotheca echioides*	Bristly ox-tongue
**Hypochaeris radicata*	Rough cat's-ear
**Lactuca saligna*	Willow lettuce
**Lactuca serriola*	Prickly lettuce
**Matricaria discoidea*	Pineapple-weed
**Pseudognaphalium luteoalbum*	Everlasting cudweed
Psilocarphus tenellus var. tenellus	Slender woolly-marbles
**Senecio vulgaris*	Common groundsel
**Sonchus asper*	Prickly sow-thistle
**Sonchus oleraceus*	Common sow-thistle
Taraxacum californicum	California dandelion
**Tragopogon porrifolius*	Salsify
Xanthium strumarium	Cocklebur

Betulaceae

Alnus rhombifolia	White alder
**Betula sp.*	Birch

Boraginaceae

**Echium plantagineum*	Echium

* Indicates a non-native species

Brassicaceae

**Brassica rapa*	Field mustard
**Capsella bursa-pastoris*	Shepherd's purse
Cardamine oligosperma	Few-seed bitter cress
**Hirschfeldia incana*	Short-podded mustard
Lepidium strictum	Peppergrass
**Raphanus raphanistrum*	Jointed charlock
**Raphanus sativus*	Wild radish

Caprifoliaceae

**Viburnum sp.*	Cultivated viburnum

Caryophyllaceae

Cerastium arvense	Meadow chickweed
**Cerastium glomeratum*	Mouse-ear chickweed
**Spergularia rubra*	Ruby sand-spurrey

Convolvulaceae

**Convolvulus arvensis*	Bindweed

Dipsacaceae

**Dipsacus sativus*	Fuller's teasel

Ebenaceae

**Diospyros kaki*	Persimmon

Ericaceae

**Arbutus unedo*	Strawberry tree

Euphorbiaceae

**Euphorbia esula*	Leafy spurge
**Euphorbia peplus*	Petty spurge

Fabaceae

**Lotus corniculatus*	Birdfoot trefoil
Lotus purshianus var. purshianus	Spanish-clover
Lupinus bicolor	Miniature lupine
Lupinus nanus	Sky lupine
**Medicago polymorpha*	California burclover
Trifolium ciliolatum	Ciliate clover
**Trifolium dubium*	Little hop clover
**Trifolium incarnatum*	Crimson clover
**Trifolium repens*	White clover
**Trifolium subterraneum*	Subterranean clover
**Vicia sativa*	Common vetch

Fagaceae

Quercus agrifolia var. agrifolia	Coast live oak
Quercus kelloggii	California black oak
Quercus lobata	Valley oak

Geraniaceae

**Erodium botrys*	Broad-leaf filaree
**Erodium cicutarium*	Red-stem filaree
**Erodium moschatum*	White-stem filaree
**Geranium dissectum*	Cut-leaf geranium

Hamamelidaceae

**Liquidambar styraciflua*	Liquidambar

Lamiaceae

**Prunella vulgaris var. vulgaris*	Self-heal
Stachys ajugoides var. ajugoides	Bugle hedge-nettle

Lauraceae

**Cinnamomum camphora*	Camphor tree

Linaceae

**Linum bienne*	Flax

Malvaceae

**Malva sp.*	Cheeseweed
**Modiola caroliniana*	Carolina bristle-mallow

Myrsinaceae

**Anagallis arvensis*	Scarlet pimpernel

Oleaceae

**Ligustrum sp.*	Privet
**Olea europaea*	Olive

Onagraceae

Epilobium brachycarpum	Summer cottonweed
Epilobium ciliatum	Hairy willow-herb

Orobanchaceae

**Parentucellia viscosa*	Yellow glandweed

Oxalidaceae

Oxalis laxa	Oxalis
**Oxalis pes-caprae*	Bermuda buttercup

Papaveraceae

Eschscholzia californica	California poppy

Plantaginaceae

**Kickxia elatine*	Sharppoint fluvellin
**Plantago lanceolata*	English plantain
**Veronica filiformis*	Speedwell
**Veronica persica*	Persian speedwell

Polygonaceae

Persicaria punctata	Dotted smartweed
**Polygonum aviculare*	Common knotweed
**Rumex acetosella*	Sheep sorrel
**Rumex conglomeratus*	Green dock
**Rumex crispus*	Curly dock
Rumex salicifolius	Willow dock

Ranunculaceae

**Ranunculus muricatus*	Spiny-fruit buttercup

Rosaceae

**Cotoneaster pannosa*	Cotoneaster
**Prunus sp.*	Prunus
**Pyracantha sp.*	Pyracantha
**Rosa sp.*	Rose
**Rubus discolor*	Himalayan blackberry

Rubiaceae

**Galium aparine*	Goose grass

* Indicates a non-native species

Salicaceae

Populus fremontii ssp. fremontii	Fremont cottonwood
Salix exigua	Narrow-leaved willow
Salix laevigata	Red willow

Sapindaceae

**Acer sp.*	Maple

Viscaceae

Phoradendron serotinum ssp. tomentosum	Oak mistletoe

Vitaceae

Vitis californica	California wild grape

Angiosperms -Monocots

Alismataceae

Alisma plantago-aquatica	Water plantain

Arecaceae

**Washingtonia filifera*	California fan palm

Cyperaceae

Cyperus eragrostis	Tall flatsedge
Eleocharis macrostachya	Creeping spikerush

Juncaceae

Juncus bufonius	Toad rush
Juncus patens	Common rush

Liliaceae

**Agapanthus orientalis*	Lily-of-the-Nile
**Yucca sp.*	Yucca

Poaceae

**Aira caryophyllea*	Silver European hairgrass
**Avena barbata*	Slender wild oat
**Avena fatua*	Wild oat
**Bromus diandrus*	Ripgut grass
**Bromus hordeaceus*	Soft chess
**Bromus madritensis ssp. rubens*	Red brome
**Bromus stamineus*	Brome
**Cortaderia jubata*	Pampas grass
**Cynodon dactylon*	Bermuda grass
Festuca idahoensis	Idaho fescue
**Holcus lanatus*	Common velvet grass
**Hordeum marinum ssp. gussoneanum*	Mediterranean barley
**Hordeum murinum ssp. leporinum*	Foxtail barley
**Lolium multiflorum*	Italian ryegrass
**Lolium perenne*	Perennial ryegrass
Paspalum distichum	Joint paspalum
**Phalaris aquatica*	Harding grass
**Poa annua*	Annual bluegrass
**Poa pratensis ssp. pratensis*	Kentucky bluegrass
**Taeniatherum caput-medusae*	Medusahead
**Triticum aestivum*	Wheat
**Vulpia bromoides*	Brome fescue
**Vulpia myuros*	Rattail fescue

Typhaceae

Typha angustifolia	Narrow-leaved cattail

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Apiaceae					
Eryngium constancei Loch Lomand button-celery	Fed: FE State: CE CNPS: List 1B.1	April-June	Vernal pools. Elevation 460-855.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Asteraceae					
Balsamorhiza macrolepis macrolepis Big-scale balsam-root	Fed: - State: - CNPS: List 1B.2	March-June	Chaparral; cismontane woodland; valley and foothill grassland; [sometimes serpentinite]. Elevation 90-1400 meters.	On CNPS 9-quad list.	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Blennosperma bakeri Sonoma sunshine	Fed: FE State: CE CNPS: List 1B.1	March-May	Valley and foothill grassland (mesic); vernal pools. Elevation 10-110 m.	Record for this species located 0.7 miles southwest of the project site (Occurrence No. 25).	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Centromadia parryi parryi Pappose tarplant	Fed: - State: - CNPS: List 1B.2	May-November	Chaparral; coastal prairie; meadows and seeps; marshes and swamps; valley and foothill grassland (vernally mesic/often alkaline). Elevation 2-420 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Erigeron biolettii Streamside daisy	Fed: - State: - CNPS: List 3	June-October	Broad-leaved upland forest; cismontane woodland; northern coniferous forest [rocky, mesic]. Elevation 30-1100 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Erigeron serpentinus Serpentine daisy	Fed: - State: - CNPS: List 1B.3	May-August	Chaparral (serpentinite). Elevation 60-670 meters	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Hemizonia congesta congesta Hayfield tarweed	Fed: State: CNPS: List 1B.2	April-November	Valley and foothill grassland (VFGrs)/sometimes roadsides. Elevation 20-560 meters.	Record for this species located approximately 1.1 mile east of the project site (Occurrence No. 22).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lasthenia burkei Burke's goldfields	Fed: FE State: CE CNPS: List 1B.1	April-June	Meadows (mesic); vernal pools. Elevation 15 to 600 meters.	Record for this species located 0.9-mile southwest of the project site (CNDDB Occurrence No. 19).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lasthenia californica bakeri Baker's goldfields	Fed: State: CNPS: List 1B.2	April-October	Closed-cone coniferous forest, coastal scrub, meadows and seeps, marshes and swamps. Elevation 60-520 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lasthenia conjugens Contra Costa goldfields	Fed: FE State: - CNPS: List 1B.1	March-June	Valley and foothill grassland (mesic); vernal pools; cismontane woodlands; playas. Elevation 0-470 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Layia septentrionalis Colusa layia	Fed: - State: - CNPS: List 1B.2	April-May	Chaparral; cismontane woodland, valley and foothill grassland; [sandy, serpentinite]. Elevation 100-1095 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lessingia hololeuca Woolly-headed lessingia	Fed: - State: - CNPS: List 3	June-October	Broad-leaved upland forest; coastal scrub; lower montane coniferous forest; valley and foothill grassland; [clay, serpentinite]. Elevation 15-305 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Microseris paludosa Marsh silverpuffs	Fed: - State: - CNPS: List 1B.2	April-July	Closed-cone coniferous forest; cismontane woodland; coastal scrub; valley and foothill grassland. Elevation 5-300 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Boraginaceae					
Mertensia bella Oregon lungwort	Fed: - State: - CNPS: List 2.2	May-July	Meadows; upper montane coniferous forest; [mesic]. Elevation 1500-2000 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Campanulaceae					
Downingia pusilla Dwarf downingia	Fed: - State: - CNPS: List 2.2	March-May	Valley and foothill grassland (mesic); vernal pools. Elevation 1-445 meters.	Record for this species located 1.6 miles west of the project site (Occurrence No. 85).	None. Marginally suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Legenere limosa Legenere	Fed: - State: - CNPS: List 1B.1	April-June	Vernal pools. Elevation 1-880 m.	On CNPS 9-quad list.	None. Marginally suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Caprifoliaceae					
Viburnum ellipticum Western viburnum	Fed: - State: - CNPS: List 2.3	May-June	Chaparral; cismontane woodland; lower montane coniferous forest. Elevation 215-1400 meters.	Record for this species located 4.0 miles northeast of the project site (Occurrence No. 11).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Convolvulaceae					
Calystegia collina oxyphylla Mt. Saint Helena morning-glory	Fed: - State: - CNPS: List 4	May-June	Chaparral (serpentinite).	Record for this species located 4.9 miles northeast of the project site (Occurrence No. 5).	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Cyperaceae					
Carex albida White sedge	Fed: FE State: CE CNPS: List 1B.1	May-July	Bogs and fens; marshes and swamps (freshwater). Elevation 15-90 meters.	Record for this species located 3.2 miles south of the project site (Occurrence No. 2).	None. Marginally suitable habitat on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Rhynchospora alba White beaked-rush	Fed: - State: - CNPS: List 1B.1	July-August	Bogs and fens; marshes and swamps (freshwater). Elevation 45-1010 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Rhynchospora californica California beaked-rush	Fed: - State: - CNPS: List 1B.1	May-July	Bogs & fens, lower montane coniferous forest; seeps; freshwater marshes and swamps. Elevation 45-1010 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Rhynchospora capitellata Brownish beakrush	Fed: - State: - CNPS: List 2.2	July-August	Lower montane coniferous forest, meadows and seeps, marshes/swamps, upper montane conif. forest /mesic; elev. range 455 - 2000 M (1,493 - 6,652 feet).	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Rhynchospora globularis globularis Roundheaded beaked-rush	Fed: - State: - CNPS: List 2.1	July-August	Marshes and swamps (freshwater). Elevation 45-60 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Ericaceae					
Arctostaphylos canescens sonomensis Sonoma manzanita	Fed: - State: - CNPS: List 1B.2	January-June	Chaparral; lower montane coniferous forest (sometimes serpentinite). Elevation 180-1675 m.	Record for this species located 2.5 miles northeast of the project site (Occurrence No. 20).	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Arctostaphylos densiflora Vine Hill manzanita	Fed: - State: CE CNPS: List 1B	February-April	Chaparral (acid marine sand). Elevation 50-120 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Arctostaphylos stanfordiana decumbens Rincon manzanita	Fed: - State: - CNPS: List 1B.1	February-April	Chaparral (rhyolitic), cismontane woodland. Elevation 75 to 370 meters.	Record for this species located 2.3 miles east of the project site (Occurrence No. 5).	None. No suitable habitat present on the project site. This species was not observed during surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Fabaceae					
Amorpha californica napensis Napa false indigo	Fed: - State: - CNPS: List 1B.2	April-July	Broadleaved upland forest (openings); chaparral, cismontane woodland. Elevation 120-2000 m.	Record for this species located 3 miles north of the project site (Occurrence No. 23).	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Astragalus claranus Clara Hunt's milkvetch	Fed: FE State: CT CNPS: List 1B.1	March-May	Cismontane woodland; valley and foothill grassland; [serpentinite, volcanic clay]. Elevation 75-275 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lupinus sericatus Cobb Mountain lupine	Fed: - State: - CNPS: List 1B.2	March-June	Broadleaved upland forest; chaparral; cismontane woodland; lower montane coniferous forest. Elevation 275-1525 m.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Trifolium amoenum Showy Indian clover	Fed: FE State: - CNPS: List 1B.1	April-June	Valley and foothill grassland (sometimes serpentinite) and coastal bluff scrub. Elevation 5 -415 meters.	Record for this species located 2.2 miles southeast of the project site (Occurrence No. 21).	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Trifolium buckwestiorum Santa Cruz clover	Fed: State: - CNPS: List 1B.1	April-October	Broadleaf upland forest; coastal prairie; [margins]. Elevation 105-610 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Trifolium depauperatum hydrophilum Saline clover	Fed: - State: - CNPS: List 1B.2	April-June	Marshes and swamps; valley and foothill grassland (mesic, alkaline); vernal pools. Elevation 0-300 meters.	Record for this species located 4.2 miles south of the project site (Occurrence No. 16).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Lamiaceae					
Monardella villosa globosa Robust monardella	Fed: - State: - CNPS: List 1B.2	June-August	Chaparral (openings); cismontane woodland; broadleafed upland forest (openings); coastal scrub; valley and foothill grassland. Elevation 100-915 meters.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Liliaceae					
Allium peninsulare franciscanum Franciscan onion	Fed: - State: - CNPS: List 1B.2	May-June	Cismontane woodland; valley and foothill grassland [clay, volcanic, often serpentine]. Elevation 52-300 meters.	On CNPS 9-quad list.	None. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009. No impact expected.
Fritillaria liliacea Fragrant fritillary	Fed: - State: - CNPS: List 1B.2	February-April	Cismontane woodland, coastal prairie; coastal scrub; valley and foothill grassland; [often serpentinite]. Elevation 3-410 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Lilium pardalinum pitkinense Pitkin Marsh lily	Fed: FE State: CE CNPS: List 1B.1	June-July	Cismontane woodland (mesic); marshes and swamps (freshwater). Elevation 35 to 65 meters.	Known from Pitikin Marsh which is greater than 5 miles west of the project site (this known locality is approximately 1 mile south of Forestville. R. Bittman, CDFG, pers. comm.).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Limnanthaceae					
Limnanthes vinculans Sebastopol meadowfoam	Fed: FE State: CE CNPS: List 1B.1	April-May	Meadows (mesic); valley and foothill grassland; vernal pools. Elevation 15-305 meters.	Record for this species located 1.7 miles west of the project site (Occurrence No. 28).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Malvaceae					
Sidalcea hickmanii viridis Marin checkerbloom	Fed: - State: - CNPS: List 1B.3	May-June	Chaparral (serpentinite). Elevation 50-430 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Sidalcea oregana valida Kenwood Marsh checkerbloom	Fed: FE State: CE CNPS: List 1B.1	June-September	Marshes and swamps (freshwater). Elevation 115-150 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Onagraceae					
Clarkia imbricata Vine Hill clarkia	Fed: FE State: CE CNPS: List 1B	June-August	Chaparral; meadows; cismontane woodland. Elevation 50-75 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Orobanchaceae					
Castilleja uliginosa Pitkin Marsh Indian paintbrush	Fed: - State: CE CNPS: List 1A	June-July	Marshes and swamps (freshwater).	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.
Cordylanthus tenuis capillaris Pennell's bird's-beak	Fed: FE State: CR CNPS: List 1B.2	June-September	Closed-cone coniferous forest; chaparral; [serpentinite]. Elevation 45-305 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Plantaginaceae					
Penstemon newberryi sonomensis Sonoma beardtongue	Fed: - State: - CNPS: List 1B.3	April-August	Chaparral (rocky).	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Poaceae					
Alopecurus aequalis sonomensis Sonoma alopecurus	Fed: FE State: - CNPS: List 1B.1	May-July	Marshes & swamps (freshwater); riparian scrub. Elevation 5-365 meters.	On CNPS 9-quad list.	None. No suitable habitat is present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Calamagrostis crassiglumis Thurber's reed grass	Fed: - State: - CNPS: List 2.1	May-July	Coastal scrub (mesic); marshes and swamps (freshwater). Elevation 10-45 meters.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Pleuropogon hooverianus North coast semaphore grass	Fed: - State: CT CNPS: List 1B.1	April-August	Broadleaved upland forest; meadows; north coast coniferous forest; vernal pools; [mesic]. Elevation 10-671 m.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Poa napensis Napa bluegrass	Fed: FE State: CE CNPS: List 1B.1	May-August	Meadows (alkaline, near hot springs). Elevation 100-200 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Polemoniaceae					
Gilia capitata tomentosa Woolly-headed gilia	Fed: - State: - CNPS: List 1B.1	May-July	Coastal bluff scrub (rocky, outcrops). Elevation 15-155 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Leptosiphon jepsonii Jepson's linanthus	Fed: - State: - CNPS: List 1B.2	March-May	Chaparral; cismontane woodland (usually volcanic). Elevation 100-500 meters.	Record for this species located 3.0 miles southeast of the project site (Occurrence No. 3).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Navarretia leucocephala bakeri Baker's navarretia	Fed: - State: - CNPS: List 1B.1	April-July	Cismontane woodland; lower montane coniferous forest; meadows; valley and foothill grassland; vernal pools (mesic). Elevation 5-1740 m.	Record for this species located 1.9 miles south of the project site (Occurrence No. 20).	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Navarretia leucocephala plieantha Many-flowered navarretia	Fed: FE State: CE CNPS: List 1B.2	May-June	Vernal pools (can be volcanic ash flow). In the S. R. Plain; it is extant on one remaining site (Occ. 7). This occ. is a claypan v. pool (no volcanic substrate). Elev. 30 to 950 M.	Record for this species located 4.9 miles northwest of the project site (Occurrence No. 9).	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Polygonaceae					
Chorizanthe valida Sonoma spineflower	Fed: FE State: CE CNPS: List 1B.1	June-August	Coastal prairie (sandy). Elevation 10-305 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*		Flowering Period	Habitat	Area Locations	Probability on Project Site
Ranunculaceae						
Delphinium luteum Yellow larkspur	Fed: State: CNPS:	FE CR List 1B.1	March-May	Chaparral; coastal prairie; coastal scrub (rocky). Elevation 0-100 meters.	On CNPS 9-quad list.	None. No suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Rhamnaceae						
Ceanothus confusus Rincon Ridge ceanothus	Fed: State: CNPS:	- - List 1B.1	February-June	Closed-cone coniferous forest; chaparral; cismontane woodland; [volcanic or serpentinite]. Elevation 75-1065 m.	Record for this species located 2.0 miles east of the project site (Occurrence No. 1).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Ceanothus divergens Calistoga ceanothus	Fed: State: CNPS:	- - List 1B.2	February-March	Chaparral (serpentinite or volcanic, rocky). Elevation 170 to 950 meters.	Record for this species located 2.7 miles east of the project site (Occurrence No. 4).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Ceanothus foliosus vineatus Vine Hill ceanothus	Fed: State: CNPS:	- - List 1B.1	March-May	Chaparral. Elevation 45 - 305 meters	Record for this species located 4.6 miles southwest of the project site (Occurrence No. 3).	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Ceanothus purpureus Holly-leaf ceanothus	Fed: State: CNPS:	- - List 1B.2	February-June	Chaparral; cismontane woodland (volcanic, rocky). Elevation 120-640 m.	On CNPS 9-quad list.	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Ceanothus sonomensis Sonoma ceanothus	Fed: State: CNPS:	- - List 1B.2	February-April	Chaparral (sandy, serpentinite, or volcanic). Elevation 215-800 meters.	On CNPS 9-quad list.	None. No Ceanothus on site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, and 2004. No impact expected.

Table 1

Special Status Plant Species with the Potential to Occur on the Sutter Medical Center Project Site

Family Taxon Common Name	Status*	Flowering Period	Habitat	Area Locations	Probability on Project Site
Rosaceae					
Horkelia tenuiloba Thin-lobed horkelia	Fed: - State: - CNPS: List 1B.2	May-July	Broadleaved upland forest; valley and foothill grassland; chaparral (mesic openings, sandy). Elevation 50-500 m.	On CNPS 9-quad list.	None. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Potentilla hickmanii Hickman's cinquefoil	Fed: FE State: CE CNPS: List 1B.1	April-August	Coastal bluff scrub; closed-cone coniferous forest; meadows (vernally mesic); marshes and swamps (freshwater). Elevation 10-149 meters.	On CNPS 9-quad list.	None. Marginally suitable habitat on site. Not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.
Themidaceae					
Brodiaea californica leptandra Brodiaea	Fed: - State: - CNPS: List 1B.2	May-July	Broadleaved upland forest; cismontane woodland; chaparral; lower montane coniferous forest; valley & foothill grassland (volcanic). Elevation 110-915 m.	On CNPS 9-quad list.	None. No suitable habitat present on the project site. This species was not observed during appropriately timed surveys conducted in 1993, 1998, 1999, 2004 and 2009.

***Status**

Federal:
FE - Federal Endangered
FT - Federal Threatened
FPE - Federal Proposed Endangered
FPT - Federal Proposed Threatened
FC - Federal Candidate

State:
CE - California Endangered
CT - California Threatened
CR - California Rare
CC - California Candidate
CSC - California Species of Special Concern

CNPS:
List 1A - Presumed extinct in California
List 1B - Plants rare, threatened, or endangered in California and elsewhere
List 1B.1 - Seriously endangered in California (over 80% occurrences threatened/ high degree and immediacy of threat)
List 1B.2 - Fairly endangered in California (20-80% occurrences threatened)
List 1B.3 - Not very endangered in California (<20% of occurrences threatened or no current threats known)

CNPS Continued:
List 2 - Plants rare, threatened, or endangered in California, but more common elsewhere
List 2.1 - Seriously endangered in California, but more common elsewhere
List 2.2 - Fairly endangered in California, but more common elsewhere
List 2.3 - Not very endangered in California, but more common elsewhere
List 3 - Plants about which we need more information (Review List)
List 3.1 - Plants about which we need more information (Review List) Seriously endangered in California
List 3.2 - Plants about which we need more information (Review List) Fairly endangered in California
List 4 - Plants of limited distribution - a watch list

Biological Resources Report
For The
Sutter Medical Center and Luther Burbank Center for the Arts

Charles A. Patterson, Plant Ecologist - 12/8/04

1.0 Introduction

1.1 Background and Setting

The study area for the Sutter Medical Center and Luther Burbank Center for the Arts (LBC) is approximately 60 acres in size total, including the 40± acre existing (developed) LBC and an undeveloped II.8 acre northern parcel. The site is bounded to the west by the Interstate Highway 101, to the east by Old Redwood Highway, and to the north by Mark West Springs Road. To the south is land which is a combination of vineyard, residential development and open undeveloped land.

The two main parts of the study area include (1) the developed southern area which contains the extensive pavement and buildings of the LBC, plus its peripheral turf and dirt parking areas, and (2) the undeveloped pasture area to the north. The entire vicinity has been historically used for agricultural and rural residential uses (and more recently commercial uses), resulting over the long term in the displacement of most of the original landscape's natural plant communities and habitats. Historic land uses have involved widespread soil disturbance and topographic alterations from discing, ripping, amendments, and/or irrigation, plus localized ditching and filling, and relatively extensive grading and leveling. The main LBC site has been almost completely graded and covered with pavement and/or large structures, with planted turf around the outer portions. The smaller (11.8 acre) parcel has not been developed, but rather, has been used as livestock pasture for many years. Both parcels were cultivated as orchard in the early 1960's and before.

1.2 Methods

Biological surveys have been conducted for the entire study area by this investigator (C. Patterson) in 1998, 1999, and 2004. While the emphasis was on the smaller undeveloped parcel, the overall study area was surveyed to document existing conditions and to determine whether any sensitive biological resources (e.g., wetlands, rare plants, etc.) might be present. The smaller undeveloped site was also surveyed for potential wetlands and rare plants in 1993.

1.2.1 Rare Plants

Portions of the study area have been walked in detail on several occasions in four separate years and have been examined for general conditions, potential wetlands, and possible occurrences of (or suitable habitats for) sensitive plant and/or animal species. Each site visit involved carefully walking across the open or undeveloped portions of each parcel and visually examining the vegetation cover, looking specifically for any unusual habitats and/or species. The vegetation types and species observed were noted, and several small potential wetland areas in particular were closely examined for possible sensitive species. Close inspection (essentially 100 percent visual examination) was made of all open ground in the study area. Field surveys were specifically timed to coincide with the known blooming periods of the region's most significant rare plants, these being Burke' goldfields *(Lasthenia burkei)*, Sebastopol meadowfoam *(Limnanthes vinculans)*, Baker's blennosperma *(Blennosperma bakeri)*, and

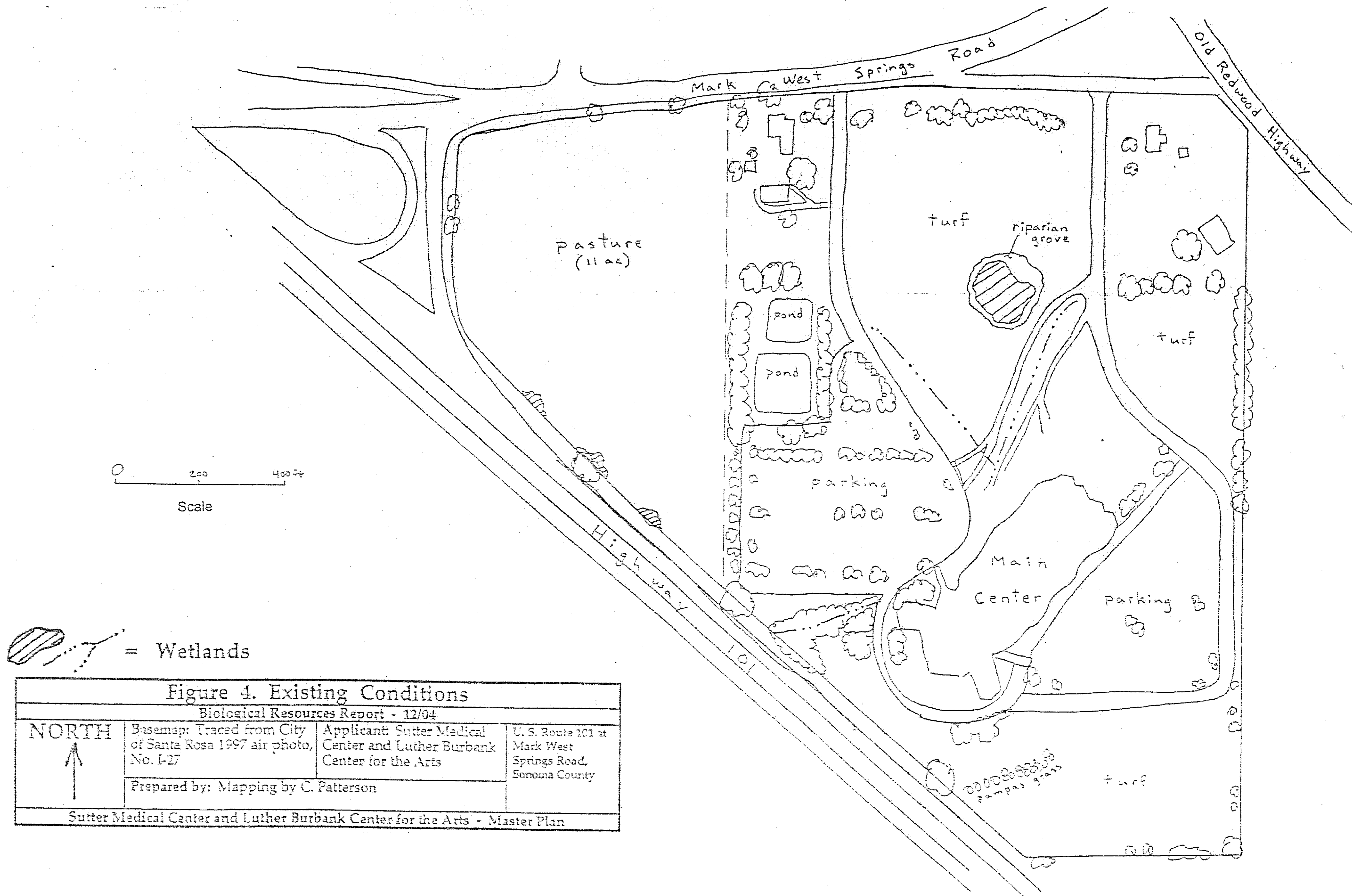
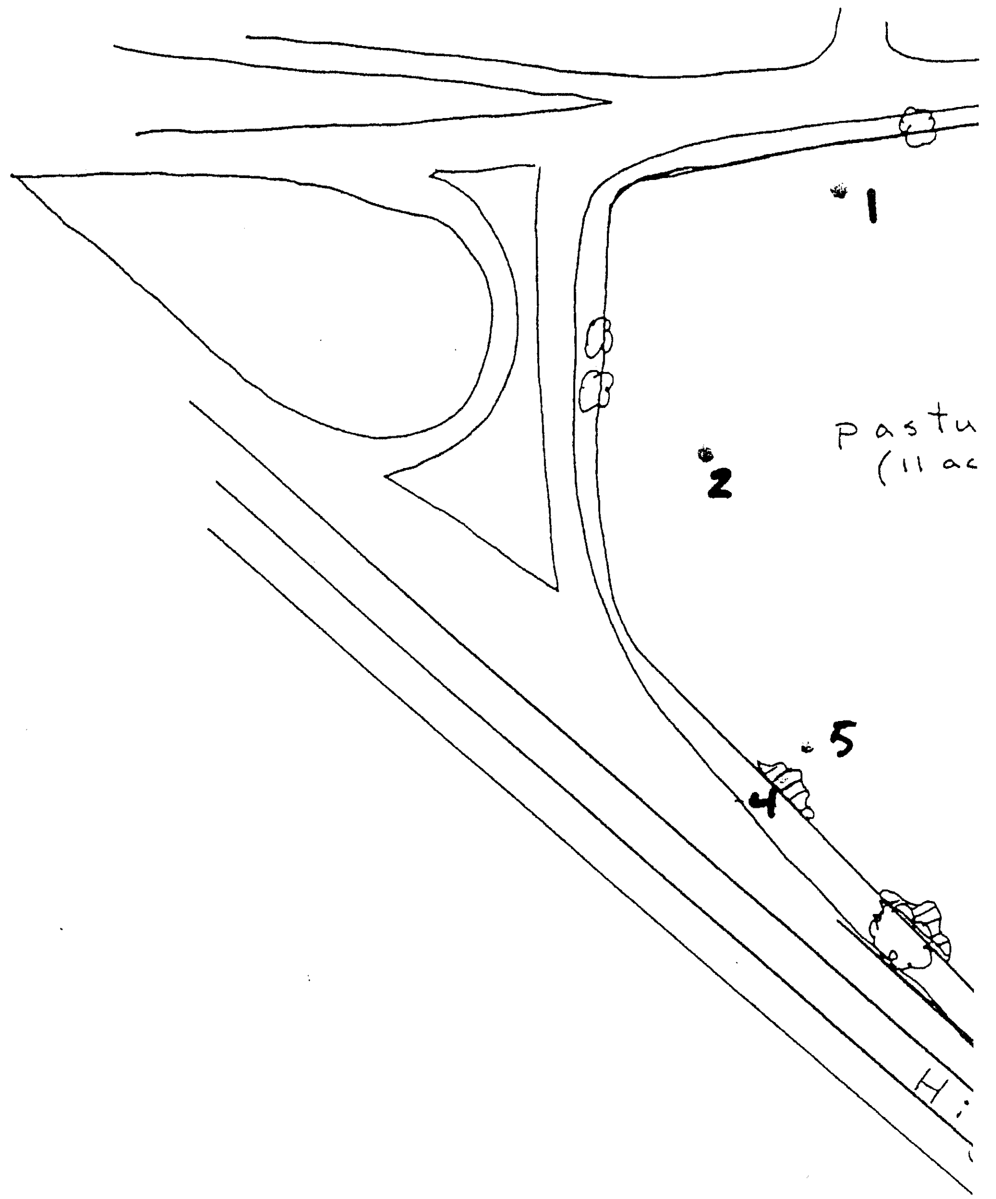
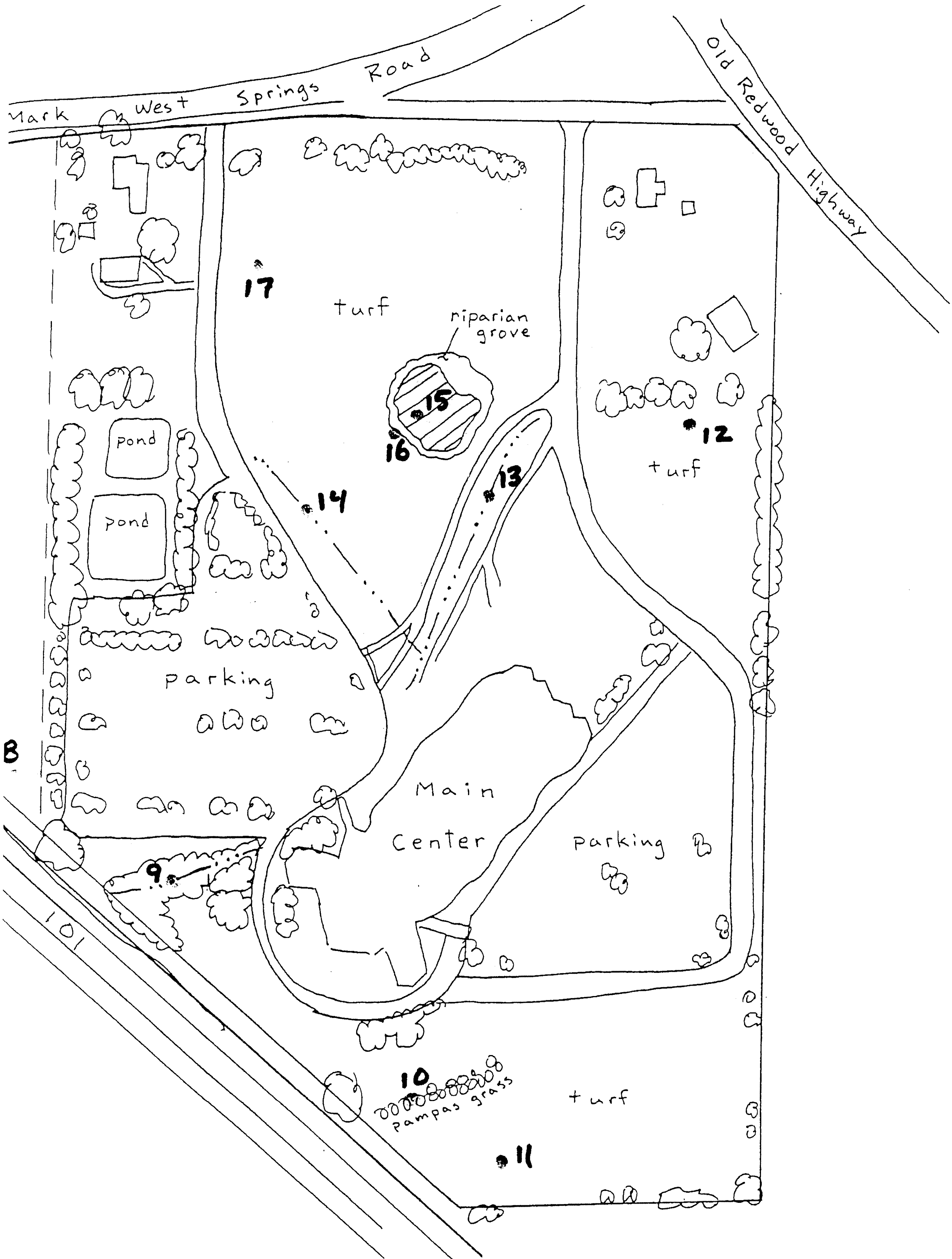


Figure 4. Existing Conditions		
Biological Resources Report - 12/04		
Basemap: Traced from City of Santa Rosa 1997 air photo, No. I-27	Applicant: Sutter Medical Center and Luther Burbank Center for the Arts	U. S. Route 101 at Mark West Springs Road, Sonoma County
Prepared by: Mapping by C. Patterson		
Sutter Medical Center and Luther Burbank Center for the Arts - Master Plan		



= Wetlands

Figure 4. Existing Conditions			
Biological Resources Report - 12/04			
NORTH ↑	Basemap: Traced from City of Santa Rosa 1997 air photo, No. I-27	Applicant: Sutter Medical Center and Luther Burbank Center for the Arts	U. S. Route 101 at Mark West Springs Road, Sonoma County
	Prepared by: Mapping by C. Patterson Scale: 1" = approx. 200 feet		
Sutter Medical Center and Luther Burbank Center for the Arts - Master Plan			



Mark West Springs Road
Old Redwood Highway
turf
riparian grove
17
15
16
14
13
12
turf
pond
pond
parking
B
Main Center
parking
9
101
10
pampas grass
turf
11

many-flowered navarretia *(Navarretiaplieanthd).* Held surveys were originally conducted for the 11.8 acre parcel in 1993, including site visits on March 16, April 14, May 10, and June 15. Held surveys were made on May 6 and June 9, 1998 (a very wet and late spring), and again in 1999, including March 29, April 27, May 15 and 30. Burke' goldfields in particular is known from several sites around the general Windsor and northwestern Santa Rosa areas, including the area near Highway 101 at Shiloh Road, at the Sonoma County Airport, and west of the freeway near Starr Road. Many years of surveys in and around this area by this investigator have indicated that most local rare plant locations now occur west of the freeway. Other site surveys conducted in 1993 by this investigator (to be used as reference sites) included the Alton Lane mitigation site and the old Naval Air Center. Reference sites for surveys in 1998 and 1999 include the Sonoma County Airport (goldfields), Alton Lane (goldfields and blennosperma), and the Wright Mitigation Bank (Hall Road or 'Cramer') site for Sebastopol meadowfoam.

Field dates in April are generally the most optimum to catch any of these four sensitive species at their peak phenology, although surveys as early as late March and as late as mid-May are generally also adequate to still identify these species. Surveys of the smaller site include four separate years (1993, 1998, 1999, 2004) and cover the appropriate spring flowering windows. This site has two or three small areas of seasonal wetland habitat that could conceivably support any of the sensitive species. The main LBC site, however, because of its thorough alteration and development, does not contain wetland habitats suitable for these species. One other sensitive species, many-flowered navarretia, typically blooms concurrently with Burke's goldfields, but it is only known from one or two sites on the Santa Rosa Plain (off Sanders Road in southwest Windsor) and has not been seen regularly in this part of its range in recent years. Its primary range is well to the north, closer to Clear Lake.

Several wetland plant species of lesser concern (e.g., *Downingia humilis, Navarretia bakeri,* and others; see Table 1) are also generally in bloom during this same period (primarily April and May) and were sought during all years of surveys. Still others, such as showy Indian clover *(Trifolium amoenum),* hayfield tarplant *(Hemizonia congesta),* and Gairdner's yampah *(Perideridia gairdneri)* bloom later (late May, June, and even July), but are also generally recognizable in late April and early May, prior to absolute peak maturation. Based on the following:

(1) full detailed surveys in the wet year of 1998,
(2) supplemental spring surveys in 1999 and 2004,
(3) the previous partial surveys (11.8 acres only) in 1993,
(4) the marginal character of the habitats present,
(5) the lack of suitable habitats on the 40 acre site,
(6) the lack of any immediately nearby historic rare plant locations, and
(7) extensive local experience.

It is this investigator's conclusion that the surveys for this study have been adequate to reliably determine the absence of the potential species of concern.

Table 1 is a list of rare plants known and/or potentially to be expected in the greater Santa Rosa region (excluding species of chaparral, forest, and strictly coastal habitats, since these habitats are not present here) and which were sought during the field surveys. This list includes all sensitive plants known or expected to occur in the greater Santa Rosa region, including all such species currently designated as being "of concern" to the California Department of Fish and Game (CDFG), California Native Plant Society (CNPS), and the U.S. Fish and Wildlife Service (FWS). Table 1 lists virtually all of the known or expected rare plants from the greater Santa Rosa Plain area, as well as a number of species historically reported from nearby areas around

Sebastopol, Petaluma, and even the more mountainous areas to the east. A few are not known from this 'region' at all (e.g., Clara Hunt's milk-vetch), but are included in the table since they have been mentioned in various project review letters by the FWS as being of some concern for a somewhat larger region (i.e., Sonoma and Napa counties). The surveys for this project were floristic in that all plants encountered were identified at least to the level necessary to determine commonness or rarity, and were conducted according to published CDFG and FWS guidelines. Table 2 is a plant species list compiled for the site.

Records from the California Natural Diversity Data Base (CNDDB, 1991) indicate no known occurrences of any rare plants on the actual project site or on any immediately adjoining property, although there are known records for several rare plants within about two miles of the site (all to the west). The nearest known rare plant occurrences are for Burke' goldfields about two miles to the south near San Miguel Avenue, about one mile to the north near Shiloh Road, and also farther west near the Sonoma County Airport. No other sensitive plants are positively known from this immediate area, although any of the species of secondary concern could also be present here or nearby.

1.2.2 Sensitive Wildlife Species

Sensitive wildlife species known, expected, or with some potential to occur in this region include the California tiger salamander (CTS), the Pacific freshwater shrimp, the California red-legged frog, steelhead trout, Coho salmon, and several species of fairy shrimp. In addition, there are a number of (protected) migratory birds that could potentially occur in this area on occasion. The habitats preferred by these species were researched as well as the current status of each and their known ranges of occurrence. Mr. Geoff Monk of Monk & Associates was contacted for information regarding these and any other potential sensitive species in the region, and field biologists at CDFG (Bill Cox, Allan Buckmann) have been contacted regarding the various wildlife species of concern for the greater Santa Rosa region.
Habitats in the study area were examined and evaluated with regard to the various wildlife species of concern. The results and conclusions reached during discussions with CDFG biologists completed recently for other regional projects regarding these species have also been incorporated into this report.

1.2.3 Wetlands

Wetlands on the site were sought and mapped according to standard 1987 Corps wetland delineation procedures, including a detailed onsite investigation of the Corps' three parameter wetland delineation approach. This involved documenting evidence of hydric soils, hydrophytic vegetation, and/or actual wetland hydrology. Early field inspections regarding potential wetlands were conducted under relatively wet conditions in March and April, *1998,* at a point with roughly 150 percent of average rainfall. These preliminary findings were corroborated in the spring of 2004.

The vegetation was examined and evaluated for the presence of plant species categorized as either Facultative or Facultative-Wet according to the U.S. Fish and Wildlife Service's (FWS) wetland plant classification for California, and direct hydrological observations were made during the 1998 site visits. Since the site was in fact 'overly' wet (for purposes of determining wetland conditions) during much of the 1998 winter and spring, it was determined during that year's site visits that any areas not exhibiting surface hydrology (shallow inundation or fully saturated soil) at that time were not considered "wetland". Clearly, areas not exhibiting qualifying hydrology under 'wet' conditions would not qualify as "wetlands".
Field mapping was initially difficult (and approximate) since there was no topographic base map

available. The study area was walked and all areas encountered in the field as having qualifying wetland characteristics (i.e., wetland hydrology, hydric soil, and wetland or hydrophytic vegetation) were identified as to their approximate shapes, sizes, and locations. Field measurements of the qualifying wetland features' dimensions were made to quantify these areas even if they could not be mapped with great precision. At the end of the 1998 study season, a blueline air photo was obtained that allowed for more detailed mapping (Figure 4 portrays the site's existing conditions).

During the data collection process, soils were examined (moist, to about 15 inches) for evidence of hydric conditions such as color variations (mottles), iron stains, and/or concretions (iron and/or manganese), plus oxidized root halos, significant organic inclusions, and/or undecomposed surface organic layers. Soil color was determined through the use of a Munsell color chart. In particular, the presence or absence of iron staining near to the soil surface was key in the wetland determination. Clear (i.e., bright: 7.5YR 4/6 etc.) and pervasive iron stains within the near-surface root zone (typically the top ten inches) and/or oxidized rhizospheres (recently oxidized root channels of live roots) were deemed primary indicators of both hydric soil and sufficiently prolonged hydrology. Mottles and dark (low chroma) soil in general were not especially helpful as diagnostic characters over much of the site because of the native soil's inherent darkness throughout.

Vegetation was recorded by noting all plant species observed and their visually estimated percent dominance (cover) in sample 'quadrats' of approximately one square meter at each soil pit. Virtually all plants present were identifiable, at least to the point of knowing genus as well as 'hydrophytic' status (Facultative, Facultative-Wet, Obligate, etc.).

2.0 Existing Conditions

2.1 Climate, Terrain, and Land Use

The study area is located on the Santa Rosa Plain of Sonoma County. This area generally receives approximately 30 inches of rainfall per year, concentrated between November and April. Summers are hot and dry, with winters being wet and relatively mild.

Topography in the study area is almost level, with the natural landscape being relatively flat, but historically with meandering low gradient swales and scattered small ephemeral creeks running from east to west, ultimately draining into the Laguna de Santa Rosa or directly into the Russian River to the west of the plain. Topography in the study area has been thoroughly altered and disturbed (i.e., leveled, ditched) by the construction of the adjacent freeway and other surrounding roadways, plus the buildout of the LBC itself. The undeveloped parcel is not as severely altered, but is also relatively flat and reflects typical agricultural uses (i.e., peripheral ditches, discing, fencing).

Most of the surrounding lands are already developed for urban (residential) and commercial uses, and there are only a few scattered parcels that are still undeveloped. This study area is essentially surrounded by developed land, with paved roads immediately adjacent on three sides. Most of the area is in residential neighborhoods. There is a small area of vineyard and open ground immediately to the south of the LBC.

2.2 Soils and Hydrology

The site's soils (Figure 3) are mapped by the USDA - Soil Conservation Service (Miller, et al,

1972) as "Yolo silt loam, 0 to 2 percent slopes" over most of the primary (40 acre) LBC site, while the northern 11.8 acre area is underlain by "Yolo clay loam, 0 to 2 percent slopes". These soils are generally "well drained" and consist of a surface loam over ancient deposits (buried layers) of sandstone and shale alluvium. These soils are found mainly on floodplains and alluvial fans (i.e., along major drainages) and have been used historically for orchards and hay cultivation. Within the Yolo series, the two phases found in the study area contain the finer components (silt and clay) of the periodic prehistoric drainage overflows, but in general are still relatively well drained because of their overall coarse (alluvial) character and lack of solid buried restrictive layers. In general, these are not considered to be "wetland" soils, although scattered inclusions and/or lenses of clay may occur that foster localized wetland formation.

The site's soils have been at least moderately (or even severely) altered through historic agricultural uses (primarily orchard in this study area) and localized ditching and minor grading throughout the general vicinity. Soils on the LBC site have been thoroughly altered, either by outright paving, or at least by leveling and planting with turf.

Topographically, the study area consists of nearly level ground, and it contains no natural watercourses or creeks. There are two sections of very small ephemeral channel that cross the main (developed) site, although both of these are relatively small man-made drainage features that were constructed to facilitate onsite runoff and drainage when the LBC was built. One is a short section of created channel (draining westward to the freeway just west of the main LBC auditorium) that has been landscaped with ornamental trees and shrubs, while the other feature is a small swale-like ditch that was constructed to aid drainage over the northeastern area of turf, plus the general entry roadway. This latter feature is strictly herbaceous and runs from roughly northeast to southwest through a planted (and irrigated) turf area in the middle of the site. The overall area that it drains is irrigated and mowed. This drainage then crosses beneath pavement (the main entry road) to the section of channel that occurs at the western edge of the main LBC, taking much of the property's onsite runoff toward the freeway. This latter section of drainage channel supports stands of planted (and/or escaped) pampas grass *(Cortaderia sellanoana)* and dense growth of the non-native Himalaya blackberry *(Rubus discolor)*, plus clusters of trees (oaks, acacia, redwoods), and understory shrubs (coyote brush, non-native rose, volunteer fruit trees, etc.). Neither of these features are natural in terms of either their configuration or vegetation.

The site contains relatively simple hydrology, including strict surface runoff (sheet flow) over most of the site, plus the two small ephemeral drainages (man-made channels) and some scattered soil saturation and/or highly intermittent shallow ponding (rainpools) in the lower topographic places. There is no significant offsite watershed that either contributes sheet flow or runoff to the site, nor are there any defined drainages (creeks or channels) that originate offsite that convey flows through the site. Virtually the entire study area drains via slow downward percolation and limited onsite collection into the small channels. While much of the surrounding Santa Rosa Plain involves a seasonally perched (subsurface) water table on top of buried restrictive layers, this study area, with its coarser alluvial soil, does not support any significant perched water table formation and is relatively well drained.

The main LBC parcel in particular is well drained (the Yolo silt loam), and the scattered small depressional areas here fail to hold any appreciable standing water after storms. There is one area, however, that has been created as a larger depression (probably a soil borrow area) where localized runoff from the northern part of the parcel (all planted turf) collects and remains indefinitely through the winter and early spring. This area (see Figure 4) is about 15,000 square feet (034 acre) in size and has obviously been created by human activities. This feature supports a dense stand of willows *(Salix* spp.) and coyote brush, and does not represent habitat suitable for any of the regionally known sensitive wetland species. It is heavily shaded and contains old deposits of trash (wood, concrete, etc.). Of this distinct grove of willows, about 12,000 square feet (0.27 acre) is actual "wetland".

The main LBC parcel also contains a rectangular man-made pond at its western edge, but this is a managed feature (wastewater treatment facility) and is not considered "wetland". This pond is maintained to have clear banks and does not support any significant wetland or riparian vegetation.

The smaller 11.8 acre parcel has a slightly higher clay content and exhibits minor seasonal ponding in about three small areas where depressional topography has been created. These features occur in low microtopography that has been created over the years along the site's fencelines due to cultivation, fence-line accumulation of soil, and localized tractor operations (e.g., turning).These features are all small and total only about 2500 square feet.

2.3 Vegetation and Flora

The study area's vegetation has been altered through historic and ongoing agricultural and other land use activities. Based on air photos from the 1960's, virtually all of the study area (all parcels) supported orchard. Since then, however, the trees have been removed and the main parcel has been completely altered by the construction and operation of the existing LBC facilities. This main parcel contains the Center's buildings and parking lots, and extensive planted (and irrigated) turf areas for picnicking, occasional overflow parking, and special events (including the erection and use of large outdoor tents). In the few undeveloped portions of this parcel (i.e., around the edges and in certain unused comers), the dominant vegetation includes typical weedy non-native annual grassland composed of introduced grasses such as wild oats *(Avena)*, bromes *(Bromus mollis, B. rigidus)*, Italian ryegrass *(Lolium multiflorum)*, and wild barleys *(Hordeum* spp.), plus a high proportion of common field weeds such as mustards *(Brassica, Raphanus)*, vetch *(Vicia* spp.), wild geranium *(Geranium dissectum, G. molle)*, bindweed *(Convolvulus arvensis)*, thistles *(Cirsium, Sonchus, Carduus)*, prickly ox-tongue *(Picris echioides)*, fennel *(Foeniculum)*,and rattlesnake plantain *(Plantago lanceolata)*. There are also planted strips of pampas grass *(Cortaderid)* used as screening and partial windrows and a few clusters of planted Monterey pines, acacia, redwoods, and other ornamental trees and shrubs. A few clumps and scattered individuals of the native shrub coyote brush *(Baccharis pilularis* ssp. *consanguined)* also occur around the site's periphery.

The 11.8 acre parcel is essentially vacant and is used for livestock grazing. This area is composed exclusively of herbaceous annual (non-native) grassland. The dominant species are roughly the same non-native grasses mentioned above (i.e., oats, bromes, barley, vetch, thistles, etc.), plus stands of the non-native herb teasel *(Dipsacus fullonum)*. Non-native grassland forms essentially 100 percent cover here.

This undeveloped parcel also contains, however, several very small, shallow depressional areas that support a slight shift in vegetation toward a weedy seasonal wetland vegetation type. These small areas are not part of any larger drainage (swale/pool) system, nor are they well developed or undisturbed enough to support significant native wetland communities (see additional discussion below under 'wetlands'). This 11.8 acre parcel contains no significant tree or shrub vegetation, although there are about three medium-sized valley oaks *(Quercus lobatd)* situated along the northern and western fencelines, and there is a small cluster of planted redwoods (offsite) along the freeway frontage.

In general, the study area has been thoroughly altered and disturbed such that there are very few native plants left. None of the grassland represents native grassland, and only a very few scattered native oak trees remain (with essentially no significant regeneration). Even the few small wetland features are dominated by non-native species, including Italian ryegrass, Mediterranean barley *(Hordeum hystrix)*, curly dock *(Rumex crispus)*, umbrella sedge *(Cyperus eragrostis)*, velvet grass *(Holcus lanatus)*, loosestrife *(Lythrum hyssopifolid)*, mint or pennyroyal *(Menlhapulegium)*, and rabbit-foot grass *(Polypogon monspeliensis)*. There are only a very few scattered individuals of such native wetland species as flowering quillwort *(Lilaea scilloides)*, meadow barley *(Hordeum brachyantherum)*, toad rush *(Juncus bufonius')*, slender rush *(Juncus temtis)*, popcornflower *(Plagiobothrys bracteatus)*, common semaphore grass *(Pleuropogon californicus)*, western manna grass *(Glyceria occidentalis)*, and water star-wort *(Callitriche marginata)*.

One native plant species of general interest that occurs as scattered individual plants and very small localized clusters in the 11.8 acre site is Indian hemp *(Apocynum cannabinum)*. While this species is in fact relatively common and widely distributed (and as such has no official status), it is of interest because of its historical (and possibly even continued) use by native Americans for various purposes that utilize its notable fiber.

The study area has not been reported as supporting any actual rare, endangered, or otherwise uncommon or sensitive plant species. There are several rare endemic plants known to grow in vernal pools in this region, but none are known from this property or any others immediately nearby. The nearest known locations for such species are for Burke's goldfields which historically have occurred west of the freeway along Airport Boulevard.

2.4 <u>Wildlife</u>

Because of the highly developed lands that surround the study area, plus the long term presence of the adjacent freeway, wildlife use of the site has been severely curtailed over the years. Movements of large mammals such as deer have been drastically reduced because of the freeway and neighboring development, and with minimal actual wetland habitats, even use by transitory birds is not great. The undeveloped parcel and the unpaved portions of the main LBC provide some resource value for songbirds, small mammals, and some reptiles (lizards, snakes), but overall, the long term agricultural use and development in this area has greatly reduced the study area's value for wildlife.

The solitary man-made 'pond' on the LBC may have some minor value for amphibians, but because of its extreme isolation and very limited extent, it is not expected to provide much actual value. Current investigations are being conducted to assess this feature's potential value for supporting the endangered California tiger salamander (CTS). Also, while such a ponded habitat might otherwise provide certain habitat values for wetland-associated birds, this feature's extremely dense cover by tall woody vegetation (to the point of totally obscuring the surface water from essentially all directions), plus its isolation and generally developed surroundings, renders the aquatic potential here to a very low level.

No rare or endangered wildlife species are known or expected to occur in this general area, and given the extremely small and poor quality of the onsite habitats for same, no such species are expected here. Studies regarding CTS (along with associated agency review of the results) will be able to provide more definitive conclusions in this regard by the spring of 2005.

2.5 Wetlands

The overall study area (all parcels combined) contains approximately 0.46 acre (20,100 square feet) of jurisdictional seasonal wetlands and other waters (channels). This includes the borrow pit with the willow grove (12,000 square feet of 'wetland') and two small man-made channels on the main parcel (5600 square feet total), plus three small seasonal wetlands around the periphery of the 11.8 acre parcel (2500 square feet). None of these features, however, represent especially natural habitat, nor do they contain significant direct wetland resource values.

The wetland features on the main 40 acre LBC parcel are without significant direct resource value because of their largely man-made character and isolated occurrence, although they do represent potentially significant generic resources for the region. The willow grove wetland may provide habitat (cover, foraging, possible nesting) for common songbirds and small mammals, but does not constitute suitable habitat for waterfowl, waterbirds, or other truly wetland-dependent wildlife. Further, because of the man-made character and the dense willow growth here, this feature does not have any significant potential to support native (endemic) wetland plants, especially any of the regionally known sensitive species. The small seasonal wetlands on the 11.8 acre parcel are likewise not of high resource value or significance, but they are slightly more 'natural' for the region and also represent generic habitats of at least some regional value (even if only for their restoration potential). While these wetland features are also highly altered and disturbed, they have at least some minor potential as suitable habitat for endemic wetland plants (although none have been reported or found here).

Overall, the site's wetlands and small channels could be considered to be somewhat genetically sensitive habitats or communities, but because of their relatively common and largely non-native vegetation, degraded physical state, and increasingly disturbed setting, are not regarded here as especially sensitive, rare, or ecologically significant in and of themselves. The study area's wetlands are, rather, severely disturbed, reconfigured, and/or heavily impacted remnants of the pre-existing area wide drainage patterns that once (long ago) occurred on this low-gradient terrain. These disturbed habitats are important and somewhat sensitive in the generic sense, but more for their general value (or the potential for restoration), rather than for the current actual direct resource values. The actual onsite habitats and plant assemblages are not of especially high direct ecological value. Their lack of persistent ponding or significant natural vegetation, plus the local setting of increasing human activity nearby render them of relatively low value to wildlife.

2.6 Other Habitats

The study area contains no other significant habitats or natural plant communities, and in particular, there is no native grassland, no significant brush, nor any significant creekbed riparian habitat, although there is a small area along the channel next to the freeway that has at least some pseudo-riparian cover (pines, pampas grass, Himalaya blackberry, and a few willows) and some intermittent flow in the winter. Further, there are no other natural habitats of particular value or significance on any adjacent land.

2.7 Sensitive Plant Species

Based on multiple spring botanical surveys in 1993,1998,1999, and 2004, the study site supports no occurrences of any rare, endangered, or otherwise sensitive plant species. No such plant species have been found on the site, nor have any been reported here (or immediately nearby) by the California Natural Diversity Data Base (CNDDB, 1991) or the California Native Plant Society (CNPS). Table 1 lists the primary target species considered during the investigations, and Table 2 is a plant list compiled for the site.

Aside from the willows in the borrow pit area, the site's wetlands and small channels support very few native wetland species. The channel bed near the freeway is largely bare and eroded, and supports no true wetland vegetation (e.g., cattails, rushes, sedges), and has a canopy of planted pines, a few small oaks, and numerous non-native shrubs and small trees (i.e., ornamental roses, escaped fruit and landscaping trees).

All species observed over the entire site (see Table 2) are relatively common in the greater Sonoma County region. There is very little realistic potential for any of the rare vernal pool species to occur here because of the high degree of local urban encroachment, the severe long term disturbance from agriculture, the meager hydrological development, and very minor physical extent. No such species have been found here during the recent investigations. Even such wetland species as the more aggressive and adaptable coyote thistle *(Eryngium)*, dock *(Rumex)*, cocklebur *(Xanthium)*, and western manna grass *(Glyceria occidentalis)* are largely absent from the study area's wetlands. There is almost no native seasonal pool vegetation, and no evidence of any of the common or rare pool species typically found in this region (e.g., no *Lasthenia, Limnanthes, Plagiobothrys, Downingia, Gratiola, Eryngium,* etc.). Even the widespread and nearly ubiquitous semaphore grass *(Pleuropogon californicus)* has not been observed here.

More specifically, the willow grove wetland supports solely willows and coyote brush, with no herbaceous wetland cover at all because of the dense shading and competition. The small channel and swale nearby (see Figure 4) support only common non-native grasses *(Lolium, Poa annua, Hordeum hystrix, Vulpia,* and lawn grasses) and common weeds *(Plantago, Lythrum, Rumex, Lotus corniculatus).*

Based on these findings, it is my conclusion that this site has essentially no realistic potential to support any rare or endangered plants, and no additional surveys should be needed.

2.8 Sensitive Wildlife Species

In general, the site contains relatively little direct resource value for wildlife, although it does provide some escape cover, resting, and potential nesting opportunities for common urban-tolerant animals. It does not, however, contain any significant natural habitats or areas of high use by any particular species of wildlife, especially species regarded as sensitive. There is only minor native vegetation left in the area and the entire site has been substantially altered, with literally all of the study area having been used historically for orchard. Currently, the undeveloped parts of the LBC parcel contain bare ground, weeds, managed turf, and planted landscaping. The 11.8 acre pasture parcel is dominated almost exclusively by non-native annual grassland. There are no significant natural wetlands or native grassland habitats, and no true aquatic habitat. The site provides some minor escape cover and potential foraging habitat for songbirds and small mammals, with possibly occasional use by other transitory animals such as deer, owls, and hawks. The site is undoubtedly used to some extent by common urban-tolerant species (e.g., opossum, skunk, raccoon, rodents, numerous small birds), but does not provide suitable habitat for the region's known rare or endangered animals.

Specifically, there are no suitable habitats here for the California red-legged frog or the Pacific freshwater shrimp (no significant perennial water). None of the listed species of fairy shrimp are known to occur anywhere in Sonoma County and are not regarded as an issue here, and the red-legged frog is specifically protected as a listed species only within certain drainages (i.e., around the north Bay Area only in the Petaluma River, Napa River, Sonoma Creek watersheds). This project site (and virtually all of the Santa Rosa Plain) occurs well outside the established range of the protected form of red-legged frog.

Significantly ponded habitats present either directly onsite or nearby that could support CTS are relatively minimal, and the project site occurs generally north of the regionally known range of this rare amphibian. The onsite channels are completely man-made and lack any significant pools. Surveys and discussions with the appropriate agencies (U.S. Fish and Wildlife Service) are currently in process to more conclusively document presence or absence of this species. Based on the general lack of suitable habitats here and nearby, the extreme degree of fragmentation and isolation, and barriers posed by the adjacent freeway, it does not appear likely that CTS will be an issue here.

There is insufficient year-round flow in any of the study area's channels for any of the region's other known sensitive aquatic species, including specifically the Pacific freshwater shrimp (or other aquatic species of concern such as the western pond turtle). Further, as highly intermittent sections (fragments) of short man-made drainages, the onsite channels do not support any fish.

3.0 Impacts to Biotic Resources from the Proposed Project

The proposed project would involve significant new building and pavement, essentially eliminating what undeveloped ground remains. Impacts to the previously developed LBC facilities should be relatively minimal, as this entire area has already been almost completely built on, paved, or landscaped. Renovating and/or re-building various components would not eliminate any natural habitats or important biological resources. Minor pockets of volunteer, semi-riparian vegetation will be lost along the small channels and at the old 'borrow pit' feature. Development of the currently vacant 11.8 acre parcel would eliminate open pasture and some minor biotic resource value, although no natural habitats or vegetation would be lost.

3.1 Baseline Condition of Onsite Resources

The existing biological resources within the study area are already in a state of severely diminished value. The LBC area has been thoroughly developed, with little remaining in the way of biotic resources, and even these (i.e., the small sections of ditch, the solitary riparian wetland) are completely man-made and are surrounded by a developed landscape. There are no remaining natural habitats or plant communities here, and impacts from the project would be, in general, minimal.

The undeveloped 11.8 acre parcel would sustain a slightly higher level of resource loss, but this too would be relatively insignificant. This parcel has no existing development and essentially all of it would be used for buildings, pavement, or landscaped facilities. This parcel consists exclusively of open, non-native annual grassland.

In addition to the main parcels planned for development, there is an adjoining undeveloped parcel of approximately 25 acres that currently is restricted to agricultural use under an 'open space' easement with the Sonoma County Agricultural Preservation and Open Space District (SCAPOSD). This parcel contains a protected wetland drainage (broad swale), a set-aside for

Indian hemp, and some area of recently planted vineyard. This parcel is under the same ownership as the project study area and may be used in part for either an onsite detention basin (to serve water quality issues) and/or additional wetland/riparian mitigation.

3.2 Direct Impacts

Direct impacts will occur from the physical development of the study area, primarily on the northern 11.8 acre parcel, where virtually all existing vegetation and ground surface would be affected and replaced with buildings, parking, and landscaping. Drainage will be collected and routed, although the overall existing pattern of simple onsite runoff collection and conveyance westward will not change dramatically.

3.2.1 Soils and Hydrology

No significant impacts will occur to soil or hydrological attributes, at least as they relate to biological resources. A small amount of potential agricultural land (11.8 acres) would be lost to possible future crop or livestock production. This translates into a small future loss of hayfield, pasture, or other potential cropland, but none of these preclusions is deemed significant and no mitigation for same is necessary. Hydrology will be altered as the areas to be developed will have onsite runoff and drainage placed in pipes below ground, but this will not affect any highly significant wetlands or water-related habitats, and no such aquatic features nearby would be adversely affected. There are no significant nearby wetlands or aquatic habitats that would have their hydrological regimes altered by the project. The only nearby wetland of note is the linear wetland swale to the south; however, this area does not currently receive any significant runoff from the project site and the project would not have any deleterious impact on this 'offsite' feature.

3.2.2 Vegetation and Flora

Completion of the project would result in the loss of approximately 11.8 acres of non-native annual grassland, plus roughly another 15-16 acres of planted and irrigated turf (which has some limited foraging value for common wildlife species similar to open grassland) and weedy peripheral grassland. There would, however, be no loss of any significant native grassland, nor of any significant native brush or woodland communities. Vegetation losses would also include the loss of approximately 0.46 acre of minor seasonal wetland, 0.4 acre of semi-riparian woodland (cottonwoods, willows, blackberries; not all of which is actual "wetland"), three mature valley oak trees (along the fencelines next to the Mark West Springs Road off ramp), and a small (but unknown) number (probably less than 100) of scattered Indian hemp plants. Several other clusters of planted ornamental trees would also presumably be lost, but these do not represent significant losses of natural habitats or communities. The loss of the Indian hemp plants may be regarded by some as a potentially significant impact, but this species has no formal status and is actually fairly common and widespread in the region.

3.2.3 Wildlife

Impacts to wildlife will be relatively insignificant in that no natural habitats, nor any others of especially high value will be lost. The main losses in terms of wildlife will be the simple elimination of approximately 15 acres of open grassland and planted turf habitat suitable for common songbirds, small mammals, and selected reptiles. The open grassland that will be lost may have some limited foraging value for raptors (common hawks, owls, etc.), but this is not regarded as a significant impact as the grassland habitat to be lost does not have high value for such species (proportional to its relatively small size, agricultural use, and semi-urban setting).

No significant aquatic habitat would be lost, and the wetlands to be eliminated do not represent important or significant habitats for wetland-dependent species. The wetlands here are of extremely limited extent and meager habitat values, set within a fairly urban landscape. Therefore, the loss of these minor features does not represent a significant impact to wildlife resources.

3.2.4 Wetlands

The project would involve the loss of (in total) approximately 0.46 acre of relatively low quality wetland, including 0.06 acre of seasonally wet, herbaceous swale or shallow rainpool habitat, 0.12 acre (roughly 650 linear feet) of man-made drainage channel (with weedy volunteer and planted shrubs and trees), and 0.27 acre of volunteer semi-riparian (wetland) woodland. None of this loss is considered significant as it is of very limited extent and is set within a generally urban landscape. None of the wetland features to be lost represent natural habitat, and none currently support any rare, endangered, or otherwise sensitive species. None of the wetland areas constitute good suitable habitat for endangered species, plants or animals, and based on the habitats' fragmented situation and meager habitat integrity, no such species are expected here.

The two primary aspects of wetland impacts that are notable are (1) the loss of the isolated semi-riparian grove of trees in the center of the LBC parcel, and (2) the scattered small seasonally wet depressions around the periphery of the undeveloped 11.8 acre site. Loss of the semi-riparian feature could be regarded as potentially of moderate significance because of the woody vegetation and the persistent ponding, but this feature's ruderal character (i.e., the vegetation is not all native, it is set within an old 'borrow' pit fringed with debris) and completely isolated occurrence render it of relatively low actual habitat value. Its loss would not be considered significant, although it will be regarded as "jurisdictional" wetland either by the Army Corps of Engineers and/or the Sate of California and will require some level of permitting. Loss of this feature is not highly significant, will be eligible for a relatively ,ow level permit, and will require some low level of mitigation (replacement).

3.2.5 Rare, Endangered, or Otherwise Sensitive Species

No rare, endangered, or otherwise sensitive plants or animals are likely to be affected by the project. No such species have been found here, and habitats suitable for such species are generally not present. No sensitive plants been found here over several years of detailed spring surveys, and there are no historic records of such species occurring here or immediately nearby.

3.2.6 California Tiger Salamander

It is conceivable that CTS use the small riparian pool onsite, but there is no current evidence of this, and the range limitations of this species seem to indicate it dies not occur here. Full protocol surveys are currently being conducted to definitively ascertain the presence or absence of this species.

3.3 Indirect Impacts

Because almost all of the land immediately next to the study area has been developed, no significant indirect impacts are expected. The properties immediately to the east north, and west are all highly altered man-made landscapes with little or no natural resource values left, and the small area to the southeast is a combination of vineyard, wetland swale, and open weedy grassland, all of which has already been placed under a land preservation easement.

There are no highly significant wetlands adjacent to the study site that could be adversely affected, and the minor swale that occurs just to the southeast is already protected within that area's easement. Drainage patterns will not be drastically altered so as to pose a threat to that swale wetland area. There are no significant natural plant communities or habitats anywhere on adjacent lands that would be jeopardized by this project.

4.0 Permits and Approvals

4.1 CEOA

State environmental concerns and issues are being addressed under CEQA through the preparation of an Environmental Impact Report (EIR), of which this biological report will become a part. Biological resource issues are addressed here and will be reviewed by the appropriate state agencies, most specifically the California department of Rsh and Game (CDFG) as part of the EIR and CEQA review process. The primary issues and topics of concern are related to wetlands, sensitive species, and native habitats and/or plant communities. These issues are all addressed herein. One possible issue that is not likely to be of concern to state or federal agencies, but which may warrant some consideration is the presence (and projected loss of) a small colony of Indian hemp on the 11.8 acre parcel. This species has no specific protection, but represents a species of at least some cultural interest.

4.2 U.S. Army Corps of Engineers

In spite of the low quality and small amount of the study area's wetlands, formal permitting will still be required if any of the wetland features are to be filled' (or otherwise eliminated). Development of the full study area as proposed, and the attendant loss of all wetland features requires notification of the Corps of Engineers requesting authorization to fill, and most likely will qualify for authorization under the Nationwide Permit (NWP) number 39.

RII authorization under the NWP 39 should be obtainable without major problems or delay provided that at least (1) 1:1 habitat replacement is provided (either through independent wetland creation, onsite or off, or through the purchase of credits at an approved mitigation bank), and (2) 1:1 wetland habitat preservation of existing higher quality wetland habitat somewhere in the region is also completed. Based on a regional "Programmatic Consultation" between the Corps of Engineers and the U. S. Fish and Wildlife Service (FWS), impacts to wetlands on the Santa Rosa Plain require both the replacement ("creation") of similar wetland habitat, as well as the preservation of existing high quality habitat. In general, the created wetlands in regional 'banks' are of the herbaceous, seasonal type, somewhat similar to the small shallow depressions on the 11.8 acre site. The loss of these wetlands (0.06 acre) will require either such a bank credit purchase (of at least equal acreage in credits, generally rounded up to the nearest 0.1 acre), or may be accomplished through the independent construction of new similar wetland habitat at an appropriate site.

However, if independent wetland creation is to be pursued, and is to be done concurrently with the project and its impacts to wetlands, the ratio of replacement will most likely be 1.5-to-l. Two factors argue for this higher ratio. The first, based on language in the governing Programmatic Consultation is the stipulation that sites where independent wetland creation is to be done that are ~~not~~ specifically approved as "High Quality" sites by the FWS require the 1.5:1 ratio, and, also dictated by the 'Programmatic', if wetland creation is done in the same season as when the impacts occur, the ratio (to account for the temporal loss) is to be 1.5:1. Wetlands created in advance and that have been in place for at least one full wet season may be allowed back at 1:1. However, if the selected site is not FWS-approved, the other factor arguing for 1.5:1 will still apply. Recent approvals do not indicate that the two 1.5:1 requirements will be multiplied together, but satisfying one of the two dictating factors (but not the other), still results in the requirement of 1.5:1 replacement. Only if the newly created wetlands are to be completed at a FWS-approved site one year in advance of the wetland loss (impacts) would the replacement ratio be allowed to stay at 1:1. Credit purchase of created wetlands can be made at simple 1:1 regardless of these two factors since the bank format establishes that the bank site is FWS-approved and the wetlands have generally been created in advance.

Preservation of wetlands is generally at simple 1:1, but usually must be in-kind, i.e., preserving the same type of wetland as is being impacted, there may be some leeway here, but typically, seasonal wetland loss must be compensated with similar wetland replacement and preservation, while riparian habitat loss should be mitigated with similar habitat. Most mitigation banks on the Santa Rosa Plain cater to vernal pool and herbaceous seasonal wetland impacts, but do not include riparian types. Some may have preservation of riparian habitat, but few (if any) actually provide 'creation' credits for riparian habitat impacts.

Most likely this project will be faced with acquiring 0.1-0.2 acre of seasonal wetland creation credits or replacement acreage, as well as equal acreage in wetland preservation, plus some form of riparian restoration (0.2+. acre). Since the creation of actual new riparian habitat is extremely difficult, many permits for similar impacts (i.e., small semi-riparian vegetation) will allow for the restoration of some previously degraded section of creekbank to compensate for loss of actual riparian growth and/or habitat.

With regard to timing, once an application is accepted as complete by the Corps under NWP 39, a decision as to the project's eligibility (or not) must be rendered within 45 days. For wetland losses less than one-half acre (and no sensitive species issues), the Corps generally processes the application in-house (without consulting with any other agencies), while impacts to more than one-half acre require them to solicit comments from the FWS and CDFG under the Individual Permit (IP) format. There is no fee for the Corps authorization process.

Should it be determined that CTS actually use this site, the permit process will be required to go forth as an IP, and additional "Section 7 Consultation" with the FWS will be required. Additional (as yet undefined) mitigation would be required for any impacts to CTS, including compensation for both wetland (potential breeding habitat) and undeveloped upland (potential summer aestivation habitat) losses. Actual mitigation requirements for CTS issues are as yet undefined by the agencies and would need to be determined through additional discussions with the FWS.

4.3 California Regional Water Quality Control Board

In addition to obtaining fill authorization from the Corps, "401 Certification" from the California Regional Water Quality Control Board (CRWQCB) is also necessary in order to make the Corps permit valid. This requires notification of the CRWQCB of the proposed action, payment of their processing fee (which will be based on the acreage of wetland fill), awaiting their public notice period, and addressing any substantial comments that might be registered on behalf of the public or the RWQCB itself. Obtaining 401 Certification typically takes approximately two months, and can be pursued either concurrently with the Corps process, or any time thereafter as long as no physical wetland impacts are incurred before obtaining the approval. Full documented compliance with CEQA must be provided to the RWQCB before they will complete the 401 Certification.

4.4 California Department of Fish and Game

A "Streambed Alteration Agreement" from CDFG would probably not (although it conceivably could) be necessary here because the site's small 'channels' are not well developed, are not natural features, and do not represent significant drainages. While a Streambed Alteration Agreement may be required, typically the mitigation required under that approval process would be essentially the same as would be required by either the Corps or the RWQCB. As a practical matter, CDFG will be contacted for their comments and possible requirements both under CEQA and during the Corps' permit process.

5.0 Recommended Mitigation Measures

5.1 Wetlands

Based on the proposed project, all of the study area's existing wetlands would be filled or otherwise eliminated. This will require specific authorization from the Corps, as well as related approvals from the RWQCB and CDFG. The first step in this process has been initiated, that being the submittal of a request of the Corps to make a "Jurisdictional Determination". This step will result in a formal map showing the exact extent of Corps jurisdiction and will establish the baseline conditions as a basis for eventual permitting.

Once the Jurisdictional map is confirmed, the applicant will need to apply for an Army Corps (404) permit to fill the onsite wetlands. This application may well fall within the terms and conditions of the NWP program, and as long as adequate replacement and preservation compensation is provided, the Corps should be able to process this permit within about two months. It is recommended here that the applicant procure specific wetland mitigation in the form of the following:

(1) herbaceous seasonal wetland replacement at a ratio of 1:1 if done through credit purchase at an approved mitigation bank, or at 1.5:1 if done independently (such as onsite);

(2) seasonal wetland preservation of at least 0.1 acre at an approved mitigation bank;

(3) approximately 0.3-0.4 acre of riparian restoration opportunity at some regional creek situation where degradation can be reversed to provide good new riparian growth.

The actual exact acreages of the various mitigation components will need to be determined through future discussions with the permitting and advisory agencies, and the exact form of such mitigation offering may be somewhat flexible given the site's already degraded and fragmented character. It is also unclear at this time whether or not preservation will be required for the riparian or channel impacts.

If space allows, onsite mitigation for all wetland impacts could likely be provided in the adjacent 25+. acre open space area. Such an effort here would need to include seasonal wetland creation, riparian planting in an appropriate setting, an adequate amount of surrounding upland watershed and buffer (roughly an area equal to or slightly greater than the wetland area being replaced), and overall legal and physical protection in perpetuity. It is unclear if onsite preservation could be accomplished here as this is not a FWS-approved site, not is there any truly "High Quality" seasonal wetland already present that could be dedicated to preservation.

5.2 Sensitive Species

Since there are no known or suspected occurrences of sensitive species in the study area, no specific mitigation measures are recommended at this time.

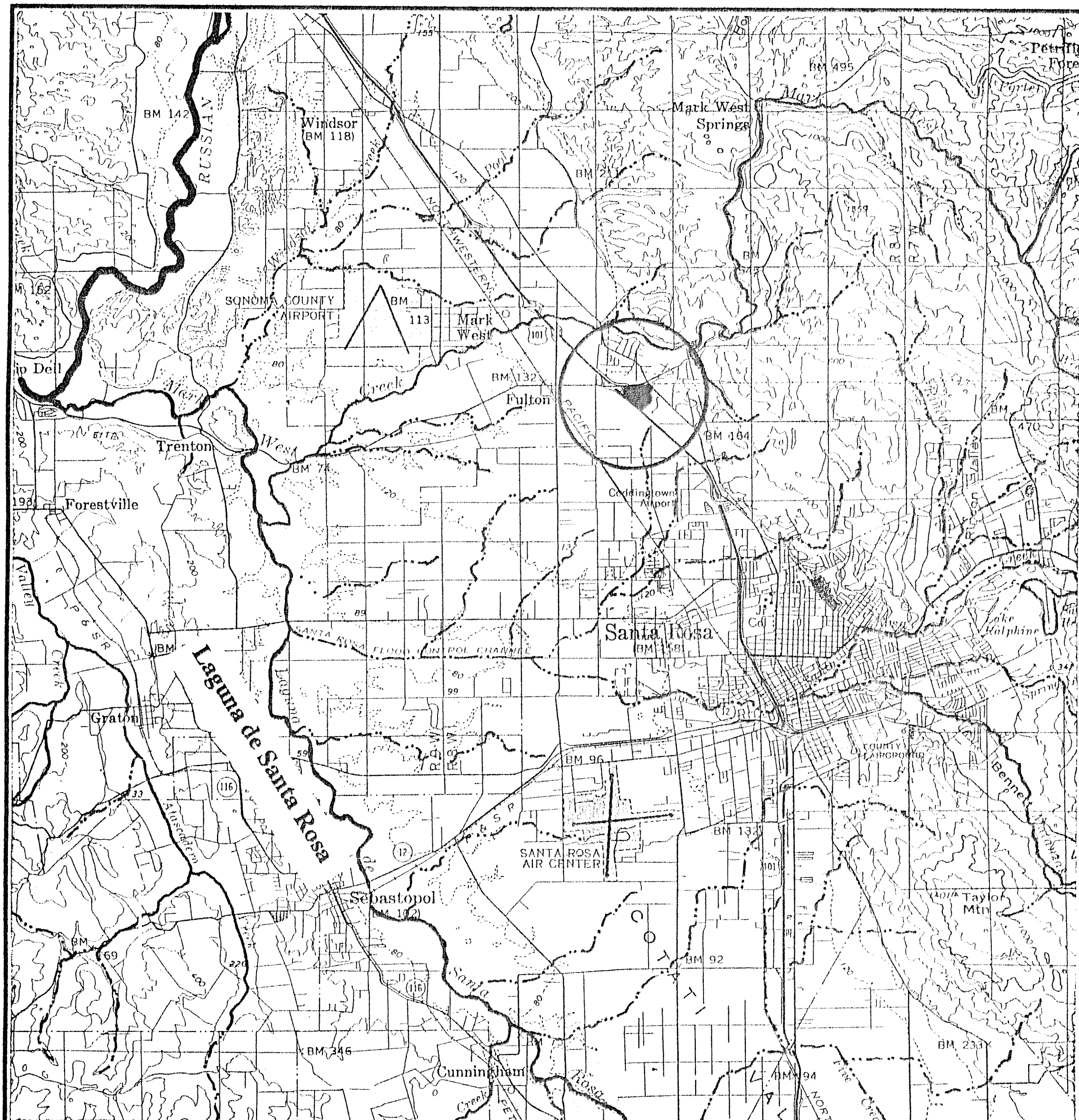


Figure 1. Regional Location

Biological Resources Report - 12/04

NORTH ↑	**Basemap:** USGS regional topo map; 1:125,000, SF Bay Area set, sheet 1 of 3	**Applicant:** Sutter Medical Center and Luther Burbank Center for the Arts	U. S. Route 101 at Mark West Springs Road, Sonoma County
	Prepared by: C. Patterson **Scale:** 1" = approx. 2 miles		

Sutter Medical Center and Luther Burbank Center for the Arts - Master Plan

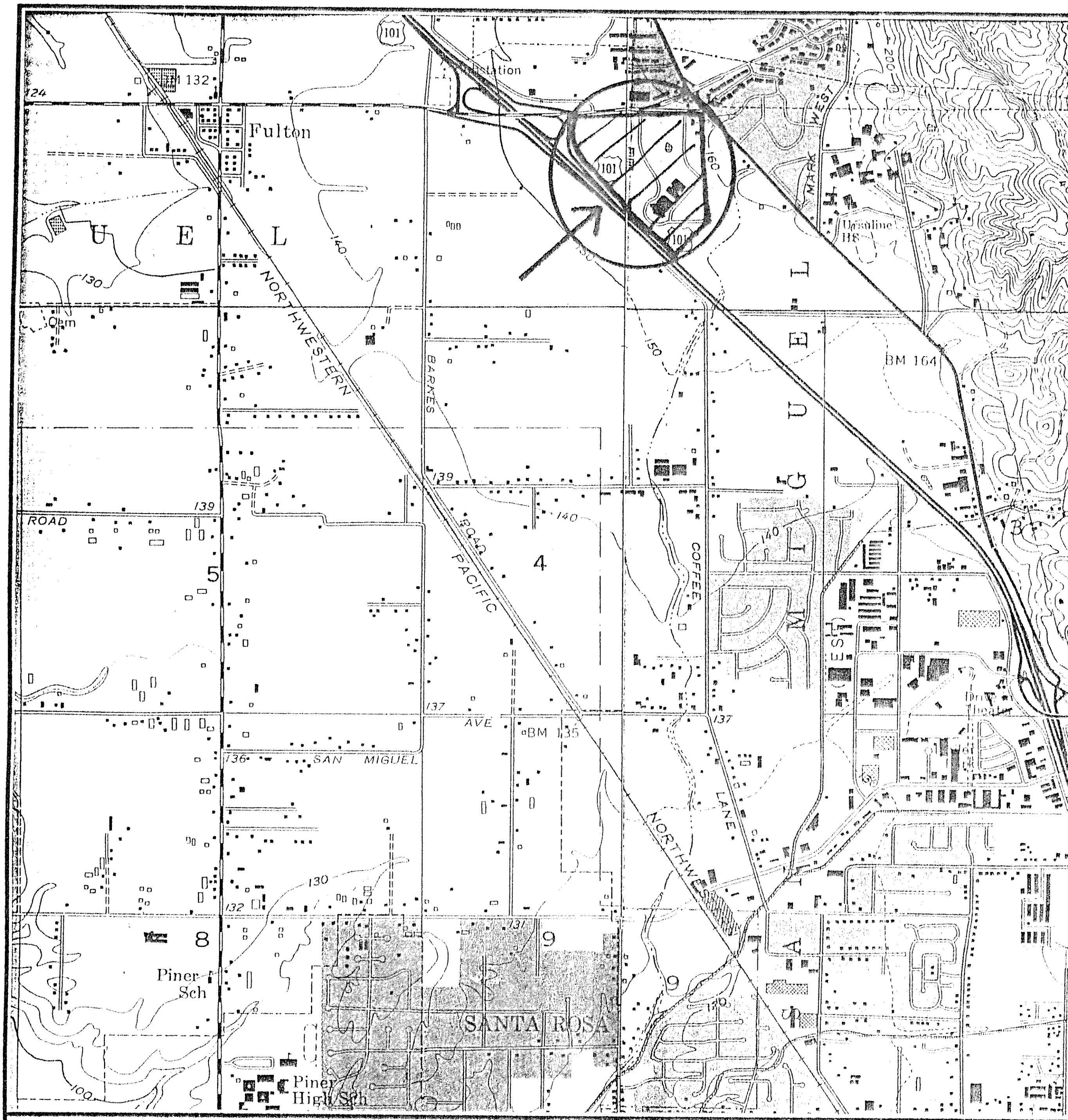


Figure 2. Local Setting

Biological Resources Report - 12/04

NORTH ↑	**Basemap:** USGS 7.5 ' topo map; 1:24,000; Sebastopol & Santa Rosa quadrangles	**Applicant:** Sutter Medical Center and Luther Burbank Center for the Arts	U. S. Route 101 at Mark West Springs Road, Sonoma County
	Prepared by: C. Patterson **Scale:** 1" = approx. 2000 feet		

Sutter Medical Center and Luther Burbank Center for the Arts - Master Plan

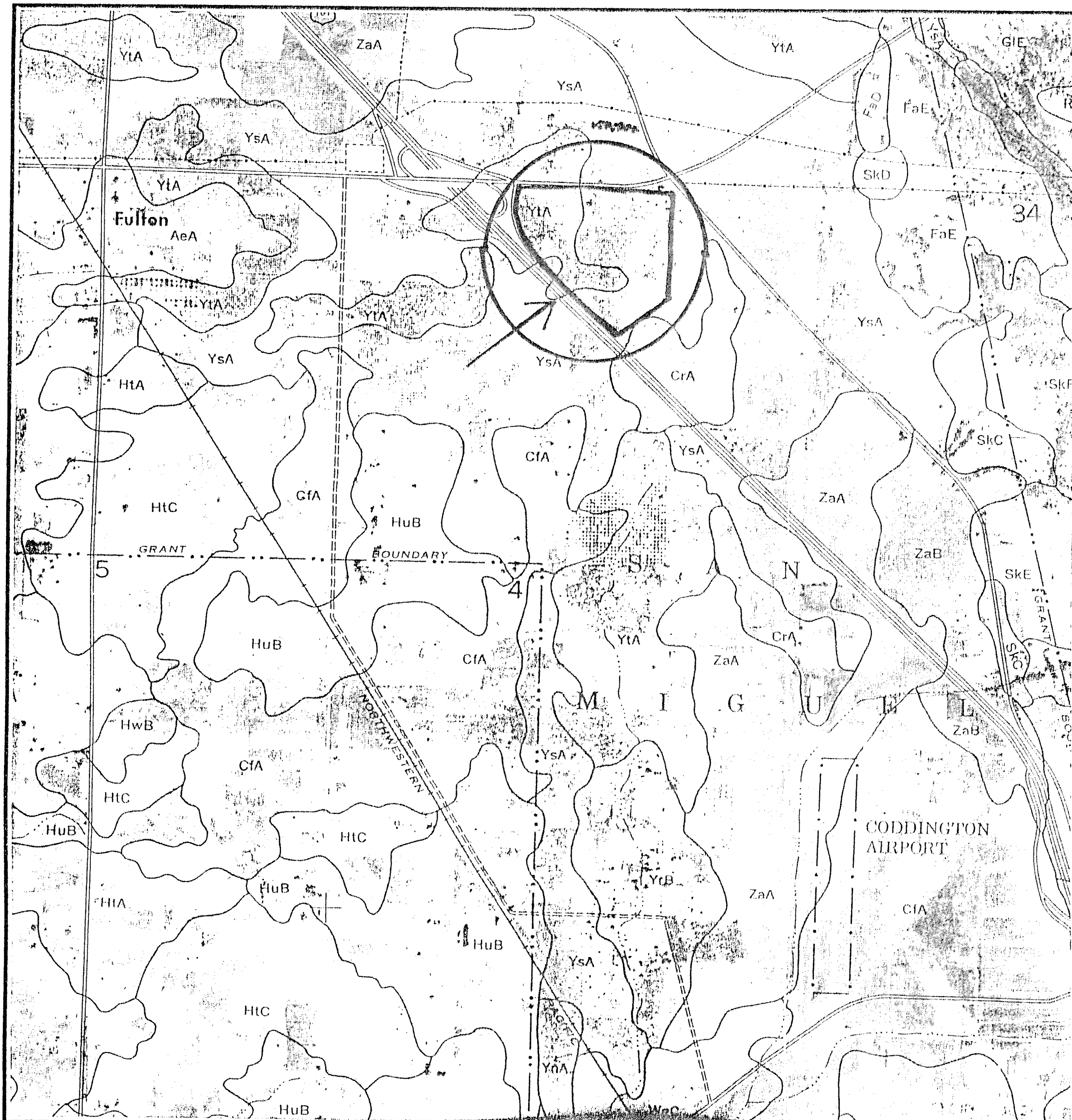


Figure 3. Areawide Soils Map

Biological Resources Report - 12/04

NORTH ↑

Basemap: USDA - SCS Sonoma Co. Soil Survey; Millar et al, 1972; sheet 74

Applicant: Sutter Medical Center and Luther Burbank Center for the Arts

U. S. Route 101 at Mark West Springs Road, Sonoma County

Prepared by: C. Patterson

Scale: 1" = approx. 1667 feet

Sutter Medical Center and Luther Burbank Center for the Arts - Master Plan

Table 1. Sensitive plants potentially on the Santa Rosa Plain

PLANT TAXON	COMMON NAME	LIST	R-E-D	FWS	CDFG	HABITAT	Likely In Study Area ?
SPECIES OF PRIMARY CONCERN:							
Castilleja uliginosa	Pitkin Marsh paintbrush	1 A	PE 1987	SC	E	marshes, wet meadow; Pitkin Marsh	No; poor habitat onsite; presumed extinct; none seen
Plagiobothrys mollis var. vestitus	Petaluma popcorn flower	1 A	PE 1888	SC	-	valley flats, vernal pools ?	No; none seen; presumed extinct; out of range?
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	1 B	3 - 3 - 3	E	-	low wet places, marsh, riparian scrub	No; poor habitat onsite; none seen
Astragalus clarianus	Clara Hunt's milkvetch	1 B	3 - 3 - 3	E	T	grassy hillsides, cismontane woodland	No; no good habitat; out of range; none seen
Blennosperma bakeri	Baker's blennosperma or Sonoma sunshine	1 B	2 - 3 - 3	E	E	low wet places; valley grassland, vernal pools	No; poor habitat onsite; none seen
Campanula californica	swamp harebell	1 B	1 - 2 - 3	SC	-	freshwater marshes, bogs, closed cone pine,	No; poor habitat onsite; none seen; out of range?
Carex albida	white sedge	1 B	3 - 3 - 3	E	E	open marshy places; Pitkin Marsh	No; marginal habitat; none seen
Fritillaria liliacea	fragrant fritillary	1 B	1 - 2 - 3	SC	-	heavy adobe soils, coastal grassland and	No; poor habitat quality; none seen
Gratiola heterosepala	Bogg's Lake hedge-hyssop	1 B	1 - 2 - 2		E	vernal pools, shallow marshy ground	No; out of main range; none seen
Lasthenia burkei	Burke's goldfields	1 B	3 - 3 - 3	E	E	vernal pools, wet swales	No; poor habitat: marginal hydrol.; none seen
Legenere limosa	legenere	1 B	2 - 3 - 3	SC	-	vernal pools; valley grassland	No; poor habitat; marginal hydrol.; none seen
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	1 B	3 - 3 - 3	E	E	wet marshy ground, Pitkin Marsh	No; poor habitat; marginal hydrol.; none seen
Limnanthes vinculans	Cunningham Marsh or Sebastopol	1 B	2 - 3 - 3	E	E	vernal pools, wet meadows	No; poor habitat; marginal hydrol.; none seen
Navarretia leucocephala ssp. bakeri	Baker's navarretia	1 B	2 - 2 - 3		-	vernal pools, wet swales, mesic grassland?	No; poor habitat; marginal hydrol.; none seen
Navarretia leucocephala ssp. plieantha	many- flowered navarretia	1 B	3 - 2 - 3	E	E	edges of vernal pools, meadows	No; poor habitat; marginal hydrol.; none seen
Pleuropogon hooverianus	Hoover's or North Coast semaphore grass	1 B	3 - 2 - 3	SC	R	meadows, coastal decid. forest, wet places	No; poor habitat quality; none seen
Rhynchospora californica	California beaked rush	1 B	3 - 3 - 3	SC	-	bogs, swamps, freshwater marsh	No; no suitable habitat; none seen

Not including plants of chaparral, forest, or coastal habitats

Table 1. Sensitive plants potentially on the Santa Rosa Plain

PLANT TAXON	COMMON NAME	LIST	R-E-D	FWS	CDFG	HABITAT	Likely In Study Area ?
ıalcea oregana ssp. valida	Kenwood Marsh checkerbloom	1B	3 - 3 - 3	E	E	freshwater marsh	No; none seen; out of main range; marginal hydrol.
Trifolium amoenum	showy Indian clover	1B	3 - 3 - 3	E	-	low rich fields, swales; serpentine	No; poor habitat quality; none seen
SPECIES OF SECONDARY CONCERN:							
Downingia pusilla	dwarf downingia	2	1 - 2 - 1		-	vernal pools; valley grassland	No; poor habitat; marginal hydrol.; none seen
Rhynchospora globularis var. globularis	round headed beaked rush	2	3 - 3 - 1		-	bogs, freshwater marsh	No; no suitable habitat; none seen
Hemizonia congesta ssp. leucocephala	hayfield tarplant	3	? - ? - 3		-	coastal scrub, prairie, grassland	Possible, but none seen
Pogogyne douglasii ssp. parviflora	Douglas' pogogyne	3	1 - 2 - 3		-	vernal pools, low seas. wet places	No; poor habitat quality; none seen
Amsinckia lunaris	bent- flowered fiddleneck	4	1 - 1 - 3		-	valley and foothill grassland	No; poor habitat quality; none seen
Astragalus breweri	Brewer's milkvetch	4	1 - 2 - 3		-	chaparral, woodland, grassland	No; no good habitat; none seen
Elymus californicus (Hystrix c.)	California bottlebrush grass	4	1 - 1 - 3		-	coastal, shaded woods and forest	No; no suitable habitat; none seen
Lomatium repostum	Napa lomatium	4	1 - 1 - 3		-	shaded woods, chaparral	No; poor habitat; out of main range; none seen
Perideridia gairdneri ssp. gairdneri	Gairdner's yampah	4	1 - 2 - 3	SC	-	moist places, marshes, woodland	No; too disturbed; none seen
Ranunculus lobbii	Lobb's aquatic buttercup	4	1 - 2 - 3		-	shallow vernal ponds & pools	Possible, but none seen
Rhynchospora alba	white beaked rush	4	1 - 1 - 1		-	bogs, freshwater marsh	No; no suitable habitat; none seen
OTHER SPECIES OF POSSIBLE CONCERN:							
Cuscuta howelliana	Bogg's Lake dodder	-	dropped		-	vernal pools	No longer listed; none seen
Hemizonia multicaulis ssp. vernalis	Tiburon tarplant	-	dropped		-	coastal scrub prairie; serpentine	No longer listed; none seen
Quercus lobata	valley oak	-	dropped		-	foot. & valley woodland, riparian	Several salings present, but no longer listed

Not including plants of chaparral, forest, or coastal habitats

Table 1. Sensitive plants potentially on the Santa Rosa Plain

PLANT TAXON	COMMON NAME	LIST	R-E-D	FWS	CDFG	HABITAT	Likely In Study Area ?
'folium grayi	Gray's clover	-	dropped		-	meadows, mesic grassland	No longer listed; no good habitat; none seen

LEGEND FOR TABLE 1

Plant Taxon: as listed by Skinner, M.W., and B. M. Pavlik, ed.s (1994).

List: Refers to the list number on which the plant is included in Skinner and Pavlik, Ed.s (1994): California Native Plant Society's sensitive plant inventory. **1a**: Plants presumed extinct, **1b**: Plants rare or endangered in California and elsewhere, **2**: Plants rare or endangered in California, but more common elsewhere, **3**: Plants about which we need more information, and **4:** Plants of limited distribution [a watch list]. Appendix 1: plants considered, but not included.

R-E-D: rarity (R), endangerment (E), and distribution (D) code from Skinner, M.W., Ed. (1994) :

Rarity :

1 = Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time.

2 = Occurrence confined to several or one extended population(s).

3 = Occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom seen.

PE = Presumed extinct in California (with date last seen)

Endangerment :

1 = Not endangered.

2 = Endangered in a portion of its range.

3 = Endangered throughout its range.

Distribution :

1 = More or less widespread outside California.

2 = Rare outside California.

3 = Endemic to California.

FWS (1999): C1 = A candidate taxon, Category 1: information sufficient for federal listing by FWS. C2 = Also a candidate, Category 2: information insufficient for formal proposal for listing. C3c = Previously considered, but currently considered to be too common for listing. * = presumed extinct. SC = species of special concern.

CDFG (1998): E = Endangered, R = Rare, T = Threatened; as designated by CDFG (1992).

Habitat, Elevation, Flowering Period: As reported in Munz and Keck (1959), Munz (1968), Skinner and Pavlik, ed.s (1994), Hickman, J.C., Ed. 1993, and/or Abrams and Ferris (1923 - 1951).

Not including plants of chaparral, forest, or coastal habitats

Table 2. Plant Species List, Luther Burbank Center for the Arts, Santa Rosa

FAMILY	Name/Jepson	COMMON NAME
\lismataceae	Alisma plantago-aquatica	water-plantain
Apiaceae	Conium maculatum	poison hemlock
	Daucus carota	Queen Anne's lace
	Daucus pusillus	wild carrot
	Foeniculum vulgare	fennel
	Lepidium nitidum	shining peppergrass
	Torilis nodosa	hedge parsley
Apocynaceae	Apocynum cannabinum	Indian hemp
Asteraceae	Achillea millefolium var. borealis	yarrow
	Achyrachaena mollis	blow-wives
	Anthemis cotula	mayweed
	Artemisia douglasiana	mugwort
	Baccharis pilularis ssp. consanguinea	coyote brush
	Bellis perennis	English daisy
	Carduus pycnocephalus	Italian thistle
	Cichorum intybus	chicory
	Cirsium arvense	Canada thistle
	Conyza canadensis	horseweed
	Filago gallica	filago
	Hemizonia congesta ssp. luzulifolia	hayfield tarweed
	Hemizonia fitchii	Fitch's tarplant
	Hypochaeris glabra	smooth cat's-ear
	Lactuca serriola	prickly lettuce
	Picris echioides	bristly ox-tongue
	Senecio vulgaris	common groundsel
	Silybum marianum	milk thistle
	Sonchus asper	prickly sow thistle
	Taraxacum officinale	dandelion
	Tragopogon dubius	oyster plant
	Xanthium strumarium	cocklebur
Boraginaceae	Amsinckia menziesii var. intermedia	fiddleneck, rancher's fireweed
	Plagiobothrys bracteatus	popcorn flower
Brassicaceae	Brassica nigra	black mustard
	Capsella bursa-pastoris	shepherd's purse
	Cardamine oligosperma	bitter cress
	Hirschfeldia incana	Mediterranean mustard
	Raphanus sativus	wild radish
	Rorippa islandica	yellow cress
Callitrichaceae	Callitriche marginata	water-starwort
Caryophyllaceae	Stellaria nitens	shining chickweed
Chenopodiaceae	Atriplex patula ssp. hastata	fat-hen

Source: C. Patterson, unpubl. field data, 1993-99

Table 2. Plant Species List, Luther Burbank Center for the Arts, Santa Rosa

FAMILY	Name/Jepson	COMMON NAME
	Chenopodium album	lamb's quarters
Convolvulaceae	Convolvulus arvensis	field morning-glory, bindweed
Cyperaceae	Cyperus eragrostis	umbrella or flat sedge
	Eleocharis macrostachya	pale spikerush
Euphorbiaceae	Eremocarpus setigerus	dove weed
Fabaceae	Lotus corniculatus	common bird'sfoot trefoil
	Lotus purshianus	Spanish clover
	Lupinus bicolor ssp. pipersmithii	Lindley's annual lupine
	Lupinus nanus var. latifolius	sky lupine
	Medicago polymorpha	bur-clover
	Melilotus indica	yellow sweetclover
	Trifolium depauperatum	dwarf-sac clover
	Trifolium fragiferum	strawberry clover
	Trifolium hirtum	rose clover
	Trifolium subterraneum	subterranean clover
	Trifolium wildenovii	tomcat clover
	Vicia sp.	vetch
	Vicia villosa ssp. varia	winter vetch
Fagaceae	Quercus agrifolia	coast live oak
	Quercus lobata	valley oak
Gentianaceae	Centaurium trichanthum	centaury
Geraniaceae	Erodium botrys	long-bearded storksbill
	Erodium cicutarium	cut-leaf filaree
	Geranium dissectum	cut-leaf geranium
	Geranium molle	dove's foot geranium
Juncaceae	Juncus bufonius ssp. bufonius	toad rush
	Juncus patens	spreading rush
	Juncus phaeocephalus var. paniculatus	iris-leaved rush
	Juncus tenuis	slender rush
Juncaginaceae	Lilaea scilloides	flowering quillwort
Lamiaceae	Lamium purpureum	dead nettle
	Marrubium vulgare	horehound
	Mentha pulegium	common mint, pennyroyal
	Stachys sp.	hedge-nettle
Liliaceae	Brodiaea elegans	harvest brodiaea
	Chlorogalum pomeridianum	soap plant
	Triteleia hyacinthina	white brodiaea
Lythraceae	Lythrum hyssopifolia	hyssop-leaved loosestrife
Malvaceae	Malva neglecta	mallow
	Malvella leprosa	alkali mallow
Onagraceae	Camissonia ovata	sun cups

Source: C. Patterson, unpubl. field data, 1993-99

Table 2. Plant Species List, Luther Burbank Center for the Arts, Santa Rosa

FAMILY	Name/Jepson	COMMON NAME
	Epilobium brachycarpum	willow-herb
	Epilobium torreyi	narrow-leaved boisduvalia
Papaveraceae	Eschscholzia californica	California poppy
Plantaginaceae	Plantago lanceolata	narrow-leaved plantain, ribwort
Poaceae	Agrostis alba	redtop
	Aira caryophyllea	annual or European hairgrass
	Anthoxanthum aristatum	vernal grass
	Avena barbata	slender wild oat
	Avena sativa	cultivated oat
	Briza maxima	quaking grass
	Briza minor	little quaking grass
	Bromus carinatus	California brome
	Bromus diandrus	ripgut
	Bromus hordeaceus	soft chess
	Bromus madritensis ssp. rubens	red brome or foxtail chess
	Cortaderia sellanoana	pampas grass
	Cynodon dactylon	Bermuda grass
	Dactylis glomerata	orchard grass
	Danthonia californica	California oatgrass
	Festuca arundinacea	tall fescue
	Glyceria occidentalis	western manna grass
	Holcus lanatus	velvet grass
	Hordeum brachyantherum	meadow barley
	Hordeum murinum ssp. gussoneanum	wild barley
	Hordeum murinum ssp. leporinum	mousetail barley
	Hordeum vulgare	common barley
	Leymus triticoides	creeping wildrye
	Lolium multiflorum	Italian ryegrass
	Paspalum dilatatum	Dallis grass
	Phalaris aquatica	Harding grass
	Pleuropogon californicus	California semaphore grass
	Poa annua	annual bluegrass
	Polypogon monspeliensis	rabbit-foot grass
	Taeniatherum caput-medusae	Medusa-head
	Vulpia microstachys	annual fescue
Polygonaceae	Polygonum arenastrum	common knotweed, doorweed
	Rumex acetosella	sheep sorrel
	Rumex conglomeratus	clustered dock
	Rumex crispus	curly dock
	Rumex pulcher	fiddle dock
Portulacaceae	Calandrinia ciliata	red maids

Source: C. Patterson, unpubl. field data, 1993-99

Table 2. Plant Species List, Luther Burbank Center for the Arts, Santa Rosa

FAMILY	Name/Jepson	COMMON NAME
	Claytonia perfoliata	miner's lettuce
Primulaceae	Anagallis arvensis	scarlet pimpernel
Ranunculaceae	Ranunculus californicus	California buttercup
	Ranunculus muricatus	roughseed buttercup
Rosaceae	Rubus discolor	Himalayan blackberry
Rubiaceae	Galium aparine	bedstraw, goose grass
Salicaceae	Populus albus	silver poplar
	Salix babylonica	weeping willow
	Salix hindsiana ?	sandbar willow
	Salix lasiolepis	arroyo willow
Scrophulariaceae	Kickxia elatine	fluellin
	Parentucellia viscosa	yellow parentucellia
	Triphysaria pusilla	dwarf owl's clover
	Triphysaria versicolor ssp. faucibarbata	owl's clover
	Veronica peregrina ssp. xalapensis	purslane speedwell
Taxodiaceae	Sequoia sempervirens	redwood
Typhaceae	Typha angustifolia	narrow-leaved cattail
Verbenaceae	Phyla nodiflora	lippia

Source: C. Patterson, unpubl. field data, 1993-99

Appendix D3

California Tiger Salamander (Ambystoma Californiense) Survey 2005-2006, Santa Rosa Medical Center Project Site, Santa Rosa, California

California Tiger Salamander (*Ambystoma californiense*) Survey 2005-2006 Santa Rosa Medical Center Project Site Santa Rosa, California

June 12, 2006

Report prepared for:

U.S. Fish and Wildlife Service
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Figure 3. Aerial Photograph of Sutter Medical Center of Santa Rosa with CTS drift fence location.

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Table 1. Summary of the number and status (dead/alive) of vertebrates captured in pitfall traps for 2005-2006.

APPENDICES

Appendix A. Daily weather data collected from the official National Weather Service station in Santa Rosa, California.

1. INTRODUCTION

On behalf of Sponamore Associates representing Sutter Medical Center of Santa Rosa, Monk & Associates, Inc. (M&A) has completed field surveys for the Sonoma County "distinct population segment" of the California tiger salamander (*Ambystoma californiense*) (CTS) on the Sutter Medical Center of Santa Rosa/Luther Burbank Center project site located at the junction of Highway 101 (101) and Mark West Springs Road (MWS Road), east of Highway 101 and south of MWS Road in Santa Rosa, Sonoma County, California. This project site is approximately 53 acres and consists of three legal parcels with the following Assessor's Parcel Numbers: 58-040-027, 58-040-026, and 58-040-045.

The project site falls within the U.S. Fish and Wildlife Service (USFWS) mapped range of the CTS in Sonoma County (USFWS 2002b). Accordingly, USFWS determined that the project site provides habitat that potentially could be used by CTS and required the project proponent to conduct focused field surveys pursuant to the USFWS' October 2003 *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander.*

The field survey was conducted using the detection methods required in the joint USFWS and California Department of Fish and Game guidelines for conducting field surveys for the Sonoma County "distinct population segment" of the CTS (USFWS 2003b). Per the guidelines, for project sites that could provide CTS aestivation habitat (i.e., over-summering habitat) and potential breeding habitats, applicants are required to conduct drift fence/pitfall trapping studies over one winter season bracketed by larval surveys during the Spring preceding and following the winter survey. The first Spring larval survey was conducted March-May 2005, the winter pitfall survey began on October 15, 2005 and ended on March 15, 2006, and the final Spring larval survey occurred March-May 2006.

No CTS were observed or captured in pitfall traps on the project site at any time during the 2005/2006 surveys. Additionally, no CTS larvae were observed or captured during the focused larval surveys of the aquatic habitats on the project site.

2. PROPOSED PROJECT

The project site is the proposed relocation site for the Sutter Medical Center of Santa Rosa. Existing single family homes, parking stalls, vineyard, and two water treatment ponds would be redeveloped as part of the project. The proposed Sutter Medical Center would include two independent structures; Sutter Hospital and an adjacent medical office building. The remainder of the parcel would be utilized as parking, landscaping, and mitigation for impacts to wetlands.

3. PROJECT SITE LOCATION/SETTING

The approximately 53-acre project site is located immediately east of Highway 101, south of Mark West Springs Road (Figures 1-3). The northern edge borders Mark West Springs Road and high density residential development. The eastern edge borders high density residential housing and cultivated vineyard. The southwestern edge borders Highway 101 and cultivated vineyard.

4. LEGAL STATUS OF THE CALIFORNIA TIGER SALAMANDER (CTS)

The U.S. Fish and Wildlife Service (USFWS) listed the Sonoma County "distinct population segment" of the CTS as endangered on March 19, 2003 (USFWS 2003a). USFWS determined that this population is significantly and immediately imperiled by a variety of threats including habitat destruction, degradation, and fragmentation due to urban development, road construction, pesticide drift, collection, and inadequate regulatory mechanisms. In addition, it was determined that this population could face extinction as a result of naturally occurring events (e.g., fires, droughts) due to the small and isolated nature of the remaining breeding sites combined with the small number of individuals in the population.

In addition to its legal status as a federal listed endangered species, the CTS is also a California "species of special concern." This title affords the CTS no legally mandated protection; however, pursuant to CEQA (14 CCR §15380), this species must be considered in any project that will undergo, or is currently undergoing, CEQA review, and/or any project that must obtain a discretionary environmental permit(s) from a public agency (e.g., County Planning Department). The CTS is also protected under Title 14 of the California Code of Regulations (CCR). Under Title 14, CCR 41 (1996), CTS is a protected amphibian that may only be taken or possessed under a special permit issued by the California Department of Fish and Game (CDFG) pursuant to sections 650 and 670.7 of these regulations, or Section 2081 of the Fish and Game Code.

5. CTS HABITAT REQUIREMENTS

CTS occur in grasslands and open oak woodlands that provide suitable aestivation and/or breeding habitats. M&A have worked with populations that are almost at sea level (Catellus Site in the City of Fremont) to almost 2,900 feet above sea level (Kammerer Ranch, East Santa Clara County). CTS spend the majority of their lives underground. They typically only emerge from their subterranean refugia for a few nights each year during the rainy season to migrate to breeding ponds. CTS may migrate up to 0.6-mile or further from their underground refugia to breeding ponds (personal data; Monk & Lynch 1997). As such, unobstructed migration corridors are important component of CTS habitat.

In Sonoma County, CTS emerge during the first heavy, warm rains of the year, typically in late November and early December. In most instances, larger movements of CTS do not occur unless it has been raining hard and continuously for several hours. Typically, for larger movements of CTS to occur nighttime temperatures also must be above 48° F (G. Monk and S. Lynch pers. observations). Other factors that encourage larger movements of CTS to their breeding ponds include flooding of refugia (observed by G. Monk in Springtown, east Alameda County in 1997).

During the spring, summer, and fall months, most known populations of the CTS predominately use California ground squirrel (*Spermophilus beechyi*) burrows as aestivation habitat (G. Monk personal observation). Other secondary subterranean refugia, or primary refugia where California ground squirrels are absent, likely include Botta's pocket gopher (*Thomomys bottae*) burrows, deep fissures in desiccated clay soils, and debris piles (e.g. downed wood, rock piles). In Sonoma County within the range of the CTS, California ground squirrel colonies are very repressed or non-existent. CTS refugia are therefore less well understood in Sonoma County, but in general, are believed to be provided by Botta's pocket gopher burrows, deep fissures in desiccated clay soils, and to some extent by debris piles.

Currently the only common truly fossorial (i.e., those animals with a life cycle that is predominately lived underground) rodent in the range of the CTS in Sonoma County is Botta's pocket gopher. These rodents typically only open their burrows to feed, closing their burrows shortly after consuming available suitable forage. In most instances, pocket gophers will feed from below ground, pulling tuberous vegetation down into their burrows for consumption. Sometimes at night they will leave their burrows traveling only a few feet to graze on the above ground forage of non-tuberous plants. The pocket gopher's behavior of meticulously closing burrows, especially in times of inclement weather when storm events potentially can cause in-burrow flooding, do not leave CTS many opportunities to use their burrows. Since most CTS migrate at night during large storm events to and from their breeding ponds, the likelihood of CTS being able to readily exit or re-enter open gopher burrows in storm events is greatly diminished. For this reason, the importance of the relationship between the Sonoma County "distinct population segment" of the CTS and the Botta's pocket gopher is likely to be far less than the relationship of the CTS to the California ground squirrel in other parts of the CTS' range. Since this ground squirrel always maintains its burrows to remain open.

Stock ponds, seasonal wetlands, and deep vernal pools typically provide most of the breeding habitat used by CTS. In such locations, CTS attach their eggs to rooted, emergent vegetation, and other stable filamentous objects in the water column. Eggs are gelatinous and are laid singly or occasionally in small clusters. Eggs range in size from about ¾ the diameter of a dime to the full diameter of a dime.

Occasionally CTS are found breeding in slow moving, streams or ditches. In 1997, Mr. G. Monk observed CTS breeding in large, still ditches in Fremont, California. Similarly, in 2001/2002, Mr. D. Wooten observed CTS breeding in a roadside ditch in Cotati, California (D. Wooten, pers. comm. w/ Mr. G. Monk). Ditches and/or streams that are subject to rapid flows, even if only on occasion, typically will not support or sustain CTS egg attachment through hatching, and thus, are not usually used successfully by CTS for breeding (G. Monk and S. Lynch, pers. observation). Similarly, streams and/or ditches that support predators of CTS or their eggs and larvae such as fish, bullfrogs (*Rana catesbeiana*), red swamp crayfish (*Procambarus clarkii*), or signal crayfish (*Pacifastacus leniusculus*), almost never constitute suitable breeding habitat.

In most of the northern range of the CTS, seasonal wetlands that are used for breeding typically must hold water into the month of May to allow enough time for larvae to fully metamorphose. In dry years, seasonal wetlands may dry too early to allow enough time for CTS larvae to successfully metamorphose. Under such circumstances, desiccated CTS larvae can be found in dried pools. In addition, as pools dry down to very small areas of inundation, CTS larvae become concentrated and are very susceptible to predation. In the past, G. Monk has observed drying pool predation by red-sided garter snakes (*Thamnophis sirtalis infernalis*), ducks (various spp.), wild pigs (*Sus scrofa*), and raccoons (*Procyon lotor*). However, in years exhibiting wet springs, these same dryer pools can remain hydrated long enough through continual rewetting to allow CTS larvae ample time to successfully metamorphose.

6. PROJECT SITE DESCRIPTION

The Sutter Medical Center Relocation project site is located on and adjacent to the Luther Burbank Center for the Performing Arts. Figure 4 at the back of this report shows the various land uses within the project site boundary. The largest use of the property is developed as either paved parking, paved roads, buildings, and/or manicured landscaping totaling approximately 25 acres. Soccer fields and other non-irrigated turf areas cover another 8.1 acres. The remaining 19.9 acres is best classified as undeveloped and ruderal. Of the 19.9 acres, 11.8 acres are an open ruderal field on the west edge of the project area that is currently used as horse pasture. The developed parcel immediately east of the pasture will be redeveloped from a single family house and horse barn, two water treatment ponds, and paved parking into the new Sutter Medical Facility. Immediately east of the entrance road to the LBC is an irrigated turf field used for soccer and lacrosse. A water retention pond is located on the southern edge of soccer fields, north of the LBC. The retention pond is fed by an underground culvert that conveys surface water collected from the northeast area of the project site. The pond attains a maximum depth of approximately 3 feet and is surrounded by willow (*Salix* sp.). East of the pond is a hydrologically connected water collection basin that, based on "bathtub rings" appears to hold approximately 1.5 feet of water. Property at the southern edge of the Luther Burbank Center consists exclusively of vineyard bisected by an intermittent storm water swale.

Vegetation on the project site is dominated by a variety of ornamentals and weedy species such as Monterey pine (*Pinus radiata*), cut-leaf geranium (*Geranium dissectum*), pampas grass (*Cortaderia sp.*), Harding grass (*Phalaris aquatica*) and Himalayan blackberry (*Rubus discolor*). Curley dock (*Rumex crispus*) can be found along fences and scattered throughout the 11.8 acre pasture.

There is a minimal amount of seasonal wetland on the project site. Much of the seasonal wetland along the western border consists of areas where the ground saturates and inundates 3-5 inches during heavy rain events. This was typical of the 2005/2006 season. However, there is rapid drainage off the site and the pools drain in a matter of a few days after rains cease. The wetland areas fluctuated dramatically throughout the 2005/2006 season depending on weather patterns. Due to heavy rains, a few areas were inundated during the March 15, 2006 closing date.

7. CTS SURVEY METHODS

7.1 Trapping

M&A received an amendment to its federal 10(A)(1)(a) permit TE-776608 authorizing M&A to conduct surveys for the Sonoma County "distinct population segment" of the CTS. Authorization to conduct spring larval surveys at the LBC site was granted by Mr. Vincent Griego in a March 22, 2005 email correspondence and approval of the drift fence survey was also confirmed by Mr. Griego in a September 7, 2005 email. Field surveys were conducted by M&A 10(A)(1)(a) authorized biologists Mr. Geoff Monk, Mr. Geoff Thomas, Ms. Sandy Etchell, Mrs. Hope Kingma, Ms. Melisa Scheele, Ms. Stephanie Scolari, Ms. Kimberly Debriansky, and Dr. Monte Kirven according to permit conditions.

The field survey was conducted following guidelines prescribed in the USFWS' October 2003 *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative*

Finding of the California Tiger Salamander. The guidelines required the use of drift fencing in combination with pitfall traps as a means of determining the presence of CTS at sites where they may be affected by development projects.

In the 2005/2006 trapping season drift fences were installed by October 15, 2005 prior to the onset of heavy seasonal rains. Trapping was completed on March 15, 2006, and trap line removal began immediately thereafter with full removal accomplished by April 1, 2006. The drift fence was approximately 6,550 feet in length and contained a total of 218 pitfall traps. The fencing layout is depicted in Figure 3 (behind tab at back of report).

The drift fence was constructed of UV resistant silt fencing and Vexar® construction material that was buried in a 6-inch trench and raised vertically 24-inches above ground level. Vexar® was used during the 2005/2006 trapping year in areas of expected inundation or flow. The Vexar® drift fence was secured to wooden stakes with one-half inch staples. The stakes were installed at approximately 6-foot intervals. Silt fencing has factory preinstalled stakes every 10 feet. These stakes were supplemented with mid-stakes. Pitfall traps consisted of five-gallon buckets that were buried so that the lip of each bucket was close to flush with the ground. Pea gravel was mounded up to a slightly raised bucket edge to make a smooth transition to the pit, but at the same time would shed sheet water flows away from the pit. Additionally, a 2" x 3" piece of movable flashing was attached to the fencing on either side of pitfall traps. This flashing filled any gap at the bucket/fence interface and also compensated for minor shifting and settling of the buckets and/or fence.

Pit-fall traps were spaced at 30-foot intervals along the length of the drift fence. A trap was placed at the beginning and end of each trapping line, and at corners or junctions. Manufacturer supplied bucket lids were modified so that they could be turned over and fitted into a raised position above the bucket openings. To accomplish this, 2"x 4" fir boards were cut into 18" lengths and then attached to the lids parallel, six inches apart. Wood screws were used to attach the boards to the lids. Finally, a piece of twine was attached to one of the boards so that when the trap was set the string would dangle to the bottom of the open bucket. This string was installed to help inadvertently trapped rodents escape the buckets.

When traps were set, the raised position of the lids over the buckets were designed to allow CTS (and other animals) to enter the buckets, and at the same time shield the bucket from rainfall and trapped animals from predators. The flashing was rotated in and out of position when opening and closing traps. To close the traps, lids were simply turned over and positioned on the buckets as the manufacturer intended.

All pitfall traps were set (i.e. opened) in the late afternoon/early evening (3:30-6:30 p.m.) on appropriate days. The following criteria were used to determine when traps should be opened (USFWS 2003):

1. Beginning on or before October 15, pitfall buckets should be opened before sunset if there was any rain during the day or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability (based on the nearest National Weather Service forecast.

2. Traps should be open each night and checked each morning until no rain has fallen within the preceding 24 hours. Nights of high relative humidity (greater than 75% relative humidity) should be considered equivalent to rain events once onsite or nearby seasonal wetlands have become inundated with standing water, regardless of its depth, surface area, or duration.

3. The above guidance was to be followed until 20 nights of surveying under the proper conditions has been conducted. After 20 nights of surveying is completed, and until March 15, pitfall buckets are to be opened before sunset if there was any rain during the day, or if at 2 PM rain is forecast for the remainder of the day or subsequent night with 70% or greater probability. Traps are to be checked the next morning, and unless it is still raining or more rain is forecast, the traps are to be closed until the next rain event.

In order to keep the drift fences and pitfall traps in good condition, as required by USFWS, it was necessary to conduct various maintenance tasks over the course of the field survey. This was especially necessary after periods of unusually heavy rains combined with strong winds that characterized December 2005 to early January 2006 and late February 2006. When necessary, drift fences and pitfall traps were always repaired the afternoon before setting traps. Maintenance measures including replacing sections of degraded silt fence and replacing pea gravel that had eroded away from the rims of buckets (i.e. pit fall traps). Finally, as the trapping seasons progressed and as soils swelled or shrank if buckets shifted or floated to ground level they were reinstalled to the original specifications.

7.2 Larval Survey

The LBC project site contains one pond that could be potential habitat to be used for breeding by CTS. Larval surveys were conducted using wire funnel traps in accordance with protocol on three consecutive days in March, April, and May 2005 and 2006 for a total of 15 trapping days. The first dip net larval survey was conducted on March 29, 2005; at that time we determined that it was necessary to also funnel trap the detention basin. Funnel traps were approved for use by Mr. Griego and installed for 2, 3-day trapping periods over the remainder of the 2005 season, and 3, 3-day periods over the 2006 season. Traps were set and monitored April 12-15 and May 26-29, 2005. During Spring 2006 funnel traps were set and monitored March 5-8, April 1-4, May 11-14. Additionally, all aquatic habitats including drainage ditches and swales were dip-netted according to survey protocols for a total of 6 dip net surveys at the project site.

With the exception of the detention pond standing water on the site lasted only during heavy storm events and receded within a few day of dry, warm weather. Standing water was still present at the end of the 2005/2006 survey season due to unusually high rainfall; however, standing water that was present during this period and other periods was regularly visually surveyed as part of the trap checking procedure.

8. SURVEY RESULTS

8.1 Drift Fence Survey Results

No CTS were captured in pitfall traps on the LBC project site during the 2005/2006 survey period. During the 2005/2006 season pitfall traps were opened/checked a total of 58 times. Pitfall traps were partially installed by October 15, 2005 and opened for the first rain event on October 26, 2005, and checked for the last time on March 15, 2006. The total number of days traps were set during the months of October, November, December, January, February and March was 3, 8, 13, 14, 9 and 11, respectively. A summary of daily weather data (rainfall and low/high temperatures) collected at the official National Weather Service station in Santa Rosa, California is provided in Appendix A (behind tabs at back of report).

A total of twelve vertebrate species (6 mammals, 2 reptiles, and 4 amphibians) were captured in pitfall traps set at the project site. Animals captured included: California meadow voles (*Microtus californicus*), Botta's pocket gopher (*Thomomys bottae*), Western harvest mouse (*Reithrodontomys megalotis*), deer mouse (*Peromyscus maniculatus*), house rat (*Rattus rattus*), Ornate shrew (*Sorex ornata*), Western fence lizard (*Sceloporus occidentalis*), alligator lizard (*Elgaria coerulea),* Pacific tree frogs (*Hyla regilla*), arboreal salamander (*Aneides lugubris*), western toad (*Bufo boreas)* and California slender salamander (*Batrachoseps attenuatus*) (Table 1 behind tabs at back of report). A total of 729 animals were captured during the 2005/2006 trapping season. Of these animals, 367 of 729 were captured alive and released.

8.2 Egg and Larval Surveys

No CTS adult, larval, or eggs were observed during trap check visual surveys or protocol level dip net surveys. The only amphibian found in the pond was Pacific tree frog. Larvae, eggs, and metamorphs of this frog were found in all survey years. Surprisingly, there were no western toad (*Bufo boreas*) eggs or larvae in the pond any survey year. All other captures were limited to Notonectids, Corixids, dragonfly larvae, snails, Dytiscids, and scuds.

The table following on the next page summarizes the results of all dip net and funnel surveys conducted in March, April and May 2005 and 2006:

Date	Feature	Survey Methods	Species Observed
29-Mar-05	Pond, swales, ditches	Observation/Dip Net	Notonectids, Corixids, *Hyla* eggs, snails, Dytiscids
4/13-15/2005	Pond, swales, ditches	Dip Net/Funnel Trap	Notonectids, Corixids, dragonfly larvae, *Hyla* larvae, snails
5/27-29/2005	Pond, swales, ditches	Dip Net/Funnel Trap	Notonectids, Corixids, dragonfly larvae, *Hyla* larvae, snails, Dytiscids
3/6-8/2006	Pond, swales, ditches	Dip Net/Funnel Trap	Notonectids, Corixids, dragonfly larvae, snails, Dytiscids, scuds
4/1-3/2006	Pond, swales, ditches	Dip Net/Funnel Trap	Notonectids, Corixids, *Hyla* eggs, snails, Dytiscids, Chironomids, damselfly larvae
5/12-13/2006	Pond, swales, ditches	Dip Net/Funnel Trap	Notonectids, Corixids, dragonfly larvae, *Hyla* larvae, snails, Dytiscids, scuds

9. DISSCUSION AND CONCLUSIONS

M&A found no evidence of CTS during two spring larval surveys and one full season of drift fence pitfall trapping at the project site located at the junction of Highway 101 and Mark West Springs Road in Santa Rosa. Based on these findings it is our conclusion that CTS do not reside within upland habitats on the project site or use the project site's aquatic habitats for breeding. Therefore it is our belief that this project will not affect CTS. This concludes the CTS trapping effort at the Santa Rosa Medical Center project site.

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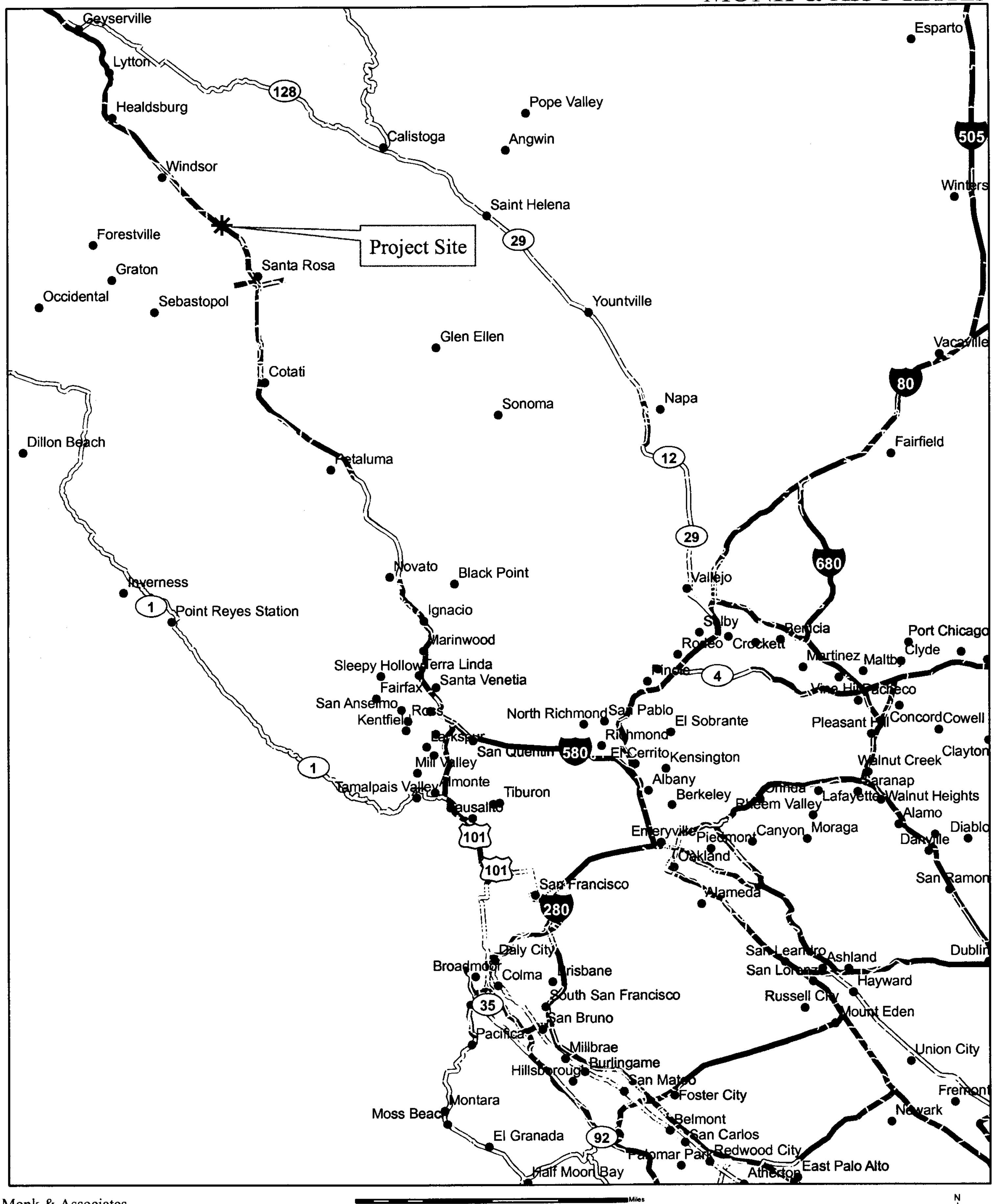

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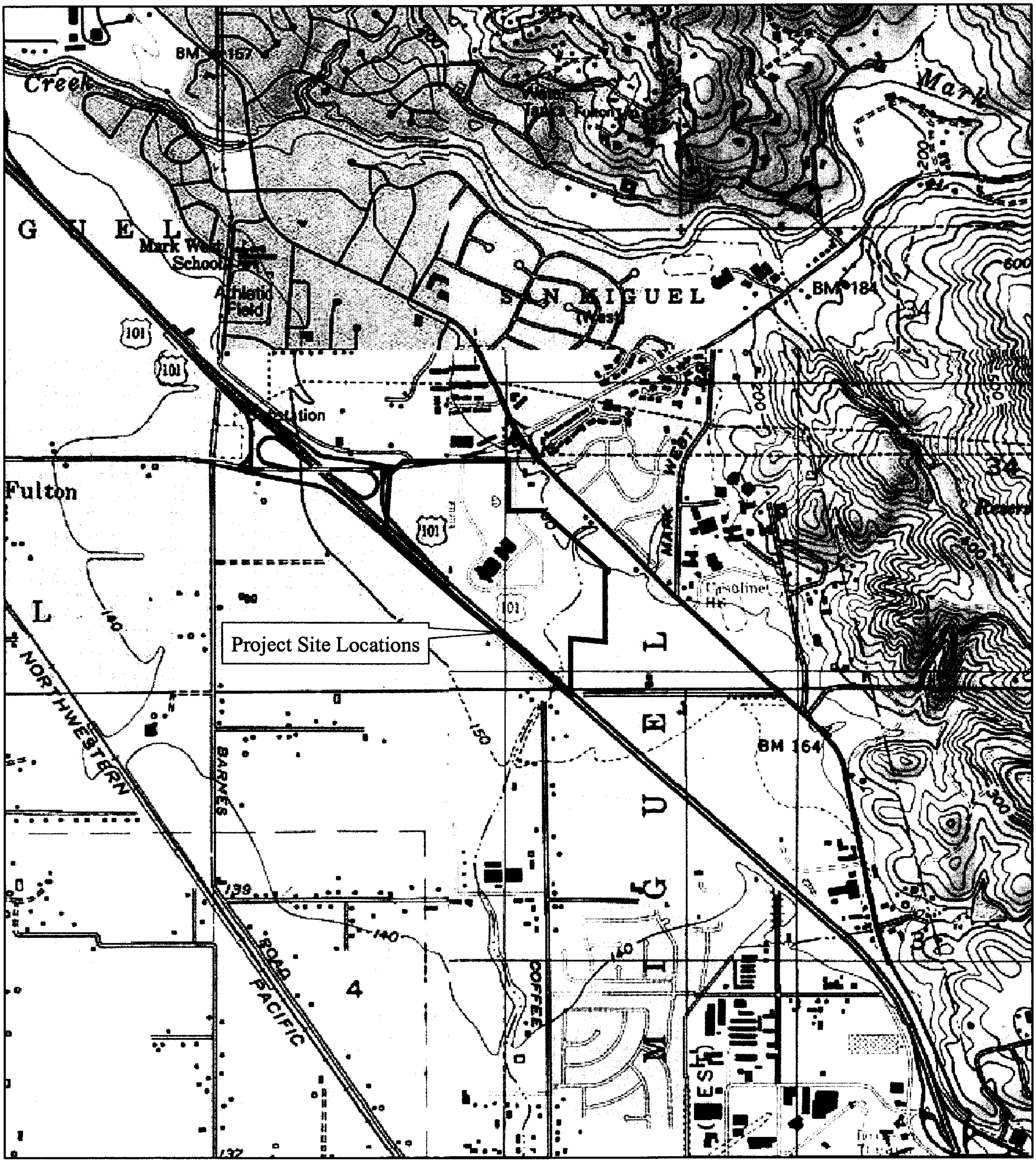
Figure 1. Sutter Medical Center Project Site
Santa Rosa, California

County: Sonoma
Map Preparation Date: June 12, 2006



7.5-Minute Quadrangle: Santa Rosa and Sebastapol
Source: National Geographic Holdings, Inc.
USGS Topographic Maps, 2001

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Figure 2. Sutter Medical Center Site Location Map
Santa Rosa, California

N
W E
S

Table 1. Summary of the number and status (alive/dead) of vertebrates captured in pitfall traps during the 2005/2006 trapping seasons at the LBC-Vineyard project site in Santa Rosa.

Left column alive / right column dead

Trap Days	DATE	# of CTS		# of PTF		# of CMV		# of CSS		# of BPG		Other species
1	10/27/2005	0	0	2	0	1	0	0	0	0	0	0
2	10/28/2005	0	0	3	0	7	0	0	0	0	0	5-harvest mice
3	10/29/2005	0	0	1	0	3	0	0	0	1	0	2-aborial salamanders
4	11/4/2005	0	0	4	0	3	0	1	0	0	0	0
5	11/7/2005	0	0	0	0	5	0	0	0	0	0	0
6	11/8/2005	0	0	0	0	0	0	0	0	0	0	0
7	11/9/2005	0	0	0	0	5	0	2	0	0	0	0
8	11/25/2005	0	0	1	0	12	2	1	0	0	0	1-deer mouse
9	11/26/2005	0	0	0	0	4	0	0	0	0	0	1-dead deer mouse
10	11/29/2005	0	0	0	0	7	2	0	0	0	0	1-harvest mouse
11	11/30/2005	0	0	0	0	0	0	0	0	0	0	1-dead deer mouse
12	12/1/2005	0	0	0	0	17	8	0	0	0	0	0
13	12/2/2005	0	0	4	0	5	3	2	0	0	0	0
14	12/8/2005	0	0	1	0	0	0	1	0	0	0	0
15	12/18/2005	0	0	0	0	0	0	0	0	0	0	0
16	12/19/2005	0	0	2	0	3	8	0	0	0	0	0
17	12/20/2005	0	0	6	0	2	3	0	0	0	0	0
18	12/21/2005	0	0	17	0	6	3	0	0	0	0	1-aligator lizard
19	12/22/2005	0	0	13	0	5	5	1	0	0	0	0
20	12/23/2005	0	0	1	0	1	2	5	2	0	0	0
21	12/28/2005	0	0	24	0	8	25	5	0	0	2	3-dead harvest mice
22	12/29/2005	0	0	28	0	2	5	0	0	0	0	1-W. fence lizard
23	12/30/2005	0	0	9	0	3	1	0	0	0	0	0
24	12/31/2005	0	0	11	0	1	22	0	0	2	9	1-harvest mouse
25	1/1/2006	0	0	13	0	1	0	0	0	0	0	0
26	1/2/2006	0	0	15	0	5	1	0	0	0	0	0
27	1/3/2006	0	0	5	0	2	1	0	0	0	0	1-house mouse
28	1/4/2006	0	0	5	1	0	1	0	2	0	0	0
29	1/7/2006	0	0	4	0	1	0	0	0	1	0	1-dead house mouse
30	1/11/2006	0	0	10	0	2	1	0	0	0	0	1-dead aligator lizard
31	1/14/2006	0	0	1	0	0	1	0	1	0	0	0
32	1/15/2006	0	0	2	0	1	0	0	1	0	0	0
33	1/18/2006	0	0	5	0	1	1	0	0	0	0	0
34	1/19/2006	0	0	4	0	0	0	0	0	0	0	0
35	1/28/2006	0	0	2	0	1	0	0	0	0	0	0
36	1/29/2006	0	0	5	2	0	0	0	0	0	0	0
37	1/30/2006	0	0	5	1	0	0	0	0	0	0	0
38	1/31/2006	0	0	2	1	0	0	0	0	0	0	2-harvest mice
39	2/1/2006	0	0	3	0	0	1	0	0	0	0	1-harvest mouse
40	2/2/2006	0	0	7	0	0	1	0	0	1	0	1-harvest mouse
41	2/3/2006	0	0	0	0	0	0	0	0	0	0	1-dead house mouse
42	2/4/2006	0	0	7	0	1	0	0	0	0	0	1-harvest mouse
43	2/5/2006	0	0	5	0	0	0	0	0	0	0	0
44	2/18/2006	0	0	4	1	0	0	0	0	0	0	5-dead harvest mice, 1-dead
45	2/19/2006	0	0	0	0	0	1	0	1	0	0	2-dead harvest mice
46	2/27/2006	0	0	0	0	0	1	0	0	0	0	0
47	2/28/2006	0	0	5	0	0	13	0	0	0	0	5-dead harvest mice, 1-aligator lizard
48	3/1/2006	0	0	5	0	0	2	0	2	0	0	0

Trap Days	DATE	# of CTS		# of PTF		# of CMV		# of CSS		# of BPG		Other species
49	3/2/2006	0	0	4	0	0	1	0	0	0	0	1-dead rat, 1-dead harvest mouse, 1-aligator lizard
50	3/3/2006	0	0	0	0	0	1	0	1	0	0	0
51	3/4/2006	0	0	0	0	0	0	0	0	0	0	0
52	3/5/2006	0	0	0	0	0	0	0	0	0	0	0
53	3/6/2006	0	0	0	0	0	0	0	0	0	0	0
54	3/7/2006	0	0	6	1	0	2	0	0	0	0	0
55	3/8/2006	0	0	0	0	0	0	0	0	1	0	1-rat, 1-fence lizard
56	3/11/2006	0	0	0	0	0	0	0	0	0	0	1-dead rat
57	3/14/2006	0	0	0	0	0	4	0	0	0	1	1-dead rat
58	3/15/2006	0	0	0	0	0	0	0	0	0	0	0
	Total	**0**	**0**	**251**	**7**	**115**	**122**	**18**	**10**	**6**	**12**	**47**

CTS-California tiger salamander (*Ambystoma californiense*);
PTF-Pacific tree frog (*Hyla regilla);*
CMV-California meadow vole (*Microtus californicus*);
CSS-California slender salamander (*Batrachoseps attenuatus*);
BPG-Botta's pocket gopher (*Thomomys bottae*);
Western harvest mouse (*Reithrodontomys megalotis*).
Ornate shrew (*Sorex ornata*)

Table 1. Summary of the number and status (alive/dead) of vertebrates captured in pitfall traps during the 2005/2006 trapping seasons at the LBC project site in Santa Rosa.

Left column alive / right column dead

Trap Days	DATE	# of CTS		# of PTF		# of CMV		# of CSS		# of BPG		Other species
1	10/27/2005	0	0	26	1	2	1	0	0	0	0	2-deer mice 1-aligator lizard
2	10/28/2005	0	0	3	0	7	0	0	0	0	0	5-harvest mice
3	10/29/2005	0	0	1	0	3	0	0	0	1	0	2-aborial salamanders
4	11/4/2005	0	0	0	0	3	1	5	0	1	0	0
5	11/7/2005	0	0	1	0	3	0	3	0	0	0	0
6	11/8/2005	0	0	1	0	19	7	1	0	1	0	0
7	11/9/2005	0	0	1	0	4	0	1	0	2	0	1-W. fence lizard, 1-aligator lizard
8	11/25/2005	0	0	0	0	15	2	0	0	0	0	0
9	11/26/2005	0	0	0	0	0	0	0	0	0	0	0
10	11/29/2005	0	0	0	0	22	4	0	0	0	0	1-dead shrew
11	11/30/2005	0	0	0	0	0	0	0	0	0	0	0
12	12/1/2005	0	0	0	0	11	3	0	0	0	0	0
13	12/2/2005	0	0	0	0	3	2	1	0	0	0	0
14	12/8/2005	0	0	1	0	0	5	0	0	1	0	0
15	12/18/2005	0	0	0	0	0	0	0	0	0	0	0
16	12/19/2005	0	0	0	0	2	6	3	0	0	0	0
17	12/20/2005	0	0	11	0	1	4	5	0	0	0	0
18	12/21/2005	0	0	5	0	2	2	1	0	0	0	1-western toad
19	12/22/2005	0	0	19	0	5	9	3	0	0	0	0
20	12/23/2005	0	0	17	0	4	6	5	2	0	0	0
21	12/28/2005	0	0	9	0	1	80	7	0	1	14	0
22	12/29/2005	0	0	8	0	0	5	0	0	1	0	0
23	12/30/2005	0	0	5	1	0	4	1	2	0	0	0
24	12/31/2005	0	0	3	0	0	31	0	0	0	23	1-western toad
25	1/1/2006	0	0	0	0	0	5	2	3	0	0	0
26	1/2/2006	0	0	0	0	0	7	2	7	1	1	1-western toad
27	1/3/2006	0	0	2	0	0	0	0	3	0	1	0
28	1/4/2006	0	0	1	0	0	1	0	0	0	1	0
29	1/7/2006	0	0	0	0	0	2	1	4	0	0	0
30	1/11/2006	0	0	3	0	0	1	3	1	0	0	0
31	1/14/2006	0	0	0	0	1	3	0	0	0	0	0
32	1/15/2006	0	0	1	0	0	0	0	2	0	0	0
33	1/18/2006	0	0	4	0	0	3	0	0	0	0	0
34	1/19/2006	0	0	0	0	0	0	0	0	0	0	0
35	1/28/2006	0	0	0	0	2	1	0	0	0	0	0
36	1/29/2006	0	0	0	0	0	4	1	0	0	0	0
37	1/30/2006	0	0	0	0	1	1	0	0	0	0	0
38	1/31/2006	0	0	0	0	0	0	0	2	0	0	0
39	2/1/2006	0	0	8	0	0	2	0	1	0	0	0
40	2/2/2006	0	0	3	0	0	0	0	0	1	0	0
41	2/3/2006	0	0	8	1	0	1	0	1	0	0	0
42	2/4/2006	0	0	4	0	2	2	0	0	0	0	0
43	2/5/2006	0	0	1	0	2	1	0	1	0	0	0
44	2/18/2006	0	0	4	1	0	0	0	0	0	0	5-dead harvest mice, 1-dead
45	2/19/2006	0	0	0	0	1	3	1	0	0	0	0
46	2/27/2006	0	0	3	0	0	15	0	1	0	0	0
47	2/28/2006	0	0	4	0	0	0	0	0	1	0	1-harvest mouse, 1-rat
48	3/1/2006	0	0	3	0	0	4	3	1	0	3	0
49	3/2/2006	0	0	1	0	0	11	0	2	0	1	0

Trap Days	DATE	# of CTS		# of PTF		# of CMV		# of CSS		# of BPG		Other species
50	3/3/2006	0	0	1	0	0	5	0	1	0	0	0
51	3/4/2006	0	0	1	0	0	0	0	0	0	0	0
52	3/5/2006	0	0	0	0	0	0	0	0	0	0	0
53	3/6/2006	0	0	0	0	0	0	0	0	0	0	0
54	3/7/2006	0	0	1	0	0	11	1	0	0	0	0
55	3/8/2006	0	0	0	0	0	1	0	2	0	0	0
56	3/11/2006	0	0	0	0	0	0	0	0	0	0	0
57	3/14/2006	0	0	2	0	1	18	0	0	0	0	0
58	3/15/2006	0	0	0	0	1	2	0	1	0	0	0
	Total	**0**	**0**	**166**	**4**	**118**	**276**	**50**	**37**	**11**	**44**	**24**

CTS-California tiger salamander (*Ambystoma californiense*);
PTF-Pacific tree frog (*Hyla regilla);*
CMV-California meadow vole (*Microtus californicus*);
CSS-California slender salamander (*Batrachoseps attenuatus*);
BPG-Botta's pocket gopher (*Thomomys bottae*);
Western harvest mouse (*Reithrodontomys megalotis*).
Ornate shrew (*Sorex ornata*)

Appendix A. 2005/2006 Daily weather data collected from the official National Weather Service station in Santa Rosa, California.

Date	OCT			NOV			DEC			JAN			FEB			MAR		
	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain
	High	Low	(in)	High	Low	(in)	High	Low	(in)	Hish	Low	(in)	High	Low	(in)	High	Low	(in)
1	78	45	0.00	70	42	0.00	60	46	1.93	56	45	1.52	56	48	0.41	59	37	0.47
2	73	38	0.00	66	41	0.00	56	35	0.00	55	40	0.25	63	51	0.02	57	35	0.07
3	71	37	0.00	62	38	0.24	57	31	0.00	52	37	0.71	58	49	0.01	52	36	0.49
4	77	34	0.00	66	44	0.01	56	30	0.00	63	45	0.00	60	43	0.10	56	34	0.00
5	84	36	0.00	66	38	0.00	60	30	0.00	64	41	0.01	66	34	0.00	51	47	2.68
6	80	39	0.00	62	50	0.06	59	26	0.00	63	41	0.08	67	36	0.00	56	44	0.62
7	78	42	0.00	63	50	1.00	49	34	0.04	59	45	0.01	73	37	0.01	57	43	0.22
8	77	35	0.00	67	49	0.18	60	38	0.00	61	35	0.00	72	35	0.00	60	35	0.00
9	80	35	0.00	70	50	0.00	64	33	0.00	61	34	0.00	72	35	0.00	55	35	0.06
10	82	36	0.00	74	42	0.00	63	32	0.00	56	36	0.04	71	36	0.00	45	31	0.04
11	76	39	0.00	62	43	0.00	57	32	0.00	60	40	0.11	70	43	0.01	51	31	0.02
12	80	36	0.00	67	38	0.00	50	37	0.00	61	38	0.00	73	38	0.01	52	34	0.12
13	88	34	0.00	72	40	0.00	55	32	0.00	62	45	0.16	73	37	0.00	54	32	0.76
14	78	49	0.06	77	55	0.00	54	32	0.00	55	43	0.62	68	40	0.01	55	41	0.43
15	71	45	0.01	83	44	0.00	58	30	0.00	56	33	0.00	55	31	0.00	57	42	0.02
16	87	41	0.00	74	39	0.00	42	27	0.00	54	37	0.00	54	27	0.00	-	-	-
17	86	39	0.00	77	38	0.00	46	36	0.47	56	47	0.59	45	32	0.36	-	-	-
18	65	42	0.00	75	37	0.00	61	46	2.43	56	37	0.18	50	33	0.16	-	-	-
19	69	42	0.00	75	34	0.00	62	43	0.28	57	33	0.00	52	33	0.00	-	-	-
20	74	43	0.00	74	33	0.00	57	42	0.60	56	30	0.10	61	29	0.00	-	-	-
21	73	43	0.01	72	35	0.00	61	54	0.78	58	39	0.05	62	28	0.00	-	-	-
22	74	42	0.00	71	33	0.00	54	38	0.24	65	36	0.01	68	29	0.00	-	-	-
23	75	43	0.00	72	33	0.00	56	35	0.07	75	35	0.00	72	32	0.00	-	-	-
24	61	50	0.00	61	39	0.07	56	36	0.00	64	34	0.00	70	33	0.00	-	-	-
25	66	50	0.02	64	43	0.57	57	36	0.11	54	33	0.03	64	39	0.00	-	-	-
26	63	42	0.24	60	35	0.00	57	36	0.07	53	32	0.00	51	38	1.12	-	-	-
27	65	43	0.00	57	29	0.00	56	38	0.15	54	43	0.17	58	50	1.89	-	-	-
28	57	49	1.21	54	38	0.82	61	44	0.12	55	44	0.39	57	41	0.23	-	-	-
29	67	41	0.01	55	38	0.07	50	44	0.10	57	39	0.00	0	0	0.00	-	-	-
30	71	35	0.00	51	35	0.23	60	48	0.19	60	41	0.63	0	0	0.00	-	-	-
31	77	37	0.00	0	0	0.00	60	46	0.11	55	35	0.00	0	0	0.00	-	-	-
Total			**1.56**			**3.25**			**7.69**			**5.66**			**4.34**			**6.00**

Highlighted data retrieved from UC Davis website http://www.ipm.ucdavis.edu/calludt.cgi/WXDESCRIPTION?STN=SNTARC

Appendix D4

Appendix to California Tiger Salamander (Ambystoma Californiense) Survey 2005-2006, Santa Rosa Medical Center Project Site, Santa Rosa, California

Appendix A. 2005/2006 Daily weather data collected from the official National Weather Service station in Santa Rosa, California.

Date	OCT			NOV			DEC			JAN			FEB			MAR		
	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain	Temp (F)		Rain
	High	Low	(in)	High	Low	(in)	High	Low	(in)	Hish	Low	(in)	High	Low	(in)	High	Low	(in)
1	78	45	0.00	70	42	0.00	60	46	1.93	56	45	1.52	56	48	0.41	59	37	0.47
2	73	38	0.00	66	41	0.00	56	35	0.00	55	40	0.25	63	51	0.02	57	35	0.07
3	71	37	0.00	62	38	0.24	57	31	0.00	52	37	0.71	58	49	0.01	52	36	0.49
4	77	34	0.00	66	44	0.01	56	30	0.00	63	45	0.00	60	43	0.10	56	34	0.00
5	84	36	0.00	66	38	0.00	60	30	0.00	64	41	0.01	66	34	0.00	51	47	2.68
6	80	39	0.00	62	50	0.06	59	26	0.00	63	41	0.08	67	36	0.00	56	44	0.62
7	78	42	0.00	63	50	1.00	49	34	0.04	59	45	0.01	73	37	0.01	57	43	0.22
8	77	35	0.00	67	49	0.18	60	38	0.00	61	35	0.00	72	35	0.00	60	35	0.00
9	80	35	0.00	70	50	0.00	64	33	0.00	61	34	0.00	72	35	0.00	55	35	0.06
10	82	36	0.00	74	42	0.00	63	32	0.00	56	36	0.04	71	36	0.00	45	31	0.04
11	76	39	0.00	62	43	0.00	57	32	0.00	60	40	0.11	70	43	0.01	51	31	0.02
12	80	36	0.00	67	38	0.00	50	37	0.00	61	38	0.00	73	38	0.01	52	34	0.12
13	88	34	0.00	72	40	0.00	55	32	0.00	62	45	0.16	73	37	0.00	54	32	0.76
14	78	49	0.06	77	55	0.00	54	32	0.00	55	43	0.62	68	40	0.01	55	41	0.43
15	71	45	0.01	83	44	0.00	58	30	0.00	56	33	0.00	55	31	0.00	57	42	0.02
16	87	41	0.00	74	39	0.00	42	27	0.00	54	37	0.00	54	27	0.00	-	-	-
17	86	39	0.00	77	38	0.00	46	36	0.47	56	47	0.59	45	32	0.36	-	-	-
18	65	42	0.00	75	37	0.00	61	46	2.43	56	37	0.18	50	33	0.16	-	-	-
19	69	42	0.00	75	34	0.00	62	43	0.28	57	33	0.00	52	33	0.00	-	-	-
20	74	43	0.00	74	33	0.00	57	42	0.60	56	30	0.10	61	29	0.00	-	-	-
21	73	43	0.01	72	35	0.00	61	54	0.78	58	39	0.05	62	28	0.00	-	-	-
22	74	42	0.00	71	33	0.00	54	38	0.24	65	36	0.01	68	29	0.00	-	-	-
23	75	43	0.00	72	33	0.00	56	35	0.07	75	35	0.00	72	32	0.00	-	-	-
24	61	50	0.00	61	39	0.07	56	36	0.00	64	34	0.00	70	33	0.00	-	-	-
25	66	50	0.02	64	43	0.57	57	36	0.11	54	33	0.03	64	39	0.00	-	-	-
26	63	42	0.24	60	35	0.00	57	36	0.07	53	32	0.00	51	38	1.12	-	-	-
27	65	43	0.00	57	29	0.00	56	38	0.15	54	43	0.17	58	50	1.89	-	-	-
28	57	49	1.21	54	38	0.82	61	44	0.12	55	44	0.39	57	41	0.23	-	-	-
29	67	41	0.01	55	38	0.07	50	44	0.10	57	39	0.00	0	0	0.00	-	-	-
30	71	35	0.00	51	35	0.23	60	48	0.19	60	41	0.63	0	0	0.00	-	-	-
31	77	37	0.00	0	0	0.00	60	46	0.11	55	35	0.00	0	0	0.00	-	-	-
Total			**1.56**			**3.25**			**7.69**			**5.66**			**4.34**			**6.00**

Highlighted data retrieved from UC Davis website http://www.ipm.ucdavis.edu/calludt.cgi/WXDESCRIPTION?STN=SNTARC

Appendix D5

Preconstruction Nesting Raptor Survey Report, Sutter Medical Center

August 31, 2009

Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, California 95405

Attention: Ms. Nadin Sponamore

RE: Preconstruction Nesting Raptor Survey Report
Sutter Medical Center
Santa Rosa, Sonoma County, California
APNs 058-040-058, -059, -060, -061

Dear Ms. Sponamore:

INTRODUCTION

On April 29, 2009, Monk & Associates, Inc. (M&A) completed a focused survey for active raptor (birds of prey) nest sites on the proposed Sutter Medical Center project site located at 50 Mark West Springs Road in the City of Santa Rosa, Sonoma County, California (herein referred to as the project site) (Figures 1 and 2). Specifically, this survey focused on nesting raptors such as red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and white-tailed kite (*Elanus leucurus*) that could be affected by future project construction activities. Below we provide a discussion of the legal protections provided nesting raptors, a description of the project site, our survey methods and results.

LEGAL PROTECTION FOR RAPTORS AND OTHER NESTING BIRDS

All raptors are protected under the Federal Migratory Bird Treaty Act. Additionally, all nesting birds, including raptors, are protected under Sections 3505, 3503.5, and 3800 of the California Fish and Game Code that protect nesting birds, raptors, their eggs, and young. Finally, the white-tailed kite is “fully protected” under California Fish and Game Code. These laws/regulations protect raptors from “take,” or direct mortality of individuals and/or eggs. Thus, in accordance with these laws and regulations, direct “take” of nesting raptors, their active nests, eggs, and young should be avoided. However, once a raptor has completed its nesting cycle and the nest is empty, that is, the young have fledged (left the nest) or the nesting attempt failed, removal of the inactive nest site or nesting tree is not considered “take” under these regulations. Other regulations may be in affect, however, such as a tree ordinance or CEQA mitigation requirement that states otherwise so it is always necessary to check local ordinance or project specific documents prior to removing nests/nest trees or other nesting locations.

SITE LOCATION AND DESCRIPTION

The project site is approximately 53± acres in size. It is located in the southeast quadrant of the U.S. Highway 101/Mark West Springs Road interchange. It is currently under two ownerships: Luther Burbank Memorial Foundation (“LBMF”), and Sutter Medical Center of Santa Rosa or affiliate (“Sutter”) and is comprised of four legal parcels as follows:

The project site is located on and adjacent to the Luther Burbank Center. Figure 3 at the back of this report shows the various land uses within the project site boundary. The largest use of the property is paved parking, paved roads, buildings, and manicured landscaping, totaling approximately 25 acres. Soccer/lacrosse fields and other non-irrigated turf areas that include a tot-lot cover another approximately 10 acres. A large, approximately 15-acre parcel occurs on the west edge of the project site; this parcel has been used in the recent past as a horse pasture. This parcel is comprised largely of non-native annual grassland species. On the east side of this parcel there is a single family home and large utility barn. A smaller livestock building also occurs on this parcel (see Figure 3 for parcel locations). Also within the 15-acre parcel and immediately south of the residence and barns, there are two sewage treatment ponds that currently service the Luther Burbank Center. The aforementioned areas will be developed into the Sutter Medical Facility.

SURVEY METHODS

A survey of the project site and surrounding trees was conducted on April 29, 2009. M&A biologist Ms. Sarah Lynch conducted a focused survey for nesting raptors known from the region of the project site. Ms. Lynch is a qualified raptor biologist with many years of survey experience. The raptor species surveyed for included white-tailed kite, red-tailed hawk, and red-shouldered hawk, among others. These three species are the three that are most likely to occur in the habitats onsite.

Survey methods included conducting walking surveys to examine all trees and shrubs on the project site and using high-powered (10x42) Leica binoculars to examine trees and suitable shrubs within 500 feet of the project site. If trees offsite were located along public roads they were also checked for nests from an optimal location at or near the base of the tree. All suitable raptor nesting areas were examined for the presence of nests. The surveys also included examinations for indirect evidence of nesting. Such evidence includes the presence of fresh white-wash (i.e., excrement) in a tree or on the ground below a nest. Also, adult molt feathers, and/or down or feathers from young and/or adults located in relatively high concentrations in the vicinity of a nest. Also, evidence of kills (i.e., plucking posts and solitary kills) or pellet piles may indicate use of a tree or locality by nesting raptors. Finally, when raptors were observed, their behavior was interpreted to determine if they might be nesting in the vicinity of the project site. Behaviors that would indicate nesting in the vicinity would include defensive behavior, territorial behavior, or other behavior indicating that a raptor was unusually interested in our presence in the area.

SURVEY RESULTS

During the April 2009 nesting survey, M&A did not identify any active raptor nests on or within 500 feet of the project site. No raptors were observed in the area during the survey. Bird species observed onsite included house finch (*Carpodacus mexicanus*), California towhee (*Pipilo crissalis*), and American crow (*Corvus brachyrhynchos*). An old, crow-sized stick nest was observed onsite in a grove of pine trees. This nest was deemed inactive due to the presence of cobwebs and the absence of white wash below the nest and an absence of green branches on the nest.

CONCLUSIONS

M&A did not identify any raptor nests on site or within 500 feet of the project site during our 2009 survey. Since raptors are highly mobile and could nest on the project site or adjacent to the project site in future years, it is M&A's recommendation that if project site grading or construction activities would take place during the nesting season (February 1 through August 31st) that a preconstruction nesting survey be conducted. This survey should take place no greater than 30 days prior to any earth-moving or construction activity onsite. If a raptor nest was identified onsite or adjacent to the site during the preconstruction survey, appropriate nesting buffers would have to be established until the birds were finished nesting and the young were foraging independently. Once the young were foraging independently then the nesting buffer could be removed.

This concludes M&A's preconstruction nesting survey report. Should you have any questions, or wish to discuss any other aspect of this survey, please do not hesitate to call me at (925) 947-4867 extension 203.

Sincerely,

Sarah Lynch

Sarah Lynch
Associate Biologist

Attachment: Figures 1-3

Monk & Associates
Environmental Consultants
1136 Saranap Avenue, Suite Q
Walnut Creek, California 94595
(925) 947-4867

Figure 1. Sutter Medical Center Project Site Regional Map
Santa Rosa, California

County: Sonoma
Map Preparation Date: December 18, 2008

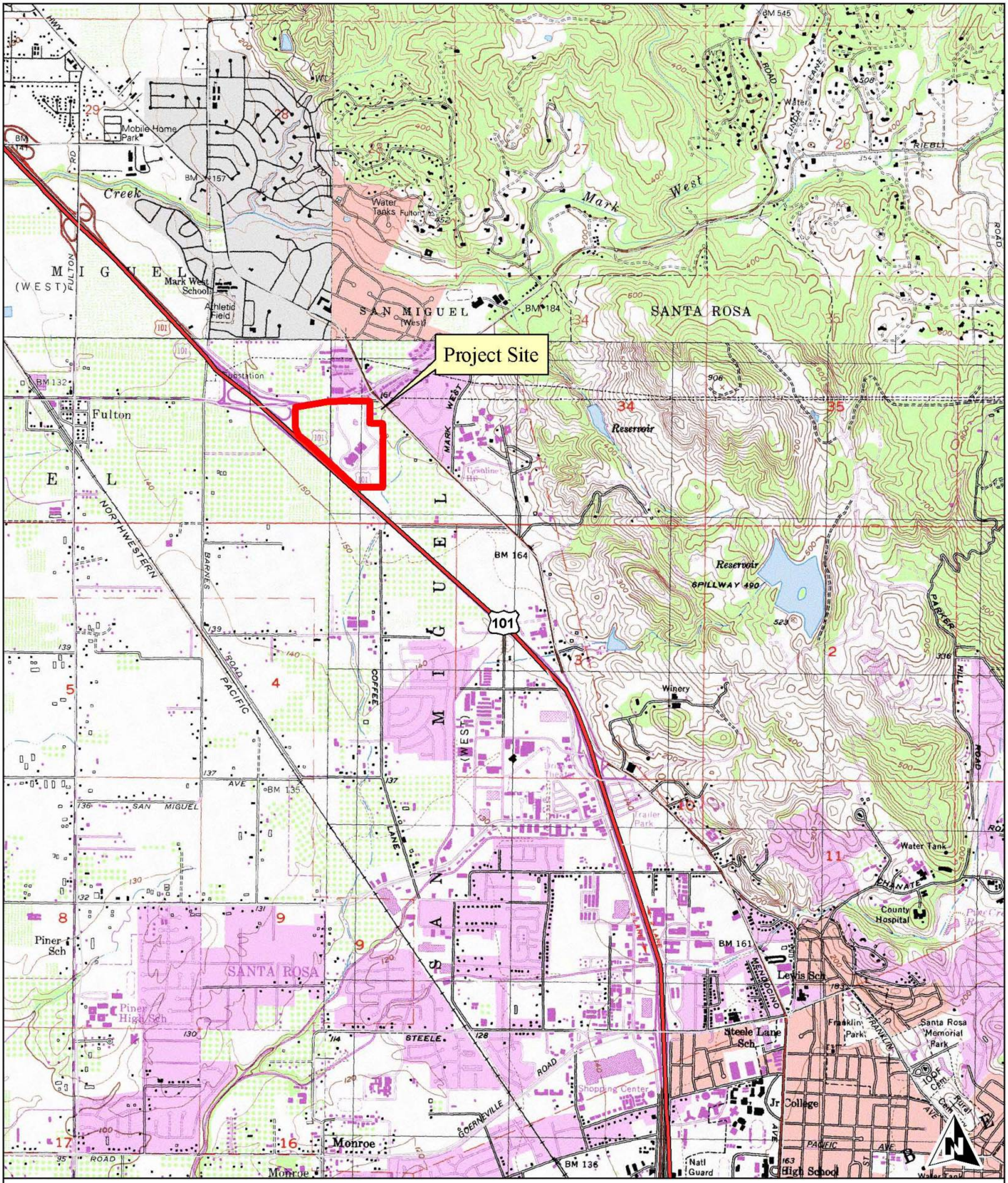

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Figure 2. Sutter Medical Center Project Location Map
Santa Rosa, California

County: Sonoma
7.5-Minute Santa Rosa, Mark West Springs, Healdsburg, Sebastopol quadrangles
Topography Source: http://gis.ca.gov
Map Preparation Date: December 29, 2008

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Figure 3. Aerial Photograph of the Sutter Hospital Project Site Santa Rosa, Sonoma County, California

Map Revision Date: July 7, 2009
Aerial Photograph Source: http://gdw.apfo.usda.gov

APPENDIX F

GEOLOGY AND SOILS TECHNICAL REPORTS

Appendix F1

Preliminary Geotechnical Exploration Report, Sutter Medical Center/ Luther Burbank Center for the Arts, Santa Rosa California

PRELIMINARY GEOTECHNICAL EXPLORATION REPORT

SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA

SUBMITTED

TO

SUTTER MEDICAL CENTER

SANTA ROSA, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6486.2.001.01

NOVEMBER 29, 2004

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INTRODUCTION

Purpose

The purpose of this study was to undertake an initial geotechnical exploration program to develop preliminary geotechnical conclusions and recommendations for the proposed development. Additionally, in accordance with the requirements for such studies established by the Hospital Facilities Seismic Safety Act (SB 1953) and the California Building Code (CBC), this report presents an assessment of geologic hazards pertinent to the project site as these relate to the planned uses of the site.

This report provides our preliminary conclusions and recommendations for the conceptual development at the site. This report provides our recommendations for site development including site preparation; grading and treatment of existing fills; treatment of areas underlain by compressible and/or expansive soils; stability of graded slopes; preliminary foundation design considerations, preliminary pavement and retaining wall design criteria, and drainage.

Scope of Services

The scope of our current services included:

1. Review of published maps and previous reports regarding geological and geotechnical characteristics of the subject site.
2. Assessment of geological hazards in the general project area.
3. Drilling 21 exploratory borings.
4. Laboratory testing on selected materials.
5. Preliminary analysis of the geological and geotechnical data.

6. Preparation of this report summarizing our preliminary findings and recommendations.

This report anticipates that additional further design-level geotechnical explorations will be required at the site once development and grading plans have been developed. The future studies should address and characterize settlement conditions and provide recommendations for site-specific foundations based on proposed grading and planned structures.

Once detailed grading and site improvement plans have been prepared, ENGEO should be provided the opportunity to review these for conformance with the intent of our recommendations. During that time, ENGEO may need to perform additional evaluation and/or modify the recommendations contained herein (as deemed appropriate). Also, during our review of the 40-scale plans, additional recommendations for remedial site grading should be provided by ENGEO. This report was prepared for the exclusive use of the Sutter Medical Center and their design team consultants. In the event that any changes are made in the character, design, or layout of the development, the conclusions and recommendations contained in this report should be reviewed by ENGEO to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO Incorporated.

<u>Site Location and Description</u>

The subject site is located at 50 Mark West Springs Road in Santa Rosa, California, as shown on the Site Vicinity Map (Figure 1). The site encompasses approximately 78 acres, including the Luther Burbank Center for the Arts (LBC) which is approximately 52 acres in size. In addition to the LBC, a rural residence with barn, out buildings and undeveloped pasture land as well as a single-family home that is currently used as law offices are present within the property boundary.

An existing Luther Burbank Center (LBC) and associated parking areas is currently located at the center of the site. The LBC structure is a cultural and performing arts event center, and a part of the property is leased to the Sonoma Academy, an independent college-preparatory high school. This portion of the Property includes approximately 39 acres that are occupied by asphalt-covered parking areas, an athletic field, and an existing waste water treatment facility. Two ponds associated with the wastewater treatment facility are located along the main access road that connects to Mark West Springs Road. The athletic field is located opposite to the wastewater treatment facility at the north side of the site along Mark West Springs Road. At the south and southeast corner of the site, a vineyard is present. The remainder of the site is currently vacant and covered with seasonal grass. Figure 2 shows the existing site conditions.

<u>Proposed Development</u>

Proposed development at the site includes construction of two Sutter facilities – a medical office building and a main hospital building; three LBC facilities – an amphitheatre, a conference/banquet center and a new hospitality center; and associated parking areas and garages. Furthermore, site improvements such as widening of Marks West Springs Road as well as construction of stormwater retention areas, water tank and wastewater storage are proposed.

A preliminary design concept for the proposed hospital building is to be approximately 6 stories in height, with a building footprint of about 180,000 square feet. A helipad is proposed at the top of the hospital building. The medical office building is planned to be 5 stories in height, and occupy a footprint of approximately 80,000 square feet. Paved parking areas and a parking garage is proposed around the hospital building. The details regarding building loads have not been determined at this time; however, based on similar developments, it is anticipated that the structural loads of the planned multi-level building structures will be low to high.

The proposed LBC facilities are anticipated to consist of single-level structures, and the amphitheater acoustically controlled for year-round use for up to 2,800 attendees.

FIELD EXPLORATION

The field exploration for this study was conducted between October 25 and 28, 2004, and consisted of drilling 20 boreholes and excavating 1 hand auger boring. The approximate locations of the borings as they relate to existing site and planned development are shown in Figures 2 and 3, respectively. The locations of borings were determined by pacing from existing features and should be considered accurate only to the degree implied by the method used.

Twenty test borings were drilled using CME 75 truck-mounted drill rig equipped with hollow stem augers and an automatic-trip hydraulic hammer. The borings ranged in depth between 6½ and 41½ feet below the existing ground surface (bgs). An ENGEO geologist logged the boreholes in the field and collected soil samples using a 3-inch O.D. California-type split-spoon sampler fitted with 6-inch-long brass liners or a 2-inch O.D. Standard Penetration Test (SPT) split-spoon sampler.

The penetration of the split-spoon samplers into the subsurface materials was field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments using the 140-pound hammer with a 30-inch drop. The report boring logs represent the actual field blow counts for the last one foot of penetration and have not been subjected to conversion factors to achieve representative SPT results.

One test boring was drilled using hand auger equipment to a depth of 2½ feet. One bulk soil sample is collected from the exploration location using hand sampling techniques.

Three 1-inch-diameter standpipe piezometers were installed within three borings designated as P-3, P-11 and P-22. On October 28, 2004, readings of stabilized free water levels in the piezometers were measured relative to the existing ground surface elevations. The field logs for the borings were used to develop the report borelogs, which are located in Appendix A. The boring logs depict subsurface conditions within the borings for the date of site activities; however, subsurface conditions may vary with time. The boreholes were backfilled on the day of field exploration activities.

Laboratory Testing

Following the exploratory drilling, the collected soil samples were re-examined in our laboratory to confirm field classifications. Representative soil samples recovered during drilling were tested for the following physical characteristics:

Characteristic	Test Method	Location of Results Within this Report
Natural Unit Weight and Moisture Content	ASTM D-2216	Appendix A
Unconfined Compressive Strength	ASTM D-2166	Appendix B
Percent Passing No. 200 Sieve	ASTM D-422	Appendix B
Atterberg Limits	ASTM D-4318	Appendix B
Consolidation Test and Time Rate	ASTM D-4186	Appendix B

The results of moisture and density tests are included on the boring logs in Appendix A. The remaining laboratory test results are presented in Appendix B.

GEOLOGY AND SEISMICITY

Regional Geology

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, about 4 million years before present. Locally, the site is mapped as underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). This alluvium consists of unconsolidated deposits of sand, silt, gravel and clay likely derived from the bedrock uplands and older unconsolidated deposits. The alluvial deposits in this area are greater than 30 feet in thickness.

Faulting and Seismicity

The site is located in a region that contains numerous active[1] and potentially active earthquake faults. The site is not located within the State of California Fault Hazard Zone. The active Rodgers Creek fault is located approximately 0.7 mile to the east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996). The Maacama Fault is located 6.3 miles to the east, and the San Andreas Fault is located 19.5 miles to the west of the site. A Regional Faulting and Seismicity Map are shown on Figure 5, which shows regional proximity of major active faults and significant historic earthquakes with respect to the site.

The regional seismicity of the Bay Area was recently evaluated by the Working Group on Northern California Earthquake Probabilities (WGEP 2003). The Working Group periodically attempts to summarize seismic risk in the Bay Area by presenting probabilities of 6.7 Mw or greater earthquakes on active Bay Area faults for a 30-year return interval (2003-2032); the most

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 11,000 years) (Hart, 1997).

recent summary gives a 62 percent aggregate probability for the entire Bay Area. The active Rodgers Creek fault system is estimated to have a 30-year probability of 27 percent for a M6.7 or greater earthquake. The San Andreas Fault system was assigned a 30-year probability of 21 percent. It should therefore be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

Subsurface Conditions

Existing Fills. Existing fills are encountered throughout this site, except in the existing fields used for grazing at the northwestern section of the site. Based on Borings B-5 through B-11, HB15 and B-16 to B-21, existing fills extend to approximately 3 to 5 feet below the current site grades. These fills typically consist of stiff to very stiff sandy clays and silty clays with various amounts of gravel and rock fragments. The existing fills were likely placed at the site in conjunction with previous site grading associated with the existing LBC center development.

Alluvium. Alluvial deposits were encountered in all borings drilled at the site. These deposits generally consist of sands, clayey sand, sandy clay, silty clay and clays. These were encountered extending from the existing ground surface at Borings B-1 to B-4 and B-12 to B-14, as well as immediately beneath existing fill deposits encountered at Borings B-5 to B-11 and B-15 to B-21. Alluvium extended to at least the maximum depth of borings drilled during this study, to depths of at least 41½ feet. Above the groundwater table, these alluvial deposits are generally medium stiff to stiff. Below the free groundwater levels, the alluvial deposits grades to sandy clay to clayey sand and become soft. The soft clayey sand to sandy clay deposits are encountered in all borings except in Boring B-7. The soft deposits are approximately 5 to 15 feet thick and are generally encountered at 10 to 15 feet bgs.

Beneath the soft alluvial deposits layer, medium dense sandy soils with gravels as well as medium stiff to stiff clayey soils are encountered to the termination depths of the deeper borings drilled, B-3, B-4 and B-11.

Groundwater Conditions

Based on the exploration data at this site, groundwater levels ranged from depth of approximately 10½ to 19 feet bgs. Three piezometers were installed at Boring B-3, B-11 and B-16. General construction of the piezometers is depicted on the boring logs in Appendix A. Groundwater in the piezometer was measured after the water level stabilized and is recorded on the well logs. It should be noted that groundwater conditions are expected to vary depending on factors such as weather conditions, time of year, and irrigation practices.

Seismic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake may include primary ground rupture, ground shaking, lurching, liquefaction, dynamic densification, lateral spreading, inundation due to embankment failure, and earthquake-induced landsliding. These hazards are discussed below. Risks from seiches, tsunamis, and volcanic eruption are currently considered negligible at the subject project site.

Ground Rupture. No active or inactive faults are known to pass through the proposed site. The closest known active fault to the site is the Rodgers Creek fault located about 0.7 mile to the east. The site is not within an Earthquake Fault Special Study Zone. Based on this information, it is our assessment that the risk of ground rupture is considered low at this site.

Ground Shaking. An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site. The degree of shaking is dependent on the magnitude of the event, the distance to its zone of rupture, and local geologic conditions. We performed a probabilistic seismic hazard analysis for the site based on current California fault data. In this analysis, a computer program (EZ-FRISK) was used to model the seismic setting of the region and is able to explicitly account for uncertainty relating to the following:

- Earthquake magnitude
- Rupture length
- Location of rupture
- Maximum possible earthquake magnitude
- Recurrence interval of earthquake events

The program calculates, by summation from earthquake sources, the total average annual expected number of occurrences of acceleration greater than each of several specified values. Once the annual probability is obtained, the probability of the level of ground acceleration being exceeded over a specified time period is calculated. Using this method, a horizontal ground surface acceleration of 0.86g is predicted to have a 10 percent probability of being exceeded in a 100-year design life, and a horizontal ground surface acceleration of 0.66g is predicted to have a 10 percent probability of being exceeded in a 50-year design life. The probabilistic ground surface acceleration was derived using attenuation relationships developed by Boore-Joyner-Fumal (1997), Sadigh (1997) and Abrahamson and Silva (1997). Figure 8 shows the normalized spectral acceleration. The EZFRISK Probabilistic Seismic Hazard Analysis is provided in Appendix C.

To mitigate the ground shaking effects, all structures should be designed using sound engineering judgment and the latest Uniform Building Code (UBC) requirements as a minimum, taking into consideration that the proposed medical facilities are considered special occupancy structures. In accordance with the 1997 UBC, the site is located within Seismic Zone 4, with a seismic zone factor Z of 0.4, as given in Figure 16-2 and Table 16-I in the UBC. Based on site conditions, the soil profile at the site can be classified as a S_D profile as defined in Table 16-J. According to Tables 16-S and 16-T, near-source factors, N_a of 1.5 and N_v of 2.0, are based on the

Rodgers Creek fault being a seismic source type A, approximately 0.7 miles (1.1 km) away. The UBC parameters for the site are presented in the following table:

1997 UNIFORM BUILDING CODE - Chapter 16

ITEM	DESIGN VALUE	SOURCE
Seismic Zone	4	Figure 16-2
Seismic Zone Factor	0.40	Table 16-I
Soil Profile Type	S_D	Table 16-J
Seismic Source Type	A	Table 16-U
Near Source Factor, N_a	1.5	Table 16-S
Near Source Factor, N_v	2.0	Table 16-T
Seismic Coefficient, C_a	0.66	Table 16-Q
Seismic Coefficient, C_v	1.28	Table 16-R

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The prescribed lateral forces are generally considered to be substantially smaller than the actual peak forces that would be associated with a major earthquake. The Structural Engineers Association of California has also developed performance-based engineering guidelines in their report entitled Vision 2000 (SEAOC, 1995). The conceptual framework for performance-based engineering guidelines is defined as a full range of seismic engineering issues to be addressed in designing structures for predictable and definable seismic performance within established levels of risk. The performance levels are defined as follows:

- Fully Operational – Facility continues in operation with negligible damage.
- Operational – Facility continues in operation with minor damage and minor disruption in nonessential services.
- Life Safe – Life safety is substantially protected, damage is moderate to extensive.
- Near Collapse – Life safety is at risk, damage is severe, structural collapse is prevented.

Vision 2000 includes four levels of earthquake risk as shown below.

Vision 2000 Event	Probability of Exceedance (%)	Design Life (years)	Recurrence Interval (years)
Frequent	50	30	43
Occasional	50	50	72
Rare	10	50	475
Very rare	10	100	970

As shown in Figure 9, essential and safety-critical buildings, such as hospitals and nuclear power facilities, would be expected to meet the basic objective to be fully operational in a rare earthquake and satisfy a life-safety performance level for a very rare earthquake.

Liquefaction. Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total, loss of shear strength because of pore pressure build-up under the reversing cyclic shear stresses associated with earthquakes. According to recent liquefaction research performed by Seed et al. (2003), a soil layer is not considered liquefiable if it meets any of the following criteria:

- The factor of safety of liquefaction resistance calculated by the methods of Youd et al. (2001) is greater than 1.0.
- The layer is above the water table.
- The fines content (FC) is greater than 20 percent, Plasticity Index (PI) is greater than 12 percent, and water content (w_c) is less than 80 percent of the liquid limit (LL).
- The FC is greater than 35 percent, PI is less than 12 percent, and w_c is less than 0.85(LL).

As discussed in previous sections, saturated, soft sandy clay and clayey sand deposits were encountered at the site. Laboratory results on two soil samples collected within this layer indicate that the soft soil deposits have an FC greater than 35 percent, PI greater than 12 percent.

Although soil in this layer contains plastic fines, if the water content relative to their liquid limit is 75 percent to 85 percent of LL, this layer has a potential to hold the water and dissipate excess pore pressures slowly due to their low permeability, resulting in a postponed liquefaction condition. Depending on the in-situ water content of the soft soils, some high water content layers might be potentially liquefiable. Although the fines of the potentially liquefiable layers are not classified as sensitive soils and, therefore, are not vulnerable to major loss of strength if sheared or remolded during an earthquake event. Supplemental geotechnical exploration at this site should employ rotary wash methods and/or cone penetration testing (CPT) to define susceptibility of alluvial soils to seismic settlement or potential deformation as these relate to liquefaction.

<u>Surface Deformation</u>. One implication of possible liquefaction is the potential that its occurrence may result in surface expression. A strong seismic event induces cyclic loading of subsurface soils and subsequent liquefaction may occur; the soil layers undergoing liquefaction lose strength due to an increase in pore pressure. The induced pore pressures upset the subsurface equilibrium and relief of the pressure is sought. If the seismic event occurs over an extended duration, the soils subjected to increased pore pressure may migrate toward the surface, resulting in ejection and subsequent sand boiling at the surface. This phenomenon of surface expression can result in substantial ground settlement and heave. Supplemental geotechnical exploration at this site should employ rotary wash methods and/or cone penetration testing (CPT) to define susceptibility of alluvial soils to surface deformation.

<u>Earthquake-Induced Densification</u>. Densification of loose to medium-dense clean sand above and below the groundwater level during earthquake shaking could cause settlement. As previously stated, loose to medium-dense clean sands were not encountered during the subsurface exploration; therefore, densification induced by earthquake shaking is expected to be low.

Lateral Spreading. Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction), which causes the overlying soil mass to move toward a free face or down a gentle slope. Supplemental geotechnical exploration at this site should employ rotary wash methods and/or cone penetration testing (CPT) to define susceptibility of alluvial soils to seismic settlement or potential lateral spreading.

Earthquake-Induced Landsliding. No landslides have been mapped within or immediately adjacent to the site; therefore, the potential for earthquake-induced landsliding to occur is considered low.

Inundation Due to 100-Year Flood. As shown on Figure 6, the project site is not located within the 100-year flood inundation area; therefore, risk of flooding is considered low.

Corrosion Potential. An evaluation of possible corrosion impacts to site improvement should be conducted after mass grading of the site. Near-surface soil samples should be collected and tested for sulfate corrosivity. Based on test results, a suitable type of cement can be chosen according to the criteria presented in Table 19-A-4 of the 1997 Uniform Building Code (UBC). In absence of lab testing on near-surface soil, we recommended utilizing the “Very Severe” sulfate exposure criteria of the UBC for concrete strength design; however, structural engineering requirements for strength design may result in more stringent concrete specifications.

Expansive Soils. Another concern within the proposed project is the expansive nature of some of the on-site soils. Based on lab testing results, Plasticity Index (PI) range from 13 to 26 indicating that site soils have low to moderately expansion potential. Expansive soils shrink and swell as a result of moisture changes. This can cause heaving and cracking of slabs-on-grade, pavements, and improvements overlying these soils. Successful development on expansive soils requires special attention during construction. It is imperative that exposed subgrade materials be kept moist at all times prior to construction because it is extremely difficult to re-moisturize the soil without excavating, moisture conditioning, and recompacting. Long-term mitigation measures should also include the prevention of moisture variation.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings from this subsurface exploration, laboratory test results and analyses, it is our preliminary conclusion that the planned project development is feasible from a geotechnical standpoint, provided that the recommendations contained in this report along with sound engineering practices are incorporated in the future design and construction of the project. This study is preliminary and intended to provide guidelines for planning and conceptual site development. The recommendations should be refined and modified, as deemed appropriate by the Geotechnical Engineer during project development. During that time, ENGEO anticipates a need to perform additional field investigations, settlement analysis, and modify the recommendations contained herein to address the site-specific development plans.

The main consideration for the planned development is the compressibility of soft clayey soils at depths between 10 to 25 feet, and potential total and differential settlement from increased future loads. The alluvial deposits are considered susceptible to compression from loads imposed by future fills and heavy structural loads. Additional geotechnical considerations for the planned development include the presence of existing “uncontrolled” fill materials considered susceptible to excessive total and differential settlements; low to moderately expansive soil which may undergo significant volume changes (swell and compression) when subjected to varying moisture contents; and the potential for liquefaction under strong ground shaking.

Settlement Considerations

Depending on planned structural loads, grading, and allowable settlement of the planned structures, the use of a number of different foundation systems may be appropriate at this site. The near-surface soils are generally stiff in the upper 10 feet of existing grades. From 10 to 25 feet, soft to stiff clayey soils were encountered and groundwater levels were detected from about 10½ to 19 feet bgs. Soft layers may compress or settle when subjected to increased loads from raising future grades and/or from heavily-loaded shallow foundations bearing upon these soils. Excessive settlement could potentially impact future structures, site improvements, grades and drainage. To reduce settlement, it is recommended to minimize raising grades. As a guideline, it is our preliminary recommendations that future site grades should not be raised greater than two feet above existing site grades. If it is necessary to raise future site grades greater than 2 feet, supplemental design-level geotechnical exploration and settlement analyses should be performed to evaluate such conditions. Furthermore, it may be possible to raise grades beyond the 2 feet, if special mitigation measures such as surcharging are undertaken. Surcharging is used to pre-consolidate compressible soils using surplus fill above design grades, and once actual settlements are nearly completed and significantly diminish the excess surcharge fill is removed. If this special mitigation measure is undertaken, a surcharge program will be established based on final design considerations, anticipated loads as well as an appropriate settlement monitoring.

Foundation Considerations

Based on the soil conditions, it is our preliminary assessment that the use of shallow foundation systems would be suitable to support relatively light to moderate load located near the existing site grades (approximately less than 1 to 3 kips per lineal foot for wall loads, and less than 30 to 40 kips per column load). Of the available shallow foundation systems, continuous strip and column footings embedded approximately 18 to 24 inches would be suitable combined with concrete slab-on-grade floors. Allowable bearing pressures considering dead plus live loads may be approximately 1,500 to 2,500 pounds per square foot (psf). A one-third increase in allowable pressure may be considered acceptable for temporary loads. Due to the presence of near-surface expansive soils slab on grade elements should be underlain by a layer of low expansive select materials.

For larger multiple-level buildings and parking structures, it is anticipated that settlement resulting from shallow foundations near existing grade may be considerable and excessive for the planned structures. Therefore, for the large buildings and structures, the use of deep foundation systems, such as driven piles or drilled piers, would be suitable to provide the necessary support and minimize settlement. Another foundation alternative to consider for heavily-loaded structures with depressed lower levels approximately 10 to 20 feet below existing site grades is the use of a rigid structural mat system.

Deep foundations would be intended to support structural loads in the stiff soils at greater depth. Based on our preliminary site exploration, stiff soils were encountered at Boring B-3 at approximately 40 feet bgs. Of the available systems and given groundwater conditions, pre-stressed concrete driven piles foundation would be suitable for support of heavy loaded structures. Pre-stressed concrete piles extending to and deriving support in stiff alluvium as friction piles are anticipated based on the significant depth of alluvium in this area. Although no design loads are available at this time, typical pile capacities of approximately 100 to 300 kips per pile could be achieved depending on specific pile design and capacity. If a pile foundation system is desired, ENGEO should be consulted to work with the Structural Engineer regarding design considerations. Design-level exploration is necessary to determine criteria for deep foundations at this site. Once details regarding the structural designs of the large structures have been determined, ENGEO should review such designs for appropriate changes and/or modifications to these preliminary foundation recommendations as deemed necessary.

Concrete Slabs-on-Grade and Concrete Pavements. It may be desired to have the lower level of the structures resting upon grade. It is our preliminary recommendations that concrete slabs of at least 6 inches thick to be underlain by an 8-inch-thick layer of Class 2 Aggregate Base (AB) material. The AB should be placed at a minimum relative compaction of 95 percent with a moisture content of at least optimum. Concrete floor slab and pavement reinforcing should be designed by the Structural Engineer. As a minimum, the slab reinforcement should consist of No. 4 bars spaced 16 inches on center each way.

If penetration of moisture or water vapor would be objectionable, such as special coverings, a vapor retarder should be used. As a minimum, this should consist of a 20 mils thick membrane. Even with this recommended system, localized wet spots may occur. If this is objectionable, waterproofing and pavement subdrainage, as described below, should be considered. Minor cracking and distress should be anticipated in the structure and the slabs-on-grade as a result of concrete shrinkage. Frequent control joints should be provided to control cracking as recommended by the American Concrete Institute (Publication ACI 302.1R-89).

Subdrainage. Groundwater levels at this site in our borings correlates to an approximate elevation of about 150 feet mean sea level datum (msl). We understand that the elevation of the lowest level of structures has not yet been determined. As such, appropriate subdrainage should be provided in order to minimize the amount of water penetration to the lower levels of the structure. Subsurface drains should be installed around the perimeter and below structures, as deemed appropriate. Alternatively waterproofing needs to be considered where portions of the structure may extend below high-water levels.

Exterior Slab-on-Grade

This section provides guidelines for exterior "secondary" slabs such as exterior walkways and steps. Secondary slabs-on-grade should be constructed as units that are structurally independent of the foundation system. This allows the slabs to move with minimum distress to the foundations. Slabs-on-grade should be designed specifically for their intended use and loading requirements by the Structural Engineer. As mentioned previously, some of the site soils have a low to moderate expansive potential; therefore, cracking of slabs should be expected in the future. To reduce and control cracking, slabs-on-grade should be reinforced with steel rebar and provided with frequent control joints. The actual reinforcement should be designed by the Structural Engineer and should, as a minimum, consist of No. 3 bars spaced 16 inches on center each way. In our experience, welded wire mesh is not sufficient to control slab cracking. Secondary slabs-on-grade should consist of a minimum thickness of 4 inches of concrete placed on a 4-inch-thick layer of clean, crushed rock or gravel (Section 2.04, Part I of Guide Contract Specifications).

Steel should not be used to tie the secondary slabs, walkways, or steps to adjacent foundations. To minimize the swell potential of the subgrade soils under secondary slabs, care must be exercised to attain a near-saturated condition of the subgrade before concrete is placed. Exterior slabs should be constructed with thickened edges extending at least 6 inches into compacted soil to minimize water infiltration. Slabs should slope away from structures at least 2 percent.

Preliminary Grading Considerations

The recommendations for grading contained in this report are of a general nature and may be refined as detailed design and grading plans become available. ENGEO should provide geotechnical input during the design process and be provided with final design drawings for review prior to grading and construction. Our preliminary recommendations for the anticipated earthwork are as follows:

Excavation. Excavations may be necessary for the construction of the proposed basement level of the structures. The size and nature of these excavations have not yet been determined. All excavations should conform to Cal-OSHA requirements.

Fills, Backfills, and Subgrade Preparation. With the exception of any organically contaminated materials (soil which contains more than 3 percent organics), the site soils are suitable for use as engineered fill provided debris and deleterious matter, as determined by an ENGEO representative in the field, has first been removed. All existing structures, buried structures and remnants should be removed prior to construction. Existing uncontrolled fills and any debris-laden fills are considered susceptible to excessive total and differential settlements. Therefore, to reduce settlements resulting from unsuitable fills where these fills will be located below structures or improvements, they should be completely over-excavated and replaced with engineered fill. In general, if existing fills are cleared of unsuitable debris and rubble, oversized-rock fragments, and any hazardous or deleterious materials (if encountered), these materials are anticipated, from a geotechnical standpoint, to be suitable for reuse as engineered fill. Prior to the placement of engineered fill, wet or compressible soil should be removed, and the bottom should be scarified an additional 12 inches. Fill placement should be performed in accordance with the recommendations provided in future anticipated design-level studies. After removal of soft surface soils and any loose fill, and existing fills, the exposed surface should be scarified to a depth of 12 inches, moisture conditioned, and recompacted to provide adequate bonding with the initial lift of fill. All fills should be placed in thin lifts. The lift thickness should not exceed 12 inches or the depth of penetration of the compaction equipment used, whichever is less. General engineered fill material should be moisture conditioned to at least 3 percentage points above optimum moisture content and compacted to not less than 90 percent relative compaction. Relative compaction refers to in-place dry density of the fill material expressed as a percentage of the maximum dry density as determined by ASTM D-1557-91. Optimum moisture is the moisture content corresponding to the maximum dry density. ENGEO must be notified a minimum of 48 hours prior to grading in order to coordinate our schedule with the grading contractor. It is important that all site preparation, including demolition and stripping, should be done under the observation of the Geotechnical Engineer or his/her qualified field representative and should be carried out according to the requirements contained herein and within the Guide Contract Specifications in Appendix D.

Import Fills. The Geotechnical Engineer should be informed when import materials are planned for the site. Import materials should be submitted to the Geotechnical Engineer for testing and approval prior to delivery at the site and should conform to the requirements provided in Section 2.02B of Part I of the Guide Contract Specifications.

Construction Dewatering. The water table for the site is estimated at depths ranging from 10½ to 19 feet bgs. If excavations extend below this elevation, temporary construction dewatering should be anticipated. The selection of dewatering equipment should be left to the discretion of the contractor. We recommend that dewatering be carried out in such a manner as to maintain groundwater a minimum of 2 feet below the bottom of the excavation. Ponding of storm water, except within engineered sediment detention basins, must not be allowed at the site and particularly on the building areas during work stoppage for rainy weather. Before the grading is halted by rain, positive slopes should be provided to carry surface runoff in a controlled manner to a discharge point approved by the Civil Engineer.

Graded Slopes. Cut and fill slopes up to 15 feet in vertical height may be constructed at slope gradients no steeper than 2:1 (horizontal:vertical).

Drainage Requirements. Improper drainage may result in fill saturation with consequent loss of compaction and fill strength. As a minimum requirement, finished grades should provide a slope gradient of at least 3 to 5 percent to drain positively away from the structures. Care should be exercised to ensure that landscape with 5-foot mounds will not interfere with these requirements.

Preliminary Retaining Walls Criteria

Conventional retaining walls (i.e. concrete, masonry, etc.) that are drained and less than 10 feet in vertical height should be designed to resist the following earth pressures. If the retaining walls are free to deflect, then these should be designed for active earth pressures. If the walls are restrained (not free to deflect), then these should be designed for at-rest earth pressures.

DRAINED LATERAL EARTH PRESSURES

Backfill Slope Condition (horizontal:vertical)	Active Pressure (pcf)	At-Rest Pressure (pcf)
Level	50	85
4:1	55	90
3:1	60	100
2:1	70	110

For walls greater than 10 feet, additional support will be needed to minimize the amount of rotational movement. The final plans should be reviewed by ENGEO, and large walls should be evaluated on a case-by-case basis. ENGEO should work together with the Structural Engineer. All walls should contain backdrain facilities placed at the base of the foundation. Backfill of walls should be performed under the observation and testing of ENGEO and according to the recommendations provided in the referenced reports.

Preliminary Pavement Design

The following recommendations for preliminary asphalt pavement sections are intended as a conceptual guide for planning. The preliminary pavement sections are based on an estimated R-Value of 5. Actual R-Value samples should be collected for testing after grading to approximate rough grades and installation of underground utilities. The preliminary pavement sections are based on the estimated R-Value, the Caltrans “Design Method for Flexible Pavements”, and Traffic Indices (T.I.) ranging from 4 to 8. However, T.I. values should be determined by the Civil Engineer or appropriate public agency.

Traffic Index	Asphalt Concrete (in.) (Type B)	Aggregate Base (in.) (Class 2)
4.0	2½	7½
5.0	3	10
6.0	3½	13
7.0	4	16
8.0	4	17½

Pavement materials and construction should comply with the specifications and requirements of the Standard Specifications by the State of California Division of Highways, City of Santa Rosa requirements and the following minimum requirements.

- All pavement subgrades should be scarified to a minimum depth of 12 inches below finished subgrade elevation; moisture conditioned to 3 percent above optimum, and compacted to at least 95 percent relative compaction and in accordance with city requirements.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate baserock materials are placed and compacted.

- Adequate provisions must be made such that the subgrade soils and aggregate baserock materials are not allowed to become saturated.

- Aggregate baserock materials should meet current Caltrans specifications for Class 2 Aggregate Baserock, and should be compacted to at least 95 percent of maximum dry density.

- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.

- All concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate baserock materials.

<u>Utilities</u>

It is recommended that all utility trench backfill be done under the observation of a Geotechnical Engineer, in accordance with both the City of Santa Rosa and utility agency requirements. Pipe zone backfill (i.e. material beneath and immediately surrounding the pipe) may consist of a well-graded import or native material less than ¾ inch in maximum dimension compacted in accordance with the recommendations provided above for engineered fill. Trench zone backfill (i.e. material placed between the pipe zone backfill and the ground surface) may consist of native soil compacted in accordance with recommendations for engineered fill.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence, but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's work. This document must not be subject to unauthorized reuse, which is, reusing without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. If actual field or other conditions necessitate clarifications, adjustments, modifications or other changes to ENGEO's work, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-site construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

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APPENDIX A

Exploratory Boring Logs

APPENDIX B

Laboratory Test Results

APPENDIX C

Probabilistic Seismic Hazard Analysis

6486.2.001.01
November 29, 2004

APPENDIX D

Guide Contract Specifications

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform with the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials. ENGEO environmental personnel will conduct an assessment of the suspect hazardous material to determine the appropriate response and mitigation. Regulatory agencies may also be contacted to request concurrence and oversight. *ENGEO will rely on the Owner, or a designated Owner's representative, to make necessary notices to the appropriate regulatory agencies. The Owner may request ENGEO's assistance in notifying regulatory agencies, provided ENGEO receives Owner's written authorization to expand its scope of services.*

4. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	<u>Sieve Size</u>	<u>Percent Passing</u>
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	<u>Liquid Limit</u>	<u>Plasticity Index</u>
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	<u>Percent Heave</u>	<u>Swell Pressure</u>
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, free from clay or organic material, suitable for the intended purpose with 90 to 100 percent passing a No. 4 U.S. Standard Sieve, not more than 5 percent passing a No. 200 U.S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

Design depths less than 30 feet

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)
- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
3/8-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632).. 180 lbs
Mass Per Unit Area (ASTM D-4751).................................... 6 oz/yd^2
Apparent Opening Size (ASTM D-4751) .... 70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491) .... 80 $gal/min/ft^2$
Puncture Strength (ASTM D-4833)....................................... 80 lbs

D. Vapor Retarder: Vapor Retarders shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick.

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
$^{3}/8$-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials."

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percent above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percentage point above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities, the upper 6 inches of engineered fill in areas to receive pavement shall be compacted to at least 95 percent relative compaction with a minimum moisture content of at least 3 percentage points above optimum.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percent above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor retarder membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are the Contractor's responsibility.

Appendix F2

Geotechnical Exploration, Sutter Medical Center Volume 1 and 2

GEOTECHNICAL EXPLORATION

SUTTER MEDICAL CENTER
SANTA ROSA, CALIFORNIA

MAY 2006
6486.2.003.01

VOLUME 1

ENGEO
INCORPORATED

GEOTECHNICAL EXPLORATION REPORT

PROPOSED HOSPITAL BUILDING
SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK CENTER FOR THE ARTS
SONOMA COUNTY, CALIFORNIA

VOLUME 1 OF 2

SUBMITTED

TO

SUTTER MEDICAL CENTER

SANTA ROSA, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6486.2.003.01

MAY 22, 2006

ENGEO INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
6486.2.003.01

May 22, 2006

Mr. Tom Minard, Director
Facilities and Support Services
Sutter Medical Center of Santa Rosa
3325 Chanate Road
Santa Rosa, CA 95404

Subject: Proposed Hospital Building
Luther Burbank Center for the Arts
Sonoma County, California

GEOTECHNICAL EXPLORATION REPORT

Dear Mr. Minard:

At your request and with your authorization, ENGEO Incorporated has prepared this geotechnical exploration report for the proposed Sutter Medical Center hospital building in Santa Rosa, Sonoma County, California. The accompanying report presents our field and laboratory exploration results, together with our conclusions and recommendations regarding the planned development. Our findings indicate that the site is suitable for the proposed development provided that the recommendations of this report are incorporated into the project design.

In general, subsurface conditions indicate that soils in the upper 30 feet at the building location are compressible. Based on this finding, we recommend that the hospital be supported by a deep foundation system consisting of pre-cast concrete piles. Our recommendations pertaining to these items, as well as other geotechnical design issues, are discussed in this report.

We are pleased to be of service to you on this project and look forward to consulting further with you and your design team.

Very truly yours,

ENGEO INCORPORATED

REGISTERED PROFESSIONAL ENGINEER
JEFFREY A. ADAMS
No. 69633
Exp. 6/30/06
CIVIL
STATE OF CALIFORNIA

FOR Janet Y. Kan, CE

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INTRODUCTION

Purpose

The purpose of this study is to gather design-level information on the distribution and variation of subsurface conditions within the proposed hospital building footprint for the purpose of planning, design and construction. ENGEO Incorporated previously performed a preliminary geotechnical study at this site. Our recommendations were presented in our report entitled "Preliminary Geotechnical Report, Sutter Medical Center of Santa Rosa / Luther Burbank Center for the Arts" dated November 29, 2004.

We prepared this geotechnical exploration report in accordance with the requirements established by the Hospital Facilities Seismic Safety Act (SB 1953), the California Building Code (CBC), and the Engineering Geology and Seismology for Pubic Schools and Hospitals in California prepared by the California Geological Survey.

Scope of Services

The scope of our services for this phase of study included:

1. Drilling 11 exploratory rotary wash borings and advancing 28 cone penetration test holes within the location of the proposed hospital building.

2. Laboratory testing on selected materials.

3. Analysis of the geological and geotechnical data.

4. Preparation of this report summarizing our preliminary findings and recommendations.

Once detailed plans have been prepared, ENGEO should be provided the opportunity to review these for conformance with the intent of our recommendations. During that time, ENGEO may need to perform additional evaluation and/or modify the recommendations contained herein (as deemed appropriate). ENGEO prepared this report for the exclusive use of the Sutter Medical Center and their design team consultants. In the event that any changes are made in the character, design, or layout of the development, the conclusions and recommendations contained in this report should be reviewed by ENGEO to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO Incorporated.

Site Location and Description

The subject site is located at 50 Mark West Springs Road in Santa Rosa, Sonoma County, California (Latitude of 38.4964 degrees North; Longitude of 122.7506 degrees South). The approximate site location is shown on both the Site Coordinate and Site Location Maps, Figures 1 and 2, respectively.

The existing site topography is shown on Figure 3. Currently, the planned hospital footprint is situated mainly within the open-space used as pasture area. The pasture area is relatively flat, having estimated elevations ranging from 156 to 159 feet above mean sea level (MSL) from south to north. The pasture area is currently covered with grass and has a few mature trees.

The proposed hospital south wing extends into an area occupied by a waste water treatment plant. A fence encloses the wastewater treatment ponds and this area is at a higher elevation than the adjacent pasture area. The top embankment elevation that surrounds the ponds is approximately 165 feet above MSL, with side slopes of approximately 2:1 (horizontal: vertical). We understand that the treatment ponds are approximately 8 feet deep. Additionally, the treatment ponds have associated facilities including pumps and buried pipes in the fenced area.

Proposed Development

Jonathan Bailey Associates prepared the current hospital development plans, dated July 2005, which include: a main hospital tower with a 157,000 square feet building footprint; a helipad at the top of the hospital building; and pavements and landscaping surrounding the building. The details regarding building loads have not been finalized at this time; preliminary loads provided by the Structural Engineer are range up to 600 kips for column loads. The hospital building is planned to be constructed within the west portion of the site. Moreover, medical office and administrative buildings ranged from 1 to 5 stories high will be constructed near the proposed hospital footprint. Geotechnical recommendation for nearby administrative structures will be provided in a separate report.

Previous Work

ENGEO previously explored the site, as referenced in our report titled "Preliminary Geotechnical Report, Sutter Medical Center of Santa Rosa / Luther Burbank Center for the Arts" dated November 29, 2004 for the SMC/LBC. Our previous study included drilling 21 exploratory borings (B-1 to B-21), laboratory testing, and report preparation which presented our findings, conclusions and recommendations for site development. As a part of this current study, ENGEO reviewed the previous work and incorporated pertinent data, as deemed appropriate.

ENGEO also conducted a Phase 1 - Environmental Site Assessment (ESA) at the property and presented the results in a report dated December 28, 2004. In summary, the Phase One ESA identified a number of items of concern within the property. Subsequently, ENGEO performed a limited Phase 2

ESA to sample and test for a number of the constituents recommended in our December 28, 2004 report. The finding presented in the report dated February 24, 2005 indicate that no further ESA work is required; however, the ESA studies assessed that existing structures and LBC facilities were not included, and that the waste water treatment facilities associated with LBC use should be decommissioned in accordance with regulatory requirements.

FIELD EXPLORATION

We conducted the field exploration for this study between May 19 and June 27, 2005 to gather additional information on the distribution and variation of subsurface conditions within the proposed hospital building area for planning, design and construction. Our current exploration included drilling 11 exploratory borings (2-B1 to 2-B11), and advancing 28 cone penetration test holes (CPTs) to a maximum depth of about 106½ feet below the existing ground surface. Figure 3 presents the approximate boring and CPT locations, as well as our previous boring locations. We located the exploratory borings and CPTs for the current study by survey stakes as provided by Breje & Race, Civil Engineer.

A truck-mounted rotary drill rig was used to drill Borings 2-B1 through 2-B8, and a barge-mounted CME-45 drill rig equipped for rotary drilling to drill Borings 2-B9 through 2-B11, located within one of the treatment ponds. We retrieved soil samples recovered during drilling using a 3-inch O.D. California-type split-spoon sampler fitted with 6-inch-long brass liners, and a 2-inch O.D. standard penetration test split-spoon sampler. The samplers were advanced with a 140-pound automatic trip safety hammer with a 30-inch drop. The penetration of the sampler into the native materials is field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. Appendix A presents the report borelogs developed from the field logs. The boring logs report blow counts as the number of blows required for the last one foot of penetration. The blow counts presented on the borelogs do not include correction factors.

A 20-ton compression-type cone with a 15-square-centimeter (cm^2) base area, (an apex angle of 60 degrees) and a friction sleeve with a surface area of 225 cm^2 were used to perform the 28 CPT soundings. The cone, connected with a series of rods, is pushed into the ground at a constant rate. Cone readings are taken at approximately 2.5-cm intervals with a penetration rate of 2 cm per second in accordance with ASTM D-3441. Measurements include the tip resistance to penetration of the cone "Qc", the resistance of the surface sleeve "Fs", and pore pressure "U" (Robertson and Campanella, 1988). The CPT logs were included in Appendix B.

Laboratory Testing

We performed laboratory tests on selected soil samples to determine their engineering properties. We list the tests and test result locations below.

Characteristic	Test Method	Location of Results Within this Report
Natural Unit Weight and Moisture Content	ASTM D-2216	Appendix A*
Unconfined Compressive Strength	ASTM D-2166	Appendix C
Gradation, Percent Passing No. 200 Sieve and Hydrometer	ASTM D-422	Appendix C
Atterberg Limits	ASTM D-4318	Appendix C
Consolidation Test and Time Rate	ASTM D-4186	Appendix C
Swell Test Method B	ASTM D-4546	Appendix C
Triaxial Compression Test (UU)	ASTM D-2850	Appendix C
Soluble Sulfate Content	CalTrans Test Method 417	Appendix C

* The boring logs presented in Appendix A contain the moisture and density test results.

GEOLOGY AND SEISMICITY

Regional and Local Geology

ENGEO previously provided detailed discussions on regional and local geology as referenced in our report titled "Preliminary Geotechnical Report, Sutter Medical Center of Santa Rosa / Luther Burbank Center for the Arts" dated November 29, 2004. The following section utilizes information presented in the November 2004 report and provides additional information, as deemed necessary.

Subsurface Conditions

We encountered the following general subsurface conditions at the exploratory boring and CPT locations within the proposed hospital building:

- Existing fills extending to depths of approximately 7 feet (which correspond to approximate Elev. 158 feet) at 2-B7, 2-CPT5, 2-CPT17 and 2-CPT18, within the waste water treatment facility area. The existing fills typically consist of stiff to very stiff clays, and silty clays with various amounts of gravel and rock fragments. The existing fills are associated with the previous grading activities of the waste water treatment facility. Natural alluvial soil deposits underlie the fills.

- Alluvial soil deposits were also encountered at 2-B1 to 2-B6, 2-B8, 2-CPT1 to 2-CPT 4, 2-CPT6 to 2-CPT 16, 2-CPT19 to 2-CPT28, within the pasture area of the site at approximately Elev. 158 feet. The alluvial deposits generally consist of inter-layered clayey sand, sandy clay, silty clay and clays. The soils above groundwater levels (which correspond to approximate Elev.153 to 155 ft) were generally medium stiff to stiff. Below this depth, the alluvial deposits become soft and/or loose to depths of about 30 to 35 feet. Beneath the soft/loose zone, stiff/medium dense sandy soils exist at approximately 30 to 35 feet bgs in our borings and CPTs that extend beyond 30 feet. At 2-CPT9, 2-CPT10 and 2-CPT11, dense sand lenses exist between depths of about 7 to 25 feet. At approximately 40 feet, medium stiff clay deposits about 5 feet in thickness exist at 2-B1, 2- B2, 2-B4 and 2-B6.

- A consistent layer of hard to very dense clayey silts and clayey gravels within each boring and CPT that extends beyond 40 feet to approximately 45 feet. This hard layer extends to the refusal depths of 101½ and 106½ feet in Borings 2-B3 and 2-B8, respectively. Based on two deeper borings, very dense clayey gravel extends to approximately 65 feet deep, underlain by very stiff to hard silty clay and sandy silt deposits to 90 feet. Below this layer, dense gravels exist to approximately 105 feet. At the bottom of 2-B8, we encountered hard silty clay deposits. The alluvial deposits extended to the maximum depth of borings advanced for this study, to depths of at least 106½ feet.

Appendix A contains the borehole logs that present more specific soil descriptions within the building area. The logs describe soil conditions in general accordance with the Unified Soil Classification System. Figures 6 present interpretive geologic cross sections depicting subsurface conditions within the building area. We emphasize that these cross sections have been derived based on an interpolation between similar strata encountered among various boring and CPT locations; as such, variations in actual subsurface conditions should be expected.

Groundwater Conditions

The rotary wash boring method restricted our ability to accurately evaluate groundwater depth during drilling. However, the site CPT data collected indicates groundwater levels ranging from approximately 3 to 5 feet bgs within the pasture area and approximately 9 to 10 feet bgs within the waste water treatment plant area. Fluctuations in the level of groundwater may occur due to variations in rainfall and other factors not evident at the time measurements were made.

Regional Faulting and Seismicity

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active[1] and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 0.7 miles east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996). The Maacama Fault is located 6.3 miles east of the site, and the San Andreas Fault is located 19.5 miles west of the site. Figure 5 presents the Regional Faulting and Seismicity Map, which shows regional proximity of major active faults and significant historic earthquakes with respect to the site.

The regional seismicity of the Bay Area was recently evaluated by the Working Group on Northern California Earthquake Probabilities (WGEP 2003). The Working Group periodically attempts to summarize seismic risk in the Bay Area by presenting probabilities of 6.7 Mw or greater earthquakes on active Bay Area faults for a 30-year return interval (2003-2032); the most recent summary gives a 62 percent aggregate probability for the entire Bay Area. The active Rodgers Creek fault system is estimated to have a 30-year probability of 27 percent for a M6.7 or greater earthquake. The San Andreas Fault system was assigned a 30-year probability of 21 percent. It should therefore be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 11,000 years) (Hart, 1997).

Seismic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake may include primary ground rupture, ground shaking, lurching, liquefaction, dynamic densification, lateral spreading, inundation due to embankment failure, and earthquake-induced landsliding. These hazards were discussed in detail with regards to the site in our November 2004 study. In conclusion, risks from seiches, tsunamis, and volcanic eruption are currently considered negligible at the subject project site. Risk for ground rupture at the site is generally low; however, strong ground shaking is expected at the site.

Ground Motion. A preliminary probabilistic seismic hazard analysis for the site was previously provided in our November 2004 report based on current California fault data. In conjunction with this current study, downhole shear wave velocities were recorded at 2-CPT8, advanced to 40 feet below the ground surface (bgs), and 2-CPT27, advanced to 48½ feet bgs, to provide a site specific shear wave profile. We input the shear wave velocities, recorded in 5 foot intervals, into the computer program, EZ-FRISK, to model the seismic setting of the region and evaluate the following:

- Earthquake magnitude
- Rupture length
- Location of rupture
- Maximum possible earthquake magnitude; and
- Recurrence interval of earthquake events.

The program calculates, by summation from earthquake sources, the total average annual expected number of occurrences of acceleration greater than each of several specified values. Once the annual probability is obtained, the probability of the level of ground acceleration being exceeded over a specified time period is calculated. Using this method and the shear wave velocity data, a horizontal ground surface acceleration of 0.87g is predicted to have a 10 percent probability of being exceeded in a 100-year design life, and a horizontal ground surface acceleration of 0.67g is predicted to have a

10 percent probability of being exceeded in a 50-year design life. The probabilistic ground surface acceleration was derived using attenuation relationships developed by Boore-Joyner-Fumal (1997), Sadigh (1997) and Abrahamson and Silva (1997). Figure 9 shows the normalized spectral acceleration. The EZ-FRISK Probabilistic Seismic Hazard Analysis is provided in Appendix F.

To mitigate the ground shaking effects, all structures should be designed using sound engineering judgment and the latest Uniform Building Code (UBC) requirements as a minimum, taking into consideration that the proposed medical facilities are considered special occupancy structures. In accordance with the 1997 UBC, the site is located within Seismic Zone 4, with a seismic zone factor Z of 0.4, as given in Figure 16-2 and Table 16-I in the UBC. Based on site conditions, the soil profile at the site can be classified as a S_D profile as defined in Table 16-J. According to Tables 16-S and 16-T, near-source factors, N_a of 1.5 and N_v of 2.0, are based on the Rodgers Creek fault being a seismic source type A, approximately 0.7 miles (1.1 km) away. The UBC parameters for the site are presented in the following table:

1997 UNIFORM BUILDING CODE - Chapter 16

ITEM	DESIGN VALUE	SOURCE
Seismic Zone	4	Figure 16-2
Seismic Zone Factor	0.40	Table 16-I
Soil Profile Type	S_D	Table 16-J
Seismic Source Type	A	Table 16-U
Near Source Factor, N_a	1.5	Table 16-S
Near Source Factor, N_v	2.0	Table 16-T
Seismic Coefficient, C_a	0.66	Table 16-Q
Seismic Coefficient, C_v	1.28	Table 16-R

Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The prescribed lateral forces are generally considered to be substantially smaller than the actual peak forces that would be associated with a major earthquake. The Structural Engineers Association of California has also developed performance-based engineering guidelines in their report entitled Vision 2000 (SEAOC, 1995). The conceptual framework for performance-based engineering guidelines is defined as a full range of seismic engineering issues to be addressed in designing structures for predictable and definable seismic performance within established levels of risk. The performance levels are defined as follows:

- Fully Operational – Facility continues in operation with negligible damage.
- Operational – Facility continues in operation with minor damage and minor disruption in nonessential services.
- Life Safe – Life safety is substantially protected, damage is moderate to extensive.
- Near Collapse – Life safety is at risk, damage is severe, structural collapse is prevented.

Vision 2000 includes four levels of earthquake risk as shown below.

Vision 2000 Event	Probability of Exceedance (%)	Design Life (years)	Recurrence Interval (years)
Frequent	50	30	43
Occasional	50	50	72
Rare	10	50	475
Very rare	10	100	970

As shown in Figure 9, essential and safety-critical buildings, such as hospitals and nuclear power facilities, would be expected to meet the basic objective to be fully operational in a rare earthquake and satisfy a life-safety performance level for a very rare earthquake.

Liquefaction. Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary, but essentially total loss of shear strength because of pore pressure build-up under the reversing cyclic shear stresses associated with earthquakes. We performed an assessment using the new CPT data and borings drilled at the site to determine the liquefaction potential of site soils based on the methods of Youd et al. (2001) and Seed et al. (2003). We calculated the Cyclic Resistance Ratio (CRR) and the Cyclic Stress Ratio (CSR) using SPT blow counts obtained from the rotary wash borings. The CRR represents the loading at which a given soil stratum will liquefy. It is further scaled using the Magnitude Scaling Factor (MSF) that adjusts the CRR to the maximum credible seismic event from the M7.5 event of which the CRR formula is based. The CSR represents the loading that is generated within the given soil profile layer during the seismic event. The scaled CRR is divided by the CSR to determine the factor of safety (F.S.) of liquefaction resistance within the given soil profile layer. According to recent liquefaction research performed by Seed et al. (2003), the soil layer is not considered liquefiable if it meets any of the following criteria:

- The factor of safety is greater than 1.0.
- The layer is above the water table.
- The fines content (FC) is greater than 20 percent, Plasticity Index (PI) is greater than 12 percent, and water content (w_c) is less than 80 percent of the liquid limit (LL).
- The FC is greater than 35 percent, PI is less than 12 percent, and w_c is less than 0.85 of the LL.

According to the above cited criteria, the soft saturated clayey sand layers encountered from beneath the bottom of the treatment pond are considered potentially liquefiable. These clayey sand layers extend from the bottom of the pond to approximately 7 feet below (corresponding to approximate Elev. 159 to 152 feet) as encountered in Borings 2-B9 and 2-B10.

Local zones of soft, saturated sands and silts encountered at borings and CPTs within the pasture area corresponding to approximately Elev. 123 to 153 feet (5 to 35 feet bgs) are considered marginally liquefiable. Although soil in this layer contains moderately plastic fines, the high water content relative to their liquid limit (over 85 percent of the LL) suggest that this layer has a potential to hold the water and dissipate excess pore pressures slowly, resulting in a postponed liquefaction condition. The fines in this layer are not classified as sensitive soils and therefore are not susceptible to significant loss of strength if sheared, or remolded during an earthquake event. In addition, these marginally liquefiable soil layers do not appear to be continuous within the proposed hospital building footprint. The gravel encountered in this site contains significant amount of plastic fines and exist in a very dense matrix, as such, the risk of liquefaction in the gravelly deposits is considered low.

In addition to analyses on soils samples collected from the rotary wash borings, we characterized the liquefaction potential based on CPT data using guidelines of Seed et al. (2003), and Robertson and Wride (1997). Based on the results, lenses of potentially liquefiable sandy and silty zones, typically less than 12 inches thick, are present between Elev. 133 to 153 feet (5 to 25 feet bgs) within the central area of the proposed hospital footprint. These soils are not present at the northern portion of the hospital footprint, and appear to thin out towards the south. In general, the potential liquefiable lenses are thin (less than 6 inches thick) and we believe that they are unlikely to be contiguous.

In conclusion, based on our analysis, it is our overall assessment that, in general, the soils within the hospital footprints have low liquefaction potential, with the exception of an 11-feet thick zone of soft sandy deposits located immediately beneath the existing waste water pond. On this basis, support of elements for the building should derive resistance at depths below these deposits. In addition, remedial grading should be performed within the bottom of the ponds to reduce the effect of liquefaction on structural elements to be supported on grade, i.e. floors, pavements, etc..

Earthquake-Induced Densification. Densification of loose to medium-dense clean sand above and below the groundwater level during earthquake shaking could cause settlement. As previously stated, we did not encounter loose to medium-dense clean sands during the subsurface exploration. Therefore, we expect a low probability of densification induced by earthquake shaking.

Lateral Spreading. Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction), which causes the overlying soil mass to move toward a free face or down a gentle slope. No free face or slopes are present near the hospital footprint; therefore, the potential for lateral spreading is considered low.

Earthquake-Induced Landsliding. No landslides have been mapped within or immediately adjacent to the site; therefore, the potential for earthquake-induced landsliding to occur is considered low.

Inundation Due to 100-Year Flood. The project site is not located within the 100-year flood inundation area; therefore, risk of flooding is considered low. However, the Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final hospital pad elevations and provide appropriate design measures for development of the project, if necessary.

Corrosion Potential. An evaluation of possible corrosion impacts to site improvement should be conducted after mass grading of the site. We collected representative samples of the near-surface soils during our field exploration to determine the potential for sulfate attack on foundation concrete and to provide recommended concrete design parameters in accordance with the guidelines presented in Chapter 19 of the Uniform Building Code (1997). We transported the samples with an appropriate Chain of Custody to our laboratory for concentrations of water-soluble sulfate (SO4) in accordance with Caltrans Test Method 417. As reported in the analytical results contained in Appendix C, the sulfate concentration of the tested site soil ranged from 6 is 33 mg/kg. In accordance with the criteria presented in Table 19-A-4 of the 1997 Uniform Building Code, the soil is classified in the negligible sulfate exposure range. Cement type, water-cement ratio and concrete strength are not specified by the UBC for this range. We recommend that Type II cement be used in foundation concrete for structures within the project site. Additionally, concrete should incorporate a maximum water cement ratio of 0.5 and a minimum compressive strength of 3,000 psi. It should be noted, however, that the structural engineering design requirements for concrete might result in more stringent concrete specifications.

Expansive Soils. Expansive soils shrink and swell as a result of moisture changes. These soils may cause heaving, cracking and related distress to structures and shallow site improvements if not properly mitigated. Based on lab testing results on the current and previous study, the Plasticity Index (PI) of near surface soils range from 13 to 26 indicating that site soils have low to moderate expansion potential. Successful development on expansive soils requires special attention during construction. It is imperative that exposed subgrade materials be kept moist at all times during construction due to the extreme difficulty to re-moisturize the soil without excavating, moisture conditioning, and recompaction. Long-term mitigation measures should also include the prevention of moisture variation, and the use of a layer of low expansive "select" materials below lightly loaded structural elements.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings from this subsurface exploration, laboratory test results and analyses, it is our opinion that the planned project development is feasible from a geotechnical standpoint, provided that the recommendations contained in this report, along with sound engineering practices, are incorporated in the design and construction of the project. If significant changes to the hospital footprint or design loadings are made, the recommendations should be refined and modified, as deemed appropriate by the Geotechnical Engineer during project development. Geotechnical matters addressed in this report include: foundation design recommendations, site preparation and grading, retaining walls, pavements, underground utilities, and drainage.

ENGEO should be retained to provide supplemental recommendations and modifications to geotechnical recommendations presented herein during the plan development and the review process, as necessary. This may include revised grading and foundation design recommendations and remedial grading plan preparation. Additional recommendations may be necessary during site grading, depending on the actual subsurface conditions exposed.

Main considerations for the planned development include the following:

- The compressibility of soft sandy and silty soils at depths between 5 to 35 feet bgs, susceptible to excessive total and differential settlement due to loads anticipated for the planned hospital structure;

- Presence of local zones of sandy material that are considered susceptible to seismic settlements (liquefaction) within the existing pond areas when subject to strong ground shaking;

- Presence of existing fill within the waste water treatment facility susceptible to excessive settlement;

- Grading considerations for removal of the ponds within the waste water treatment facility; and

- The presence of low to moderately expansive soil underlying the site which may undergo significant volume changes (swell and compression) when subjected to varying moisture contents.

Settlement Considerations

The alluvial deposits underlying the site are considered susceptible to compression from loads imposed by future fills and heavy structural loads. Soft and compressible silty and clayey deposits exist from 5 feet to 35 feet bgs. To provide necessary support to the moderate to heavy structural loads of the hospital, we recommend that the building be supported on driven pre-cast pre-stressed concrete piles. The piles should be interconnected by utilizing a system of grade-beams and/or a structural floor slab. We believe that such deep foundation system will provide the necessary support and minimize settlement due to soft soil and liquefaction of thin sand lenses for the proposed hospital tower.

In addition, increasing site grades surrounding the building should be minimized to reduce excessive settlement. If future site grades are to be raised greater than two feet above existing site grades, special mitigation measures such as surcharging may be necessary to reduce soil settlement to within acceptable levels. ENGEO should review final grading for conformance with the recommendations contained herein to determine whether preconsolidation measures are necessary.

Foundation Design

As indicated in the previous section, the structural loads of the hospital should be supported on driven pre-cast pre-stressed concrete piles. Based on preliminary discussions with the Structural Engineer, Mr. Kan Patel with John A. Martin & Associates, we understand that 14-inch square pre-cast concrete piles will be used to support the hospital building. To derive the necessary pile support, we recommend piles extend into the dense gravelly deposits encountered at approximately

45 feet bgs, corresponding to approximate Elev. 113 feet). Practical refusal can be expected when the piles are driven about 5 feet into the gravel layer. It is our opinion that piles driven to practical refusal in this gravel layer can support an allowable capacity of approximately 100 to 120 tons. At the time of this study, we were not provided with design loads. ENGEO should be consulted to work with the Structural Engineer regarding design considerations. Pile spacing should be not less than 3 times the pile diameter, center-to-center.

We recommend driving indicator piles at several locations within the building footprint to determine the actual penetration depth into the supporting stratum, as discussed in the following section. If practical refusal does not occur in the gravel stratum, piles designed as friction piles may be considered. For this condition, we anticipate 14-inch-square piles, penetrating 60 feet below the ground floor of the proposed building structures to develop a design capacity of 60 tons. Additional piles may be required in this situation.

Typically, 14-inch-square pre-stressed concrete piles may be driven continuously with a hammer developing at least 40,000 foot-pounds of energy until achieving practical refusal. Refusal blow count criteria may be determined during construction given the hammer size and evaluated efficiency. However, for planning purposes, we suggest that the following refusal blow count criteria:

REFUSAL BLOW COUNT CRITERIA

Actual Hammer Energy (foot-lbs/blow)	Practical Refusal Blow Count
40,000	60 blows per foot
60,000	40 blows per foot

Uplift Resistance. Resistance to uplift loads will be developed in friction along the face of the pile. We recommend an allowable uplift frictional resistance of 150 psf along the sides of the pile. The upper 10 feet of the pile should be neglected in calculating uplift resistance.

Lateral Loading. Lateral resistance to wind and seismic loads can be developed by passive pressure on the soil against the pile caps and grade-beams as well as by bending resistance of the pile foundation. In general, passive resistance against the pile caps could be evaluated using a triangular pressure distribution modeled as an equivalent fluid weight of 250 pounds per cubic foot provided that the pile cap is embedded in engineered fill material. Based upon our exploration, we were also able to develop representative soil criteria for the required variables used in the applied L-Pile program for lateral passive pressure calculations. We present a tabular summary of the L-Pile soil parameters below.

Table 1: Generalized L-Pile Soil Parameters

Elevation(ft)	Generalized Soil Profile	L-Pile Soil Type	Soil Strength	Soil Strength	K (pci)	E50 (%)	Effective Unit Weight (pcf)
153 to 158	Silty Clay to Sandy Clay	3. CLAY	---	2,000 psf	500	0.7	115
128 to 153	Sandy Clay / Sandy Silt / Silty Clay	1. CLAY	---	500 psf	30	2.0	37.6
123 to 128	Silty Clay / Gravelly Clay	2. CLAY	---	2,000 psf	800	0.5	47.6
118 to 123	Silty Clay	1. CLAY	---	1,000 psf	100	1.5	47.6
98 to 118	Clayey Gravel / Clayey Silt	4. SAND	26°	5,000psf	125	0.4	67.5

The following tabulated information summarizes our lateral pile analysis results. Additionally, Appendix E provides the relationships between pile displacement and moment with depth for 14-inch-square pre-stressed concrete pile.

Table 2: Allowable Lateral Capacities (Single Pile)

Pile Diameter (inch)	Axial Loading (tons)	Pile Condition	Allowable Lateral Capacity (tons)	
			¼-inch Top of Pile Deflection	½-inch Top of Pile Deflection
14	60	Pinned-Head	8	11
		Fixed-Head	15	20
14	150	Pinned-Head	8	12
		Fixed-Head	15	20

The above lateral capacities represent the probable response of a single pile under short-term loading conditions and include a factor of safety of 3.0. The Structural Engineer should select other suitable factors of safety based on the type of loading.

We estimated maximum bending moments and points of fixity of a 14-inch square pre-cast pre-stressed concrete pile for ¼- and ½-inch pile top deflection given fixed-head and pined-head condition. The Structural Engineer should be consulted to determine the maximum allowable bending moment for the piles. As referenced in Table 3 below, "point of fixity" is defined as a point of zero lateral deflection.

Table 3: Load Deflection Characteristics (14-inch Square Pile)

Pile Head Condition	Deflection Characteristic	Pile Deflection	
		¼-inch	½-inch
Pinned-Head	Maximum Bending Moment (in-kips)	490	750
	*Depth to Maximum Bending Moment (feet)	4.5	5.0
	*1st Point of Fixity (feet)	8.5	10.5
	*2nd Point of Fixity (feet)	22	25
Fixed-Head	Maximum Bending Moment (in-kips)	590	910
	*Depth to Maximum Bending Moment (feet)	0	0
	*1st Point of Fixity (feet)	15-1/2	17-1/2
	*2nd Point of Fixity (feet)	26-1/2	30

*Below Top of Pile

The foundations should be designed by a licensed Structural Engineer. Once details regarding the structural designs of the hospital building and related development have been determined, ENGEO should review such designs for appropriate changes and/or modifications to these preliminary foundation recommendations as deemed necessary.

Indicator Pile Program For this foundation system, we recommend a minimum of 8 indicator piles be driven prior to the casting of the production piles. The piles should be driven at the corners and around the center of the hospital tower, and should be located to serve as functional foundation piles. The primary purpose of the indicator pile driving will be to determine if practical refusal will occur in the gravel layer, or if the piles could be embedded at least 5 feet into the gravel layer. In addition, the information obtained during indicator pile driving can be used to estimate the production pile lengths, and provide blow count data to correlate with information obtained from the test borings. Indicator piles should be driven with the same equipment that will be used to drive production piles. We recommend that indicator piles be long enough to allow them to be driven at least 65 feet below the proposed foundation elevation of the building structures.

The Geotechnical Engineer should review the final foundation plans when they become available to check for conformance with these recommendations. In addition, all pile-driving operations should be conducted under the observation of the Geotechnical Engineer, and the blow counts should be recorded by a representative of the Geotechnical Engineer.

Grade Beam Design. All foundation piles supporting bearing walls should be interconnected by well-reinforced grade beams. We do not recommend the use of isolated piers. All grade-beams should be reinforced to maximize their moment capacity. The grade beam reinforcement will be dependent on the pile spacing and the structural loads to be supported, but in no case should less than four (4), No. 5 rebars, two in the top and two in the bottom of the beam. Grade beams should be kept to the minimum width that is structurally practical to avoid uplift forces associated with swelling soils. The grade-beam reinforcement should be designed by the Structural Engineer.

Due to the expansive potential of some of the soil in the area of the building, grade beams should be raised off the ground. Provide a void or a pad of degradable or compressible material at least 3 inches thick between the bottom of the grade beam and the ground. In this case, provide for rapid removal of any water that may flow under the hospital. Place at least 7 inches of soil, and compact soil on the outside of exterior grade beams. Provide a minimum 3 to 5 percent slope away from the foundation at right angles to the grade beams to provide for rapid removal of surface water runoff.

Structural Floor Slab. The floor of the hospital building may be pile supported and be designed structurally to span between pile caps and/or grade beams. We recommend floor slab construction consist of a concrete slab at least 6 inches thick underlain by a capillary break consisting of a minimum 6-inch-thick layer of Class 2 Permeable Material. The floor slab reinforcing should be designed by the Structural Engineer. As a minimum, provide No. 4 bars spaced 16 inches on center each way for the slab reinforcement. Anticipate minor cracking and distress in the structure and the slabs-on-grade as a result of concrete shrinkage. Provide frequent control joints to control cracking as recommended by the American Concrete Institute (Publication ACI 302.1R-89).

Resistance to short duration (earthquake-induced) lateral loads may be provided by frictional resistance between the foundation concrete slab and the bearing soils and by passive earth pressure acting against the side of the foundation. A coefficient of friction of 0.35 can be used between concrete and the subgrade. A uniform pressure of 1,000 psf can be used to evaluate the passive resistance that can be developed on the foundation elements for transient loads. For static loads, passive resistance should be evaluated using a triangular pressure distribution modeled as an equivalent fluid weight of 250 pounds per cubic foot. The upper one foot of soil should be excluded from passive pressure computations unless it is confined by pavement or a concrete slab. A combination of both friction and passive pressure may be used if one of the values is reduced by 50 percent.

Underfloor Subdrain

We understand that the elevation of the lowest level of structures has not yet been determined. If structural portions are planned below the water level, provide appropriate subdrainage in order to minimize the amount of water penetration to the lower levels of the structure. Utilize one or more of the following measures to reduce moisture infiltration for these areas:

- Provide a permanent dewatering system under the lowest floor slabs to collect water and reduce water infiltration. The system may consist of a minimum 6-inch-thick layer of Class 2 permeable material or free draining gravel surrounded by synthetic filter fabric graded to drain to a sump. Depending on the amount of water infiltration, multiple sump pumps may be required.

- Provide seal-tight water-proofing for foundation elements anticipated to be within the free water levels. Design for hydrostatic pressure conditions.

Exterior Slab-on-Grade

This section provides guidelines for secondary slabs such as walkways, driveways, and steps. Construct secondary slabs-on-grade structurally independent of the foundation system, to allow slab movement to occur with a minimum of foundation distress. Where slabs-on-grade construction is anticipated, care must be exercised in attaining a near-saturation condition of the subgrade soil before concrete placement. Due to the expansion potential of the near surface soils, we recommend that slabs-on-grade be supported on non-expansive fill to reduce the likelihood of slab damage from heave or shrinkage. To reduce the effects of expansive soil on interior slabs, we recommend the following:

1. Provide a minimum concrete thickness of 4 inches.
2. Reinforce slabs with No. 3 rebar on 16-inch centers, each way, placed within the middle third of the slab.
3. Pre-saturate the upper 10 inches of slab subgrade as described above.

The Structural Engineer should provide final design thickness and additional reinforcement, if necessary, for the intended structural loads. As a minimum requirement, reinforce slabs-on-grade to control cracking. Provide frequent control joints to reduce the cracking. In our experience, welded wire mesh is not sufficient to control slab cracking. Provide a thickened edge extending at least 6 inches into compacted soil to minimize water infiltration. Place a 4-inch-thick layer of clean crushed rock or gravel, which conforms to the requirement listed in Section 2.04 of Part I of the Guide Contract Specifications, under all secondary concrete slabs. Slope slabs away from the buildings at a slope of at least 2 percent to prevent water from flowing toward the building.

Grading Considerations

Coordinate all grading and study area development plans with the Geotechnical Engineer to modify the plans to mitigate any known soil and geologic hazards, as necessary. Notify ENGEO at least 48 hours prior to grading to coordinate our schedule with the grading contractor. Grading operations should meet the requirements of the Guide Contract Specifications included in the Appendix H and must be observed and tested by ENGEO's field representatives.

Ponding of storm water should not be permitted at the site except within engineered sediment detention basins, particularly during cease of work for rainy weather. Before the grading is halted by rain, provide positive slopes to carry the surface runoff to storm drainage structures in a controlled manner to prevent erosion damage.

Demolition and Stripping

Begin grading with the removal of existing structures and associated foundations, buried pipes, septic tanks, leach fields, irrigation lines, water well systems, designated fences, trees and associated root systems, and any other deleterious materials. Remove underground structures that will be abandoned or are expected to extend below proposed finished grades from the project site. Remove tree roots to a depth of at least 3 feet below original grades. The organically contaminated materials should not be used in proposed building pads or pavement areas. Strip and stockpile the organics and use in landscape areas subject to the approval of the Landscape Architect or off haul. Remove any debris found within any areas to be graded.

The planned hospital footprint encroaches into the existing waste water treatment plant location. Prior to site grading, the waste water treatment facility should be decommissioned in accordance with regulatory requirements. Additionally, the bottom 11 feet of the ponds should be overexcavated and replaced with engineered fill under observation of the Geotechnical Engineer and/or by a representative of the Geotechnical Engineer. Grading for the pond area should include:

- Temporary dewatering of the ponds and removal of soft material beneath ponds;
- Excavating and off-hauling the soft and liquefiable material at the pond bottom;
- Overexcavating any undocumented fill within the waste water facility area; and
- Removing underground pipelines and buried foundations.

A representative of ENGEO should determine the actual removal depth in the field based on conditions encountered during the site grading. Clean excavations resulting from demolition and stripping below design grades to a firm undisturbed, non-yielding soil surface as determined by the Geotechnical Engineer. Following clearing and grubbing, scarify, moisture-condition and backfill all depressions with compacted engineered fill. The requirements for backfill materials and placement procedures are the same as those for engineered fill as described in the "Fill Placement" section.

Remove all existing non-engineered fill, vegetation and soft or compressible soils in areas to be graded as necessary for project requirements. The Geotechnical Engineer or qualified representative should determine the material removal depth in the field at the time of grading. Evaluation of unsuitable deposits should be performed during grading and may include sampling and laboratory analyses.

Site Preparation

After the site has been properly cleared and stripped, and necessary excavations have been made, scarify the surface at least 12 inches, moisture condition, and compact in accordance with the recommendations presented below in the "Fill Placement" section, prior to replacing and recompacting overlying soils as engineered fill. The compaction requirements for existing soil used for fill placement are the same as those for engineered fill, as described in a subsequent section of this report.

Materials Selection. With the exception of organic-laden soils, we anticipate engineered fill to consist of the on-site soil materials in connection with the planned grading and site improvements. Organic laden soils contain more than 3 percent organic content above typical background levels in soil. It is our experience that organic laden soils can be blended with general fill material at a ratio not greater than 10:1.

Import materials must be free of organic material, debris and fragments larger than 6 inches in greatest dimension. Import material should meet the requirements contained in Section 2.02B, Part I of the Guide Contract Specifications in Appendix H. Submit a sample of the proposed import material to the Geotechnical Engineer for evaluation by laboratory testing prior to study area delivery.

Fill Placement. Scarify, moisture-condition and recompact the exposed surface area to 12 inches in depth, to provide adequate bonding with the initial fill lift. Place all fills in thin lifts. Avoid lift thicknesses exceeding 6 inches or the compaction equipment penetration depth, whichever is less. Generally apply the following compaction control requirements to granular fills:

Test Procedure:	ASTM D-1557 (most recent).
Required Moisture Content:	A minimum of 3 percent above optimum moisture content.
Required Relative Compaction:	A minimum of 90 percent for non-expansive soil.

Relative compaction refers to in-place dry density of the fill material expressed as a percentage of the maximum dry density based on ASTM D-1557. Optimum moisture is the moisture content corresponding to the maximum dry density.

Monitoring and Testing It is important that all site preparations for mass grading be done under the observation of a Geotechnical Engineer or his/her qualified field representative. Allow the Geotechnical Engineer or his/her field representative to observe all graded area preparation, including demolition and stripping, following the recommendations contained in the Guide Contract Specifications in Appendix H. We also recommend the Geotechnical Engineer or his/her qualified representative be present full time during all phases of the mass grading operations to observe grading procedures and test for soil compaction. Submit the final grading plans to the Geotechnical Engineer for review.

Temporary Dewatering

Based on the boring and CPT data, groundwater levels at this site are as shallow as 5 feet below the ground surface, corresponding to approximate Elev.153 feet in the proposed hospital building area. If excavations extend below this elevation, anticipate the need for temporary dewatering measures. The Contractor should select the dewatering equipment. We recommend dewatering procedures maintain groundwater at a minimum of 2 feet below the bottom of the excavation.

Retaining Walls Criteria

Conventional retaining walls (i.e. concrete, masonry, etc.) that are drained and less than 10 feet in vertical height should be designed to resist the following earth pressures. Design retaining walls that are free to deflect with active earth pressures and walls not free to deflect with at-rest earth pressures.

DRAINED LATERAL EARTH PRESSURES
(Working Stress Loads)

Backfill Slope Condition (horizontal: vertical)	Active Pressure (pcf)	At-Rest Pressure (pcf)
Level	50	85
4:1	55	90
3:1	60	100
2:1	70	110

For walls greater than 10 feet, additional support will be needed to minimize the amount of rotational movement. The final plans should be reviewed by ENGEO, and large walls should be evaluated on a case-by-case basis. ENGEO should work together with the Structural Engineer. Provide backdrain facilities at the base of the foundation for all walls. Backfill of walls should be performed under the observation and testing of ENGEO and according to the recommendations provided in this and the referenced reports.

Preliminary Pavement Design

The following recommendations for preliminary asphalt pavement sections are intended as a conceptual guide for planning. We based the preliminary pavement sections on an estimated R-Value of 5. Actual R-Value samples should be collected for testing after grading to approximate rough grades and installation of underground utilities. The preliminary pavement sections are based on the estimated R-Value, the Caltrans "Design Method for Flexible Pavements", and Traffic Indices (T.I.) ranging from 4 to 8. However, T.I. values should be determined by the Civil Engineer or appropriate public agency.

Traffic Index	Asphalt Concrete (in.) (Type B)	Aggregate Base (in.) (Class 2)
4.0	2½	7½
5.0	3	10
6.0	3½	13
7.0	4	16
8.0	4	17½

Pavement materials and construction should comply with the specifications and requirements of the Standard Specifications by the State of California Division of Highways, City of Santa Rosa requirements and the following minimum requirements.

- Scarify pavement subgrades to a minimum depth of 12 inches below finished subgrade elevation; moisture condition to 3 percent above optimum, and compact to at least 95 percent relative compaction and in accordance with city requirements.

- Subgrade soils should be in a stable, non-pumping condition at the time aggregate baserock materials are placed and compacted.

- Adequate provisions must be made such that the subgrade soils and aggregate baserock materials are not allowed to become saturated.

- Aggregate baserock materials should meet current Caltrans specifications for Class 2 Aggregate Baserock, and should be compacted to at least 95 percent of maximum dry density.

- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.

- All concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate baserock materials.

Utilities

It is recommended that all utility trench backfill be done under the observation of a Geotechnical Engineer, in accordance with both the City of Santa Rosa and utility agency requirements. Pipe zone backfill (i.e. material beneath and immediately surrounding the pipe) may consist of a well-graded import or native material less than ¾ inch in maximum dimension compacted in accordance with the recommendations provided above for engineered fill. Trench zone backfill (i.e. material placed between the pipe zone backfill and the ground surface) may consist of native soil compacted in accordance with recommendations for engineered fill.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence, but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

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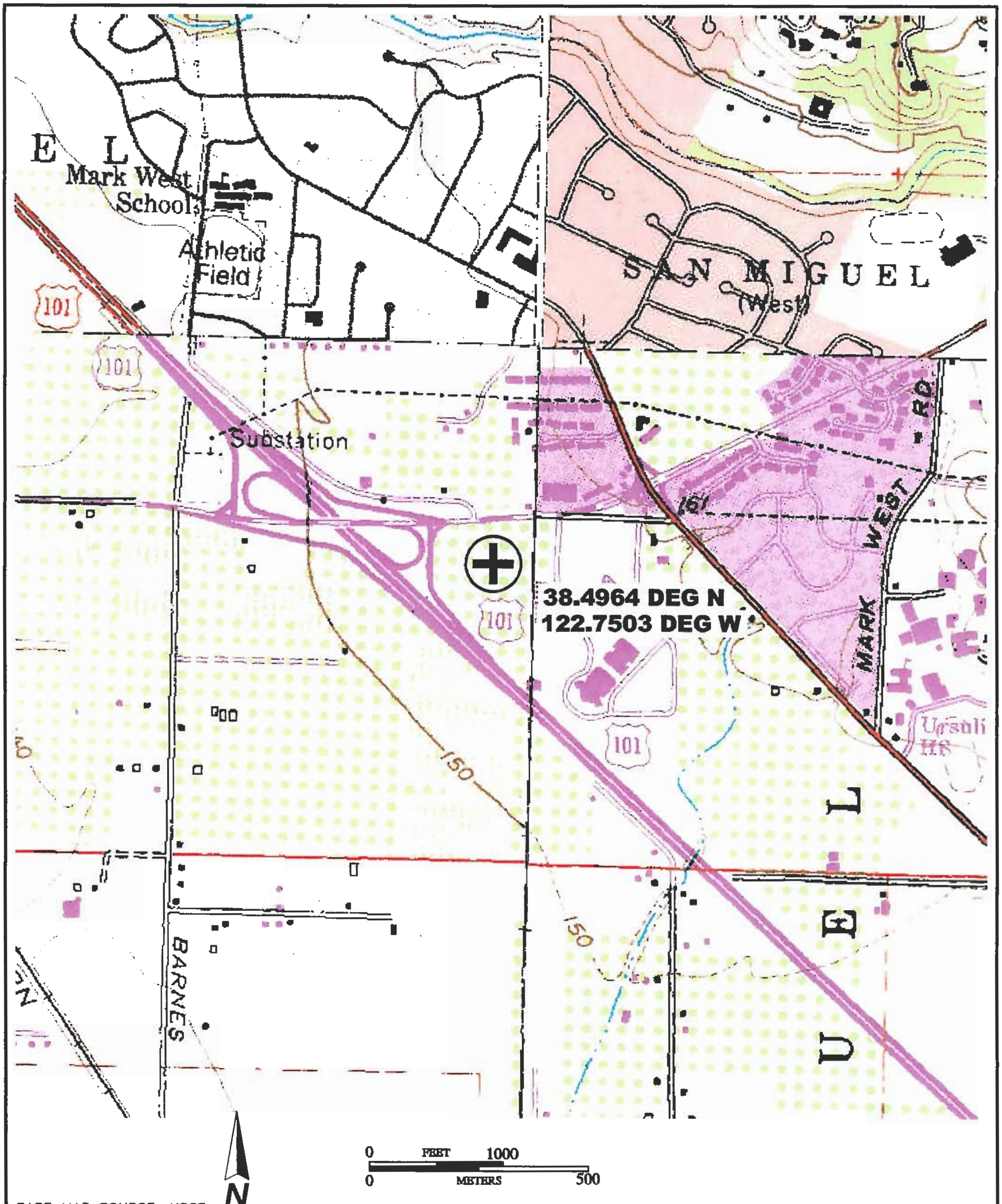

BASE MAP SOURCE: USGS

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SITE VICINITY MAP SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.2.003.01 DATE: MAY 2006 DRAWN BY: LC / CHECKED BY: JYK	FIGURE NO. 1

ORIGINAL FIGURE PRINTED IN COLOR

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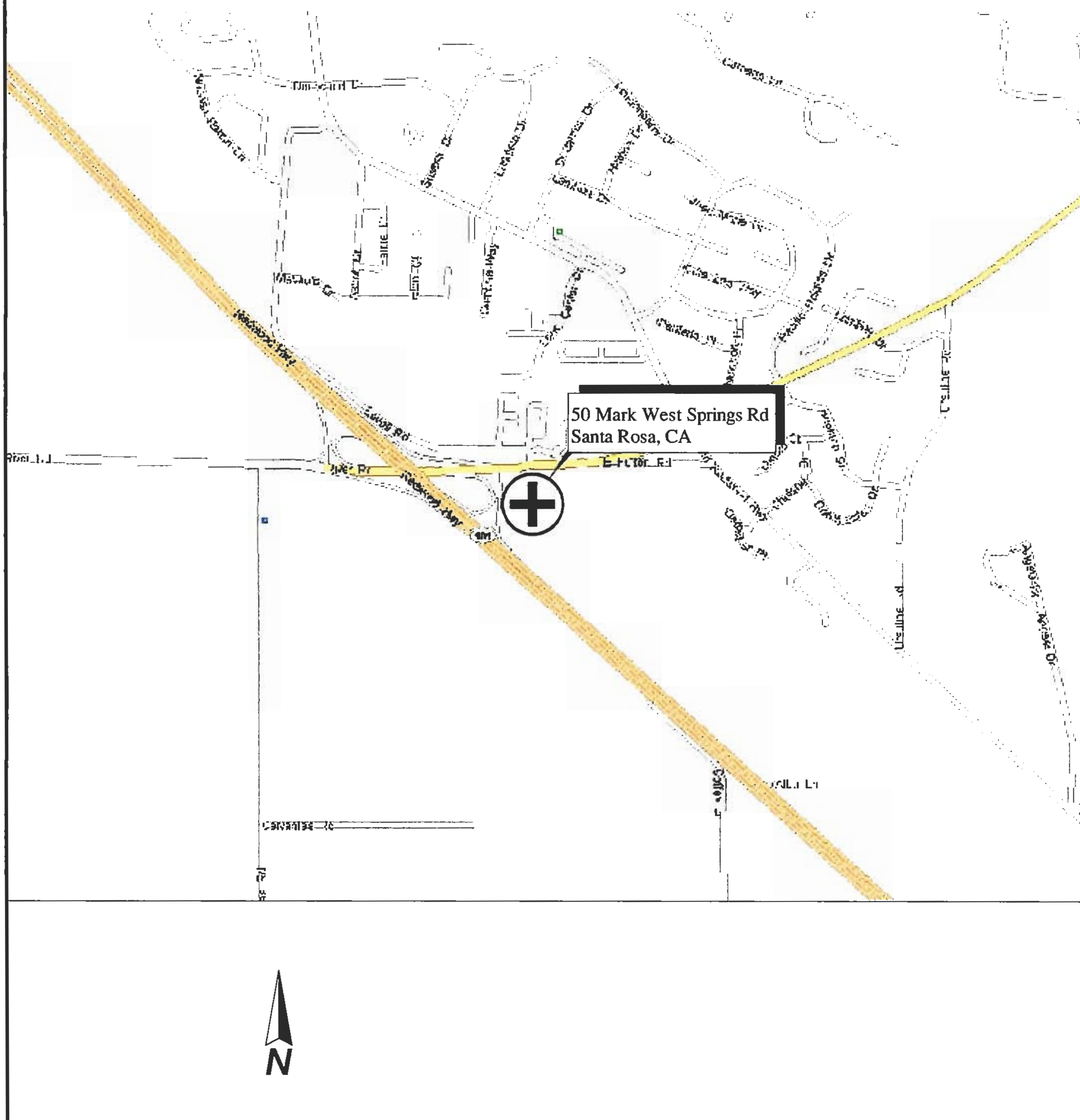

BASE MAP SOURCE: MS STREETS AND TRIPS (10/05)

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE LOCATION MAP
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.2.003.01		FIGURE NO. 2
DATE: MAY 2006		
DRAWN BY: LC	CHECKED BY: JYK	

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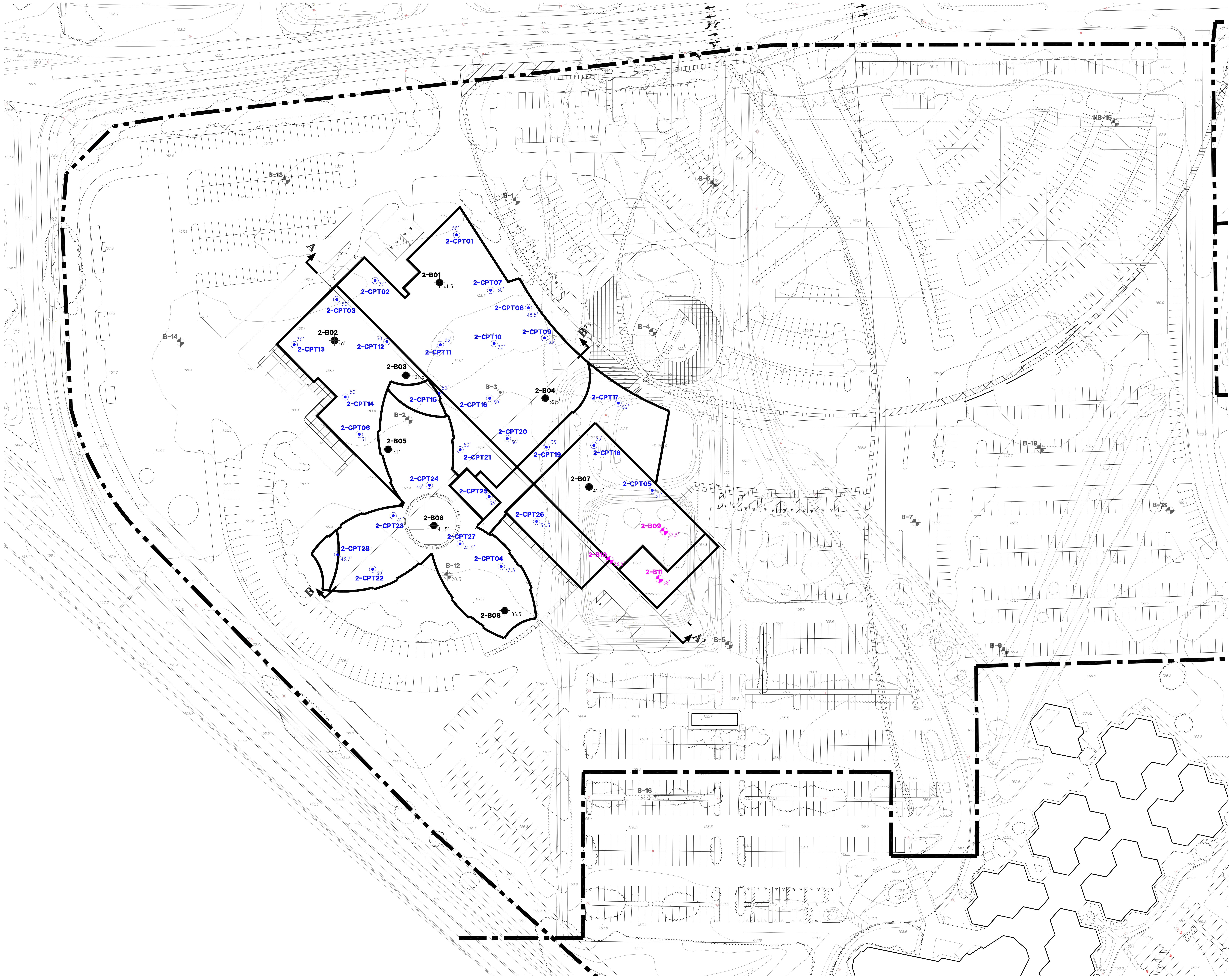


EXPLANATION

B02-08 30' — APPROXIMATE LOCATION OF PROPOSED BORING AND DEPTH (FEET)

B02-11 30' — APPROXIMATE LOCATION OF PROPOSED BORING DRILLED ON A BARGE AND DEPTH (FEET)

CPT02-28 30' — APPROXIMATE LOCATION OF PROPOSED CONE PENETRATION TEST HOLES AND DEPTH (FEET)

B-19 30' — APPROXIMATE LOCATION OF BORING PERFORMED DURING PREVIOUS STUDY AND DRILLED DEPTH (FEET) (ENGEO, 2004)

A A' — APPROXIMATE LOCATION OF A-A'

B B' — APPROXIMATE LOCATION OF B-B'

N

0 FEET 60
0 METERS 30

BASE MAP SOURCE: BAILEY (AUGUST 2005)

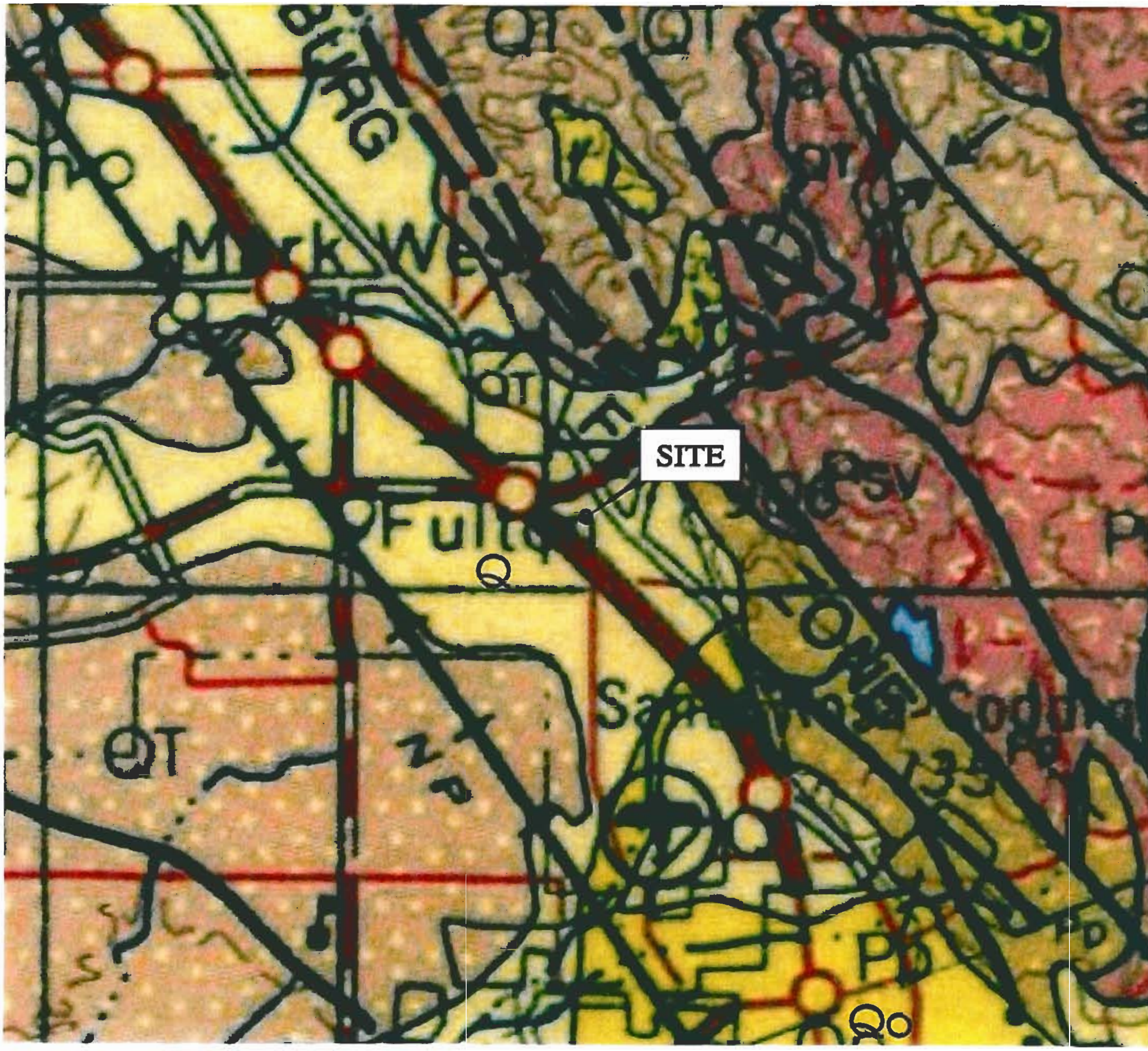
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE EXPLORATION MAP
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.:	6486.2.003.01
DATE:	MAY 2006
DRAWN BY: LC	CHECKED BY: JYK
FIGURE NO.	3

G:\Drafting\DRAFTING2_Dwg\6486\003\6486200301-3SITEPLAN-0506.dwg 8-06-08 03:09:27 PM

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

Q	ALLUVIUM
Qo	OLDER ALLUVIUM
Qt	TERRACE DEPOSITS
Pp	PETALUMA FORMATION (CLAYSTONE, SILTSTONE, MUDSTONE; MOSTLY NON-MARINE)
Psv	SONOMA VOLCANICS (B-BASALT; A-ANDESITE; R-RHYOLITE; T-TUFF AND OTHER PYROCLASTIC ROCKS)

N

0 MILES 0.5
0 KILOMETERS 1

BASE MAP SOURCE: CALIFORNIA GEOLOGICAL SURVEY, 1980

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	REGIONAL GEOLOGIC MAP SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.2.003.01 DATE: MAY 2006 DRAWN BY: LC CHECKED BY: JYK	FIGURE NO. 4

ORIGINAL FIGURE PRINTED IN COLOR

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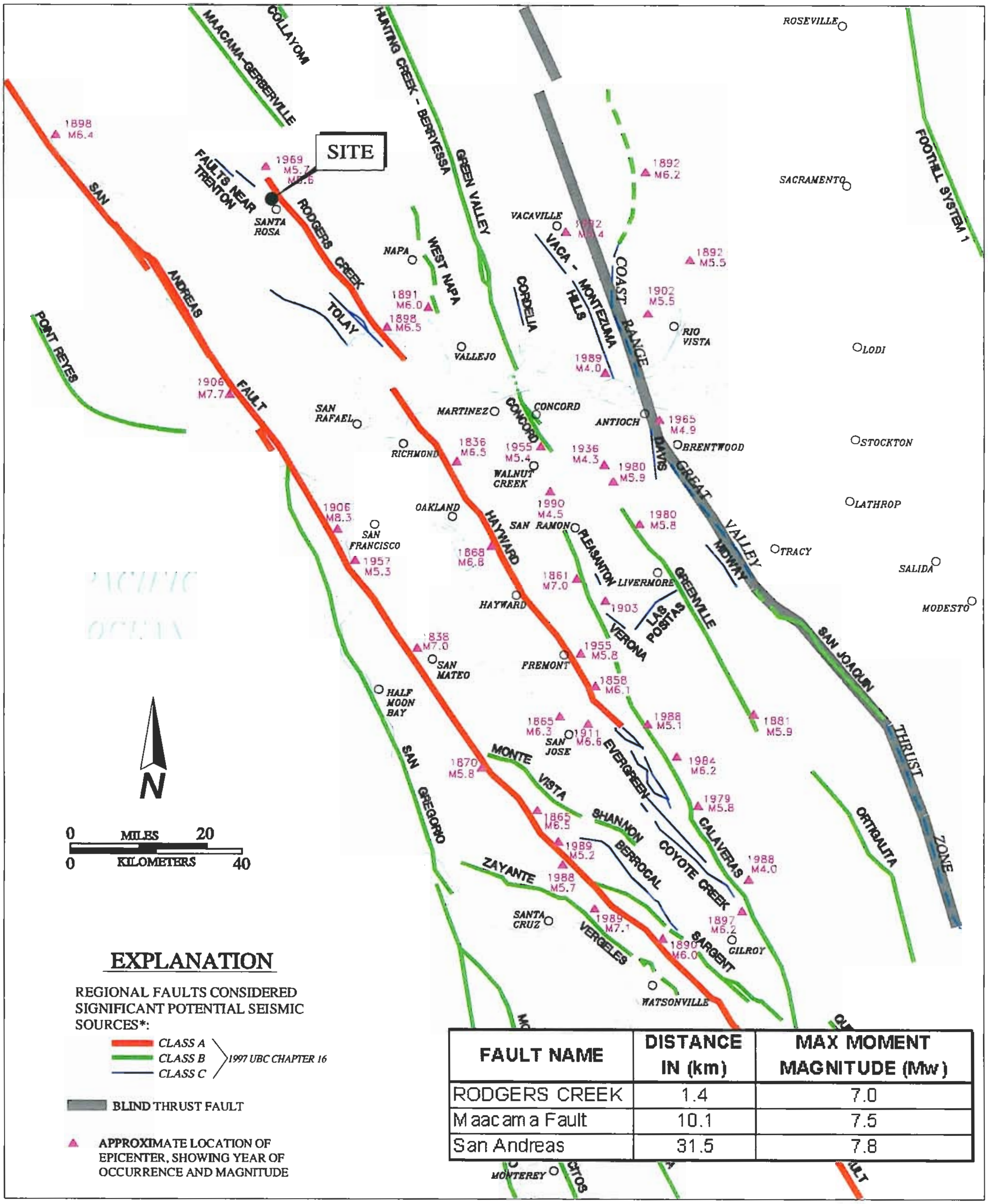


FAULT NAME	DISTANCE IN (km)	MAX MOMENT MAGNITUDE (Mw)
RODGERS CREEK	1.4	7.0
Maacama Fault	10.1	7.5
San Andreas	31.5	7.8

EXPLANATION

REGIONAL FAULTS CONSIDERED SIGNIFICANT POTENTIAL SEISMIC SOURCES*:

- CLASS A
- CLASS B
- CLASS C

1997 UBC CHAPTER 16

BLIND THRUST FAULT

▲ APPROXIMATE LOCATION OF EPICENTER, SHOWING YEAR OF OCCURRENCE AND MAGNITUDE

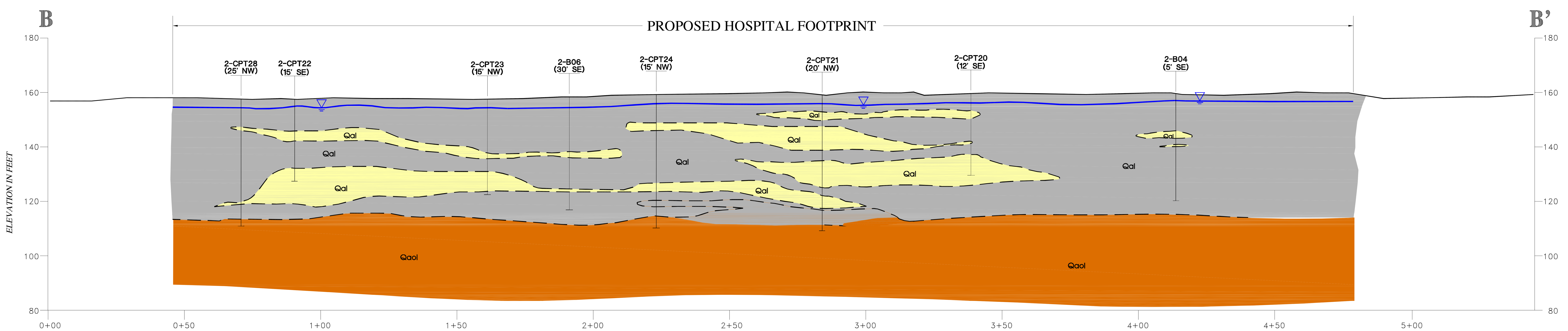
*BASED ON USGS OPEN FILE 96-706

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	REGIONAL FAULTING MAP SUTTER MEDICAL CENTER SONOMA, CALIFORNIA	PROJECT NO.: 6486.2.003.01 DATE: MAY 2006 DRAWN BY: LC CHECKED BY: JYK	FIGURE NO. 5

ORIGINAL FIGURE PRINTED IN COLOR

C:\Drafting\DRAFTING2_Dwg\6486\003\6486200301-5FAULT-0506.dwg 5-24-06 02:40:05 PM

SECTION A-A'
1"=20'



SECTION B-B'
1"=20'

EXPLANATION

MANMADE FILL

Qaf	SILTY CLAY AND GRAVELLY CLAY, STIFF, MOIST TO DRY

ALLUVIUM

Qaf	SANDY CLAY, CLAYEY SAND, GRAVELS, LOOSE/SOFT, WET (POTENTIALLY LIQUEFIABLE)
Qal	INTER-LAYERED CLAYEY SAND, SANDY CLAY, SILTY CLAY, AND CLAY, SOFT TO STIFF, MOIST-DRY
Qal	INTER-LAYERED SANDY SILT, SILTY CLAY, CLAY, AND SAND, MEDIUM DENSE, STIFF TO VERY STIFF, WET

OLDER ALLUVIUM

Qaol	INTER-LAYERED CLAYEY SILT AND CLAYEY GRAVELS, VERY DENSE/HARD, WET

2-CPT24 (15' NW)	APPROXIMATE LOCATION OF CONE PENETRATION TEST (APPROXIMATE DISTANCE PROJECTED FROM SECTION LINE)
2-B06 (30' SE)	APPROXIMATE LOCATION OF SOIL BORING (APPROXIMATE DISTANCE PROJECTED FROM SECTION LINE)
▽	WATER TABLE LEVEL

VERTICAL AND HORIZONTAL SCALE:
0 FEET 20
0 METERS 10

SOILS ENGINEER:

THESE CROSS SECTIONS HAVE BEEN DERIVED BASED ON AN INTERPOLATION BETWEEN SIMILAR STRATA ENCOUNTERED AMONG VARIOUS BORING AND CPT LOCATIONS; AS SUCH, VARIATIONS IN ACTUAL SUBSURFACE CONDITIONS SHOULD BE EXPECTED. THIS PLAN HAS BEEN PREPARE UNDER THE DIRECTION OF AND REVIEWED BY THE UNDERSIGN.

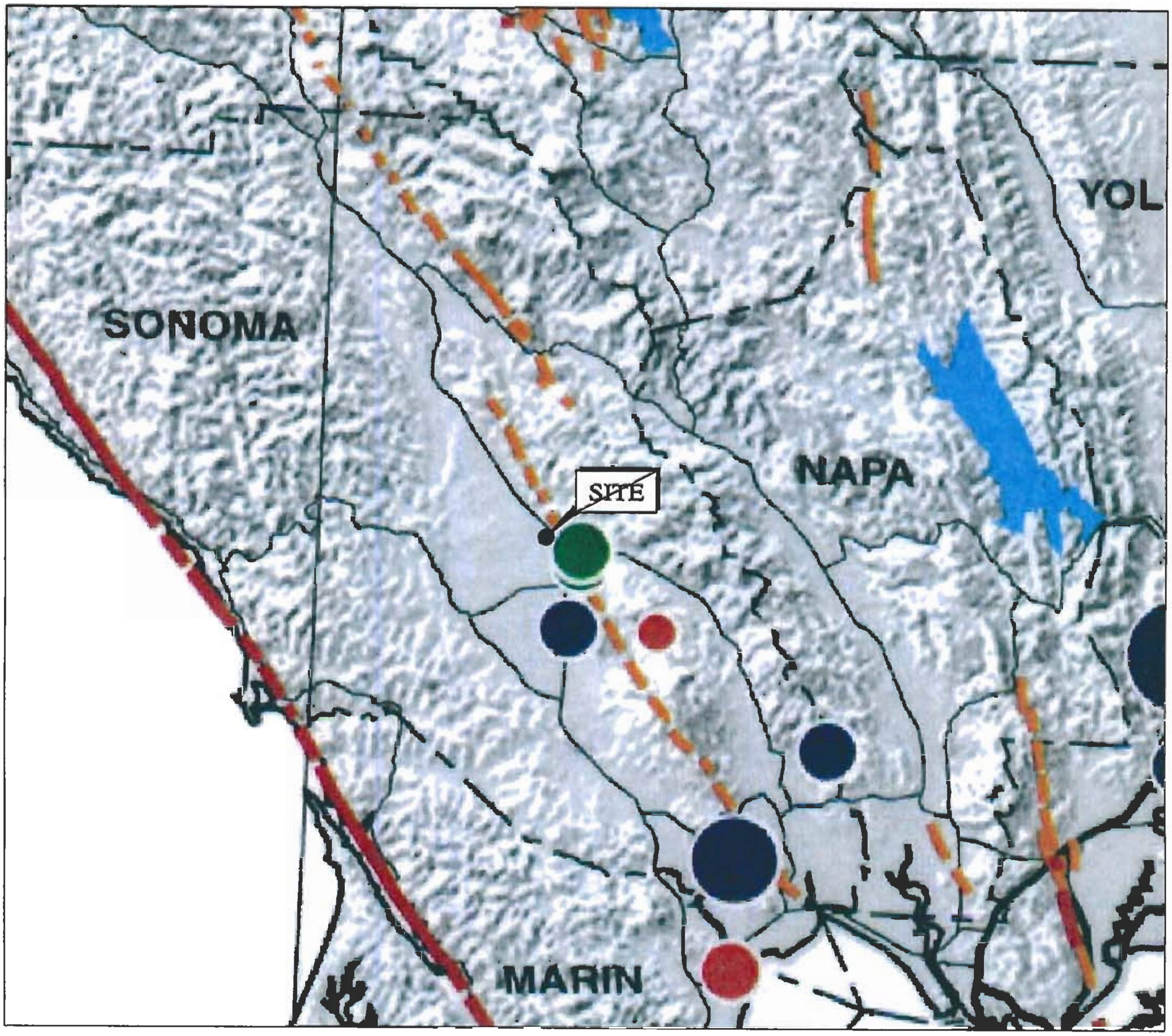
BY:______________________ ______________
THEODORE P. BAYHAM DATE
GE 2480, EXPIRES 9-30-06

1"=20'

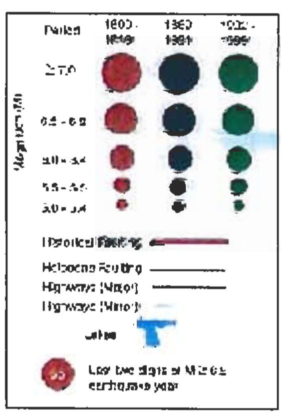
ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	GEOLOGIC CROSS SECTIONS SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.2.003.01 DATE: MAY 2006 DRAWN BY: LC CHECKED BY: JYK	FIGURE NO. 6

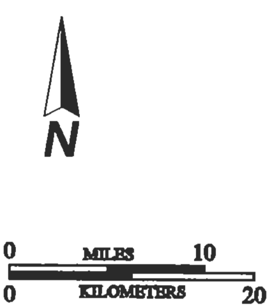
G:\Drafting\DRAFTING2_Dwg\6486\003\6486200301-6A-XsecAA-0506.dwg 8-06-08 03:09:52 PM

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION





BASE MAP SOURCE: CAGS MAP SHEET 49

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	HISTORICAL SEISMICITY MAP SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.2.003.01 DATE: MAY 2006 DRAWN BY: LC CHECKED BY:	FIGURE NO. 7

ORIGINAL FIGURE PRINTED IN COLOR

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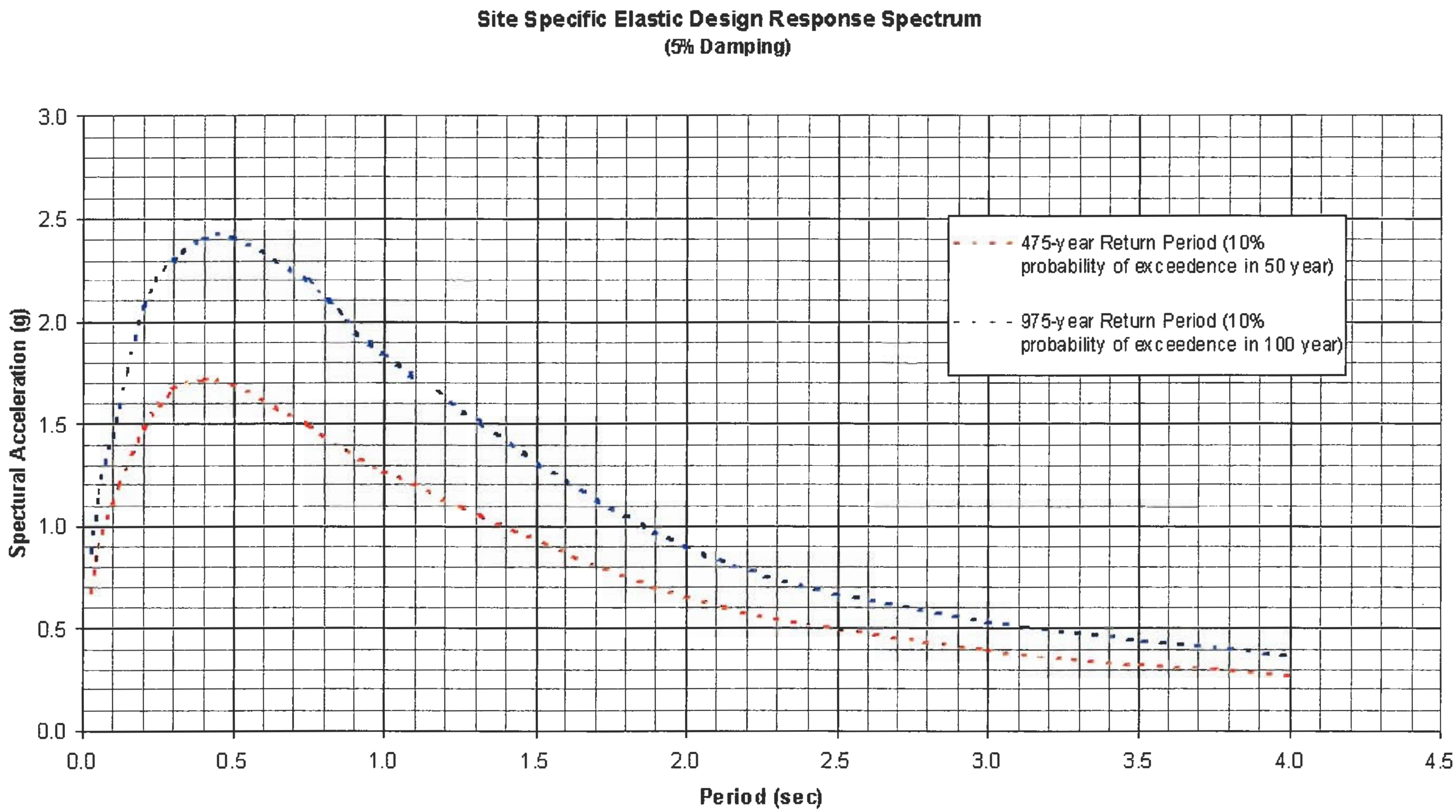
ORIGINAL FIGURE PRINTED IN COLOR



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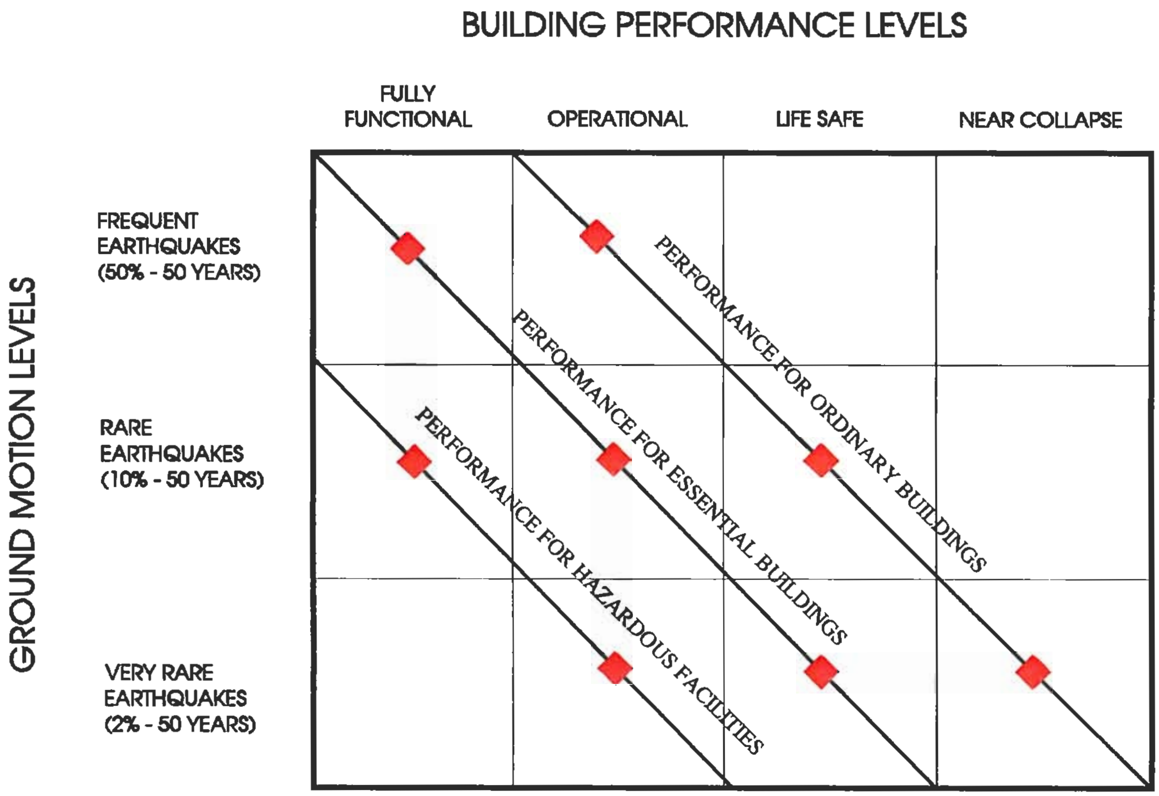
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

NORMALIZED SPECTRAL ACCELERATION
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.2.003.01	
DATE: MAY 2006	
DRAWN BY: LC	CHECKED BY: JYK
FIGURE NO. 8	

VISION 2000 PERFORMANCE OBJECTIVES



BASE MAP SOURCE: SEAOC, 1995

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PERFORMANCE OBJECTIVES OF STRUCTURES
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.2.003.01	FIGURE NO. 9
DATE: MAY 2006	
DRAWN BY: JMG	CHECKED BY: JYK

ORIGINAL FIGURE PRINTED IN COLOR

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APPENDIX A

Exploratory Boring Logs

ENGEO Incorporated (2005)

Borings 2-B01 to 2-B11

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SANDY CLAY (CL), brown.				
	1							
5		B1@4.5' B1@5'		CLAYEY SAND (SC), brown, loose, subangular to subrounded, trace fine gravels.	9	1.0*	88	33.3
	2			SILTY CLAY (CL), olive brown, medium stiff, trace sand, trace pebbles, trace oxidation, small inclusions of organics.				
10	3	B1@8.5' B1@9'			10	0.8	89	32.6
	4	B1@13.5'		SANDY CLAY (SC), brown, soft, trace gravels.	3	0.5	93	29.1
15	5	B1@16.5' B1@17'		SANDY SILT (ML), olive brown, medium stiff, small inclusions of organics.	6	2.0*	80	44.0
20	6	B1@21'		SILTY CLAY (CL), mottled olive brown, soft, some sand, small inclusions of organics.	5	1.0*		43.1
25	7	B1@25'		SANDY CLAY (CL), brown, medium stiff, fine to course sand, subangular to subrounded, small inclusions of organics.	7			
30	8 9	B1@29'		SILTY SAND (SM), brown, trace gravels.	39		97	27.8

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B1

LOGGED BY: J. Wisniewski

CHECKED BY

PROJ. NO.: 6486.2.003.01

FIGURE NO. A01

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10	B1@33'		SILTY CLAY (CL), mottled blue-brown, stiff, with sand, some trace fine gravels, small inclusions of organics.	17	2.25*		
35				Gravels (GP)				
	11	B1@37'		SILTY CLAY (CL), mottled blue-gray, stiff, trace sand, trace fine gravels, small inclusions of organics.	6	0.5	74	48.9
40	12	B1@41'		SILTY CLAY (CL), blue-gray, stiff with sand.	11			14.4
	13			Bottom of boring at approximately $41^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	14							
50	15							
	16							
55	17							
60	18							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B1

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A01

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SANDY CLAY (CL), mottled olive-brown, soft, some sand, subangular to subrounded, trace pebbles subrounded.				
	1							
5	2	B2@6'			6		101	25.3
10	3							
	4	B2@13'		SILTY CLAY (CL) with sand, olive-brown, soft, small inclusions of organics.	6	0.5	87	35.1
15	5			CLAYEY SAND (SC), brown, very loose.				
		B2@18'		SILTY CLAY (CL) with sand, olive-brown, soft, small inclusions of organics.	5		83	40.3
20	6			SANDY CLAY (CL), mottled olive-brown, soft, fine sand, subangular to subrounded, small inclusions of organics, trace gravel.				
	7	B2@23'			4			
25	8			GRAVEL (GP), gray, blue, red, and brown, loose, subangular to subrounded.				
		B2@28'		GRAVELLY CLAY (CL) with sand, brown, medium stiff, some oxidation.	11		116	14.6
30	9							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B2

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A02

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
				SILTY CLAY (CL), mottled olive-brown, stiff, small inclusions of organics, trace oxidation.				
	10	B2@33'			11	1.75*		
35	11							
		B2@37.5'		SILTY CLAY (CL), blue-gray, soft, some sand, small inclusions of organics.		1.0	74	47.0
		B2@38'		SAND (SP), olive-brown to blue-gray, subangular to subrounded.	7	1.0*	77	44.7
	12			SILTY CLAY (CL) with sand, blue gray, stiff.				
40		B2@39.5'			20			37.6
				Bottom of boring at approximately 40 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	13, 14							
50	15							
55	16, 17							
60	18							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B2

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A02

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SANDY CLAY (CL), brown.				
	1							
5	2	B3@6'		CLAYEY SAND (SC), olive-brown, loose, subangular to subrounded, trace oxidation.	6		91	28.0
10	3	B3@10.5' B3@11'		Small inclusions of organics.	5	0.75*	91	30.4
	4							
15	5	B3@16'		GRAVELLY SAND (SP), brown, medium dense, subangular to subrounded.	13			
		B3@17.5'		SANDY CLAY (CL), olive-brown, soft, subangular, trace gravel, subrounded, small inclusions of organics, trace oxidation.	4			30.4
20	6	B3@20' B3@21.5'		SILTY CLAY (CL) with sand, mottled olive-brown and orange, soft, some oxidation, small inclusions of organics.	4		71	42.0
	7			SILTY SAND (SM), brown, subangular to subrounded.				
25	8	B3@26' B3@26.5'		SANDY SILT (ML), blue-grey, soft, trace pebbles, subrounded.	3			
30	9			SILTY SAND (SM), olive-grey, loose, subrounded.				

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B3@31'			6			29.4
	10							
35				SILTY CLAY (CL) with sand, olive-grey, very stiff, trace gravel, up to 1.5" in diameter, small inclusions of organics, trace oxidation.				
	11	B3@36'		SAND (SP), blue-grey, dense, some gravel, subangular to subrounded.	32	2.0*	126	11.7
40	12			CLAYEY GRAVEL (GC), olive-grey, medium dense, subangular to subrounded.				
		B3@41'		SANDY SILT (ML), blue-grey, stiff, fine sand, subangular to subrounded.	17		93	31.5
	13							
45	14	B3@45.5' B3@46'		SILT (ML), blue-grey, very stiff, trace fine sand, subangular to subrounded, trace oxidation, small inclusions of rootlets.	26		94	28.1
50	15	B3@50.5'		CLAYEY GRAVEL (GC), mottled olive-grey, red, and green, very dense.	50/6"			11.2
	16							
55	17	B3@56'		Grades to mottled green, blue, red, and olive, subangular gravels.	73			8.0
60	18	B3@61'		Grades to mottled olive-grey, brown, red, and green, subangular to subrounded gravels.	71			11.6

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A03

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
65	19, 20							
	21			SILTY CLAY (CL), mottled olive-brown, trace sand.				
70	22	B3@70.5' B3@71'		SANDY SILT (ML), blue-green, very stiff.	36	4.5*	79	41.2
75	23, 24			SILT (ML), blue-green, very stiff, some sand, trace oxidation, small inclusions of rootlets.				
80	25	B3@80.5' B3@81'		SILTY SAND (SM), brown, dense, trace fine gravel, subangular to subrounded.	55	3.0*	86	35.5
85	26, 27			SILTY CLAY (CL), blue-grey, hard, some sand, some gravel. (Harder drilling.)				
90	28	B3@90.5'			50/3"	4.5+*	100	24.6

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A03

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
95	29							
	30			SILTY GRAVEL (GM) with sand, olive-brown, very dense, subangular to subrounded, trace oxidation.				
100		B3@101'			83			11.0
	31			Bottom of boring at approximately $101^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
105	32							
	33							
110	34							
115	35							
	36							
120	37							

DATE OF BORING: May 26, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			SILTY CLAY (CL), mottled dark brown and orange, stiff, some organics, trace sand, trace pebbles, trace oxidation.				
	1			15			
5			CLAYEY SAND (SC), mottled brown, blue, and red, very loose.				
	2	B4@6.5' B4@7'	SILTY CLAY (CL), mottled dark brown and olive, soft to medium stiff, some sand, some organics, trace fine gravels.	4		98	24.6
10	3		Grades to with sand, mottled olive-brown.				
		B4@11'		6		94	29.5
	4		SILTY SAND (SM), brown, subangular to subrounded.				
15		B4@14.5' B4@15'	SILTY CLAY (CL), mottled olive-brown, stiff, trace sand, fine to medium, small inclusions of organics, trace oxidation.	11	1.5*	84	36.4
	5						
		B4@18.5'	SILTY SAND (SM), mottled brown, red, and blue, loose, fine to coarse, subangular to subrounded.	6		87	35.0
20	6		SILTY CLAY (CL), mottled olive-brown, medium stiff, some sand, small inclusions of organics.				
	7	B4@23'		8	1.5*	87	37.0
25	8		Grades to with sand, dark brown, becomes stiff.				
		B4@27'		12	0.8	87	35.1
30	9		SILTY CLAY (CL), mottled olive-grey, soft, trace sand, small inclusions of organics, trace oxidation.				

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B4

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A04

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 26, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B4@31'			5	1.25*	75	45.3
	10							
35				SILTY CLAY (CL), blue-grey, medium stiff, trace sand, small inclusions of organics, trace oxidation.				
		B4@35'			11			
	11							
	12	B4@39'			6			39.9
40				Bottom of boring at approximately 39 $^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B4

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A04

ENGEO BORELOG2 648620030I-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SILTY CLAY (CL), mottled olive-brown and orange, medium stiff, trace sand, small inclusions of organics.				
	1	B5@4'			6	1.5*	89	31.8
5	2							
				Becomes stiff.				
10	3	B5@9'			13	1.4	82	32.3
				CLAYEY SAND (SC), mottled brown and olive, loose, subangular to subrounded, some silt.				
	4	B5@14'			6		88	33.3
15	5							
				SILTY CLAY (CL), mottled olive-brown and orange, soft, some sand, trace subangular - subrounded pebbles, small inclusions of organics.				
20	6	B5@19'			4			35.5
	7			Grades to with sand, brown, trace oxidation.				
25		B5@24'			3			38.6
	8			SANDY CLAY (CL), mottled olive-brown, medium stiff, some oxidation, small inclusions of organics.				
30	9	B5@29'			8			34.8

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10			SILTY CLAY (CL), blue-grey, stiff, some oxidation, trace sand.				
35		B5@34'			11			27.7
	11							
	12	B5@38.5' B5@39'		SANDY GRAVEL (GP), blue-grey, medium dense.	18		98	26.9
40		B5@40.5'		SILTY SAND (SM), blue-grey, medium dense, subangular to subrounded.	13			32.3
				Bottom of boring at approximately 41 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
	13							
45	14							
50	15							
	16							
55	17							
	18							
60								

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SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B5
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
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FIGURE NO. A05

DATE OF BORING: May 23, 2005

SURFACE ELEVATION: Approx. 157 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			SILTY CLAY (CL), brown, soft, some sand, trace pebbles.				
5	2	B6@6'		4	1.0*	95	26.5
10	3		CLAYEY SAND (SC), brown, very loose, fine-grained, subangular.				
		B6@11'		2			34.6
15	4		SANDY CLAY (CL), mottled olive-brown and orange, soft, trace pebbles, subangular.				
	5	B6@16'		4		87	36.0
20	6		CLAYEY SAND (SC), brown, loose, coarse, subangular.				
		B6@21'		7		99	26.9
	7		SILTY CLAY (CL), mottled brown, olive, and orange, very stiff, trace sand, trace pebbles, subangular, small inclusions of organics.				
25	8	B6@26'		26	3.0*	82	32.6
30	9		CLAYEY SILT (ML) with sand, mottled olive-brown, medium stiff, some oxidation, small inclusions of organics.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B6

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A06

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 23, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B6@31'			7			
	10	B6@32.5'			8			35.3
				SAND (SP).				
35								
	11	B6@36'		SILTY CLAY (CL), blue-grey, stiff.	19	2.75*		
	12							
40				Becomes medium stiff.				
		B6@41'			10	0.7	83	39.6
	13			Bottom of boring at approximately 41 1/2 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45								
	14							
	15							
50								
	16							
55								
	17							
	18							
60								

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SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B6
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
CHECKED BY

FIGURE NO. A06

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 26, 2005 SURFACE ELEVATION: Approx. 165 feet (50 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				CLAYEY GRAVEL (GC). (FILL)				
	1							
5				SILTY CLAY (CL) with gravels, olive, stiff, subangular to subrounded.				
	2	B7@6'			13	0.5*		
				SILTY CLAY (CL), mottled olive-brown, medium stiff, some sand, small inclusions of organics.				
10	3							
		B7@11'			6			
	4							
15				Becomes stiff, trace sand.				
	5	B7@16'			10	1.0	88	33.2
20	6			SANDY CLAY (CL), olive-brown, medium stiff, small inclusions of organics.				
		B7@21'			6	1.5*	83	37.5
	7							
25				SILTY CLAY (CL), mottled olive-brown, soft, trace sand, small inclusions of organics, trace oxidation.				
	8	B7@26'			3			
30	9			Becomes medium stiff, some gravel, some sand.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B7

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A07

DATE OF BORING: May 26, 2005

SURFACE ELEVATION: Approx. 165 feet (50 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B7@31'			6			26.7
	10							
35				CLAYEY GRAVEL (GC) with sand, mottled olive-brown, red, orange, and white, dense, subangular to subrounded.				
	11	B7@36'			37			
	12							
40				Becomes very dense.				
		B7@41'			68			10.4
	13			Bottom of boring at approximately $41^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	14							
	15							
50								
	16							
55	17							
	18							
60								

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B7

LOGGED BY: J. Wisniewski

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FIGURE NO. A07

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 157 feet (48 meters)

SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	SILTY CLAY (CL), mottled olive brown, medium stiff, trace sand, fine to coarse, small inclusions of organics.				
B8@6'		6	1.5*		
	CLAYEY SAND (SC), brown, very loose, subangular to subrounded.				
B8@11'		3			
	SANDY CLAY (CL), brown, medium stiff, trace gravel, fine to coarse.				
B8@15.5'				85	36.0
B8@16.5		2			
	SANDY GRAVEL (GP/SP), brown, very loose, subangular to subrounded.				
B8@21'		4			26.8
	SILTY CLAY (CL), olive-brown, very stiff.				
B8@25.5'		25	0.7	84	33.1
	CLAYEY GRAVEL (GC), dark brown, subangular to subrounded, up to 1.5" in diameter.				
	SILTY SAND (SM), mottled orange, brown, and blue, medium dense, trace fine gravel, subangular to subrounded.				

DEPTH (FEET): 0, 5, 10, 15, 20, 25, 30

DEPTH (METERS): 1, 2, 3, 4, 5, 6, 7, 8, 9

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A08

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B8@31'			25		77	45.1
	10			GRAVEL (GP), mottled blue-grey and brown, medium dense, subangular to subrounded, up to 1.5" in diameter, some clay.				
35	11	B8@36'			23			
40	12			Becomes mottled black and dark brown.				
		B8@41'		CLAYEY GRAVEL (GC) with sand, olive-brown, very dense.	57			12.1
	13							
45	14	B8@44'		Becomes mottled orange, brown, olive, and red.	44			
50	15			CLAYEY SILT (ML) with sand, orange-brown, hard.	42			
55	16							
	17	B8@56'		CLAYEY GRAVEL (GC) with sand, orange-brown, very dense.	68	4.5*	119	15.2
60	18			Become mottled red, brown, green, and blue, medium dense, subangular to subrounded gravels.				
		B8@61'			22			15.2

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EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
CHECKED BY

FIGURE NO. A08

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	19							
65				CLAYEY SAND (SC), dark brown, medium dense, small inclusions of organics.				
	20	B8@66'			22			44.7
	21			SILTY CLAY (CL), blue-grey, hard, some fine sand, subangular. (Harder drilling.)				
70		B8@70.5'					75	46.0
		B8@71'			39	4.5+*	85	37.3
	22							
75	23							
	24							
80				Becomes very stiff, trace sand.				
		B8@81'			37			
	25							
85	26							
	27							
90		B8@90.5'		Becomes hard, trace subangular pebbles.	50/3"	4.0*	84	32.5
	28							

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SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
CHECKED BY
FIGURE NO. A08

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
95	29			CLAYEY GRAVEL (GC), mottled olive-grey, blue, red, black, green, and orange, very dense, subangular to subrounded.				
	30							
100		B8@100.5'			50/5"			8.7
	31							
105	32			SILTY CLAY (CL), olive-brown, very stiff, trace sand, trace pebbles.				
		B8@106'			21			
	33			Bottom of boring at approximately 106 1/2 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method. Steel casing installed to depth of approximately 65 feet below ground surface due to presence of flowing gravel and sand.				
110	34							
115	35							
	36							
120	37							

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SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
CHECKED BY
FIGURE NO. A08

ENGEO_BORELOG2 648620030 1-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				▽ Waste Water Treatment Plant Pond				
	1							
5								
	2							
	3			CLAYEY SAND (SC), dark olive brown, medium stiff, wet, fine to medium grained sand, trace coarse subrounded sand, some silt.				
10								
	4							
15		B9@6'			7		96	27.3
	5	B9@7.5'		SILTY CLAY (CL), red brown, soft, wet.	2			
				Becomes yellow brown, medium stiff, trace fine sand.				
		B9@10'			9	0.9	81	39.2
20	6							
		B9@13'			9	1.25*		
	7							
25				SILTY CLAY to CLAYEY SILT (CL-ML), brown, stiff, wet, trace fine sand. Harder drilling.				
	8							
		B9@18'			14	1.5*	85	37.0
	9							
30								

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B9

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A09

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10	B9@24'		SILTY SAND (SM), brown, medium dense, wet, some coarse subangular gravel (2 to 3 inch diameter).	27			
35		NR		CLAYEY SILT (ML), dark grey, hard, wet.	50/6"			
	11	B9@27.5'			50/0.5"		89	31.8
				Bottom of boring at approximately 37 1/2 feet. Water level at time of drilling at surface.				
40	12							
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

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EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B9
LOGGED BY: L. Chan
PROJ. NO.: 6486.2.003.01
CHECKED BY

FIGURE NO. A09

DATE OF BORING: May 19, 2005

SURFACE ELEVATION: Approx. 159 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			▽ Waste Water Treatment Plant Pond.				
	1						
5							
	2						
	3		SANDY CLAY (CL), red brown, mottled dark grey, wet, soft, fine to medium grained sand.				
10							
		B10@3'		5			
	4		CLAYEY SAND (SC), red brown, medium stiff, wet, find to medium subrounded sand.				
15		B10@6.5'					
	5	B10@7'	SANDY CLAY to SILTY CLAY (CL), yellow brown, soft, wet, fine grained sand	3	0.5*	72	47.1
	6		Becomes medium stiff, trace medium subrounded sand.				
20		B10@11'		9	1.4	89	33.2
	7		SILTY CLAY (CL), red brown, stiff, wet, trace medium subrounded sand.				
25		B10@15'		13	2.75*	92	30.5
	8		CLAYEY SILT (ML), brown, very stiff, wet.				
		B10@19'		43			30.4
30	9		Bottom of boring at approximately 28 $^{1}/_{2}$ feet. Water level at time of drilling at surface.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B10

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A10

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 / SURFACE ELEVATION: Approx. 159 feet (48 meters) / DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				▽ Waste Water Treatment Plant Pond.				
10	3			SILTY CLAY (CL), dark reddish brown, medium stiff, wet, with fine sand.				
		B11@11'		Becomes olive grey, mottled red brown, trace subrounded medium sand.			90	29.3
	4	B11@13.5'			5	0*	79	40.7
15				Gravel (GP), poorly graded, loose, wet, rounded fine grained gravel.				
	5	B11@18'		SILTY CLAY (CL), dark brown, medium stiff, wet, some subrounded gravel.				
		B11@18.5'			9	1.0*	76	43.6
20	6	B11@20.5'		SANDY CLAY (CL), brown, medium stiff, brown, coarse grained sand, with coarse subrounded fine gravel.			78	41.2
		B11@21'			8	1.0*	81	40.6
25	7	B11@26'		SILTY CLAY (CL) with fine grained sand, reddish brown, very stiff, wet, some black oxidation staining.	23	2.3*	89	32.9
	8			Inter-layered CLAYEY SAND and SANDY CLAY (CL/SC), olive grey, medium stiff, wet, fine grained sand.				
		B11@30'			10			
30	9	B11@31'			7			29.0

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B11

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A11

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10							
35		B11@35.5'		GRAVELLY SAND (SW), dark grey, very dense, wet, well graded, subrounded fine gravel.				
		B11@36'		SANDY GRAVEL (GP), dark brown, very dense, wet, fine subrounded gravel, medium grained sand, trace clay. Drilling refusal at 37 feet.	67	4.5*	108	21.3
	11	B11@37.5'			64			12.7
				Bottom of boring at approximately 38 feet. Water level at time of drilling at surface.				
40	12							
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B11

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A11

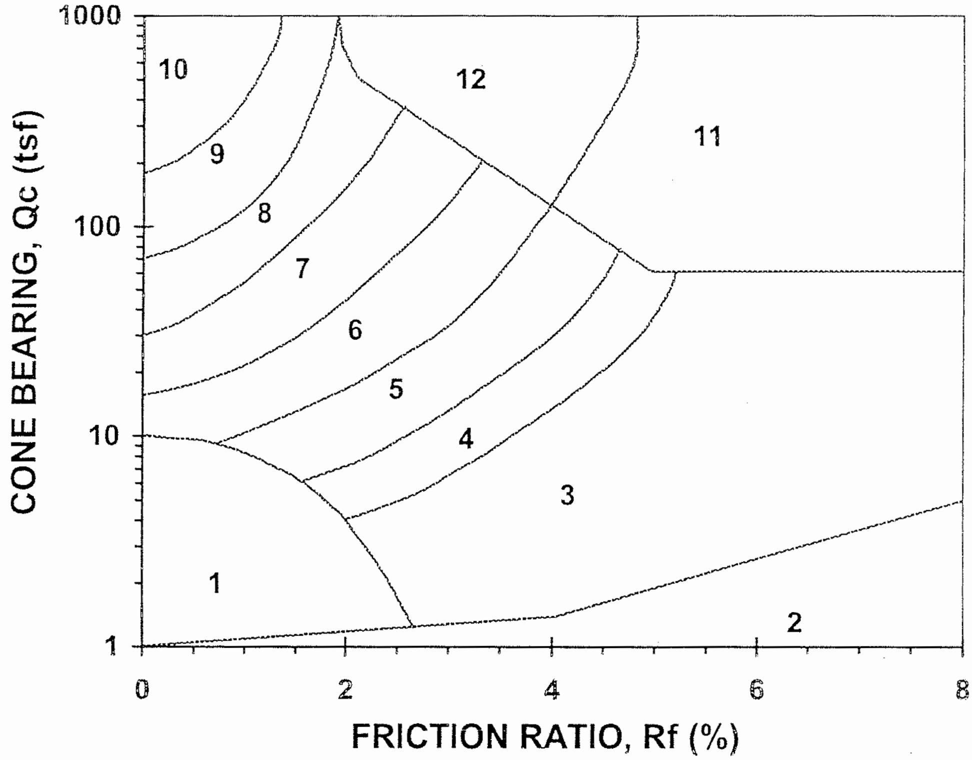
APPENDIX B

Cone Penetration Test Logs

John Sarmiento and Associates (2005)

2-CPT01 to 2-CPT28

SIMPLIFIED SOIL BEHAVIOR TYPE CLASSIFICATION FOR STANDARD ELECTRONIC CONE PENETROMETER



ZONE	Qc/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2		Sensitive Fine Grained
2	1	for Zones 1 to 6	Organic Material
3	1	10 for Qc <= 9 tsf	CLAY
4	1.5	12 for Qc = 9 to 12 tsf	Silty CLAY to CLAY
5	2	15 for Qc > 12 tsf	Clayey SILT to Silty CLAY
6	2.5		Sandy SILT to Clayey SILT
7	3	---	Silty SAND to Sandy SILT
8	4	---	SAND to Silty SAND
9	5	---	SAND
10	6	---	Gravelly SAND to SAND
11	1	15	Very Stiff Fine Grained (*)
12	2	---	SAND to Clayey SAND (*)

(*) Overconsolidated or Cemented

Qc = Tip Bearing
Fs = Sleeve Friction
Rf = Fs/Qc*100 = Friction Ratio

References: [1]Robertson, 1986, Olsen, 1988
[2]Bonaparte & Mitchell, 1979 (young bay mud Qc <= 9)
[2]Estimated from local experience (fine grained soils Qc > 9)

Note: Testing performed in accordance with ASTM D3441

John Sarmiento & Associates
Cone Penetrometer Testing Services

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-01
DATE : 06-01-2005
Groundwater measured at 4.6 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.58	21.10	0.870	4.1	14	23	0.07	----	2.81	Silty CLAY to CLAY	130-140
1.01	16.60	0.950	5.7	17	27	0.12	----	2.21	CLAY	120-130
1.55	19.50	1.120	5.7	20	31	0.19	----	2.59	''	130-140
2.09	20.00	1.610	8.1	20	32	0.27	----	2.65	''	''
3.04	13.40	1.040	7.8	13	21	0.39	----	1.76	''	120-130
3.58	8.00	0.660	8.3	8	13	0.45	----	1.55	''	''
4.01	6.10	0.390	6.4	6	10	0.50	----	1.17	''	110-120
4.55	6.90	0.300	4.3	7	11	0.56	----	1.32	''	100-110
5.10	6.10	0.230	3.8	6	10	0.62	----	1.16	''	''
5.53	5.90	0.250	4.2	6	9	0.66	----	1.11	''	''
6.09	8.00	0.300	3.8	8	13	0.73	----	1.53	''	110-120
6.53	11.00	0.380	3.5	7	12	0.78	----	1.77	Silty CLAY to CLAY	''
7.07	11.90	0.450	3.8	12	19	0.85	----	1.91	CLAY	120-130
7.51	10.50	0.430	4.1	11	17	0.90	----	1.68	''	110-120
8.05	10.70	0.400	3.7	11	17	0.96	----	1.70	''	''
8.59	12.40	0.670	5.4	12	20	1.03	----	1.58	''	120-130
9.03	10.30	0.510	5.0	10	16	1.08	----	1.63	''	''
9.57	7.00	0.260	3.7	7	11	1.14	----	1.29	''	100-110
10.00	7.50	0.250	3.3	8	12	1.18	----	1.38	''	''
10.55	7.90	0.240	3.0	5	8	1.24	----	1.46	Silty CLAY to CLAY	''
11.09	7.90	0.220	2.8	5	8	1.30	----	1.45	''	''
11.52	4.90	0.190	3.9	5	7	1.34	----	0.85	CLAY	90-100
12.06	9.50	0.370	3.9	10	14	1.40	----	1.47	''	110-120
12.53	5.80	0.190	3.3	6	8	1.45	----	1.02	''	100-110
13.08	4.90	0.130	2.7	5	7	1.50	----	0.83	''	90-100
13.51	11.10	0.360	3.2	7	10	1.55	----	1.72	Silty CLAY to CLAY	110-120
14.05	7.60	0.290	3.8	8	11	1.61	----	1.36	CLAY	100-110
14.59	8.30	0.340	4.1	8	11	1.67	----	1.49	''	110-120
15.02	8.80	0.290	3.3	9	12	1.72	----	1.59	''	''
15.54	9.10	0.280	3.1	6	8	1.78	----	1.37	Silty CLAY to CLAY	''
16.07	10.80	0.410	3.8	11	14	1.84	----	1.65	CLAY	''
16.50	22.40	0.780	3.5	11	15	1.89	----	2.86	Clayey SILT to Silty CLAY	120-130
17.04	30.50	0.800	2.6	12	16	1.97	----	3.94	Sandy SILT to Clayey SILT	130-140
17.56	13.20	0.470	3.6	9	11	2.03	----	1.62	Silty CLAY to CLAY	120-130
18.09	28.50	1.100	3.9	19	24	2.10	----	3.66	''	130-140
18.51	15.80	0.500	3.2	8	10	2.16	----	1.96	Clayey SILT to Silty CLAY	120-130
19.02	7.60	0.360	4.7	8	9	2.21	----	1.30	CLAY	110-120
19.56	8.00	0.340	4.3	8	10	2.28	----	1.37	''	''
20.09	10.00	0.370	3.7	10	12	2.34	----	1.47	''	''
20.51	11.30	0.450	4.0	11	14	2.39	----	1.68	''	120-130
21.05	12.20	0.470	3.9	12	14	2.46	----	1.46	''	''
21.58	12.20	0.830	6.8	12	14	2.52	----	1.46	''	''
22.04	11.80	0.510	4.3	12	14	2.58	----	1.75	''	''
22.57	9.70	0.600	6.2	10	11	2.65	----	1.40	''	''
23.53	11.10	0.370	3.3	7	8	2.76	----	1.62	Silty CLAY to CLAY	110-120
24.05	10.40	0.290	2.8	7	8	2.82	----	1.50	''	''
24.58	12.60	0.410	3.3	8	9	2.88	----	1.49	''	120-130
25.04	14.60	0.550	3.8	10	11	2.94	----	1.75	''	''
25.58	12.70	0.500	3.9	13	14	3.01	----	1.49	CLAY	''
26.00	18.00	0.930	5.2	18	19	3.07	----	2.20	''	130-140
26.53	20.20	0.880	4.4	20	21	3.14	----	2.48	''	''
27.06	21.60	1.140	5.3	22	23	3.21	----	2.67	''	''
27.56	82.30	2.440	3.0	33	34	3.28	----	10.75	Sandy SILT to Clayey SILT	''
28.09	18.80	1.040	5.5	19	19	3.35	----	2.28	CLAY	''
28.51	27.10	1.130	4.2	18	18	3.40	----	3.39	Silty CLAY to CLAY	''
29.03	22.00	1.570	7.1	22	22	3.47	----	2.70	CLAY	''
29.52	192.90	4.640	2.4	64	65	3.54	42	----	Silty SAND to Sandy SILT	''
30.02	203.70	2.500	1.2	41	41	3.61	42	----	SAND	''
30.52	74.00	1.460	2.0	25	25	3.68	36	----	Silty SAND to Sandy SILT	''
31.03	14.60	0.570	3.9	10	10	3.74	----	1.70	Silty CLAY to CLAY	120-130
31.53	13.40	0.690	5.1	13	13	3.80	----	1.53	CLAY	''
32.09	16.00	0.570	3.6	11	11	3.87	----	1.88	Silty CLAY to CLAY	''
32.59	15.30	0.610	4.0	10	10	3.94	----	1.78	''	''
33.02	13.80	0.570	4.1	14	14	3.99	----	1.57	CLAY	''
33.55	14.70	0.780	5.3	15	15	4.05	----	1.69	''	''

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-01
DATE : 06-01-2005
Groundwater measured at 4.6 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
34.07	72.40	3.190	4.4	36	36	4.12	----	9.38	Clayey SILT to Silty CLAY	130-140
34.59	17.10	0.720	4.2	17	17	4.19	----	2.00	CLAY	120-130
35.03	19.20	0.680	3.5	13	13	4.24	----	2.28	Silty CLAY to CLAY	''
35.55	11.70	0.460	3.9	12	12	4.31	----	1.59	CLAY	''
36.08	13.70	0.550	4.0	14	14	4.38	----	1.53	''	''
37.01	168.60	2.230	1.3	34	33	4.50	41	----	SAND	130-140
37.52	204.10	4.470	2.2	68	67	4.57	42	----	Silty SAND to Sandy SILT	''
38.00	296.90	4.200	1.4	59	58	4.64	44	----	SAND	''
38.55	233.30	3.770	1.6	47	45	4.71	43	----	''	''
39.02	124.60	5.800	4.7	125	118	4.78	----	16.29	Very Stiff Fine Grained *	>140
39.56	266.00	3.460	1.3	53	50	4.85	43	----	SAND	130-140
40.02	89.50	6.590	7.4	90	83	4.91	----	11.61	Very Stiff Fine Grained *	>140
40.59	23.80	1.780	7.5	24	22	4.99	----	2.84	CLAY	130-140
41.06	17.00	1.070	6.3	17	15	5.05	----	1.93	''	''
41.54	21.70	0.830	3.8	14	13	5.12	----	2.55	Silty CLAY to CLAY	''
42.05	21.10	0.630	3.0	11	9	5.18	----	2.47	Clayey SILT to Silty CLAY	120-130
42.56	30.60	1.990	6.5	31	26	5.25	----	3.73	CLAY	130-140
43.06	35.70	2.720	7.6	36	30	5.32	----	4.41	''	''
43.58	72.70	3.420	4.7	73	61	5.39	----	9.33	Very Stiff Fine Grained *	''
44.09	29.50	2.910	9.9	30	24	5.46	----	3.57	CLAY	''
44.58	201.80	2.330	1.2	40	33	5.52	41	----	SAND	120-130
45.05	237.80	2.810	1.2	48	39	5.58	42	----	''	130-140
45.53	209.00	2.930	1.4	42	34	5.65	41	----	''	''
46.04	353.60	8.130	2.3	71	57	5.72	44	----	''	''
46.53	372.30	7.950	2.1	74	60	5.78	44	----	''	''
47.05	274.70	2.890	1.1	55	44	5.85	43	----	''	120-130
47.52	535.10	11.410	2.1	268	214	5.91	46	----	SAND to Clayey SAND *	130-140
47.59	276.30	12.260	4.4	276	221	5.92	----	36.45	Very Stiff Fine Grained *	>140
48.53	340.00	7.300	2.1	68	54	6.05	44	----	SAND	130-140
49.03	221.30	6.240	2.8	74	58	6.11	41	----	Silty SAND to Sandy SILT	''
49.54	287.10	4.560	1.6	57	45	6.18	43	----	SAND	''
50.01	568.20	15.360	2.7	284	221	6.25	47	----	SAND to Clayey SAND *	>140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-02
DATE : 05-31-2005
Groundwater measured at 4.8 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.53	17.00	0.730	4.3	17	27	0.06	----	2.26	CLAY	120-130
1.08	18.40	1.160	6.3	18	29	0.13	----	2.44	''	130-140
1.50	20.30	1.380	6.8	20	32	0.19	----	2.69	''	''
2.04	13.90	1.090	7.8	14	22	0.26	----	1.84	''	120-130
3.03	12.10	0.860	7.1	12	19	0.38	----	1.59	''	''
3.58	9.20	0.590	6.4	9	15	0.45	----	1.50	''	''
4.01	6.70	0.380	5.7	7	11	0.50	----	1.29	''	110-120
4.55	7.30	0.270	3.7	7	12	0.56	----	1.40	''	100-110
5.09	6.60	0.310	4.7	7	11	0.62	----	1.26	''	''
5.53	9.50	0.420	4.4	10	15	0.67	----	1.53	''	110-120
6.01	5.40	0.220	4.1	5	9	0.72	----	1.01	''	100-110
6.56	7.60	0.280	3.7	8	12	0.77	----	1.44	''	''
7.00	7.20	0.270	3.8	7	12	0.82	----	1.36	''	''
7.54	9.80	0.410	4.2	10	16	0.88	----	1.56	''	110-120
8.08	10.60	0.420	4.0	11	17	0.94	----	1.69	''	''
8.52	12.40	0.610	4.9	12	20	1.00	----	1.59	''	120-130
9.54	8.90	0.320	3.6	9	14	1.12	----	1.67	''	110-120
10.08	8.90	0.280	3.1	6	9	1.18	----	1.66	Silty CLAY to CLAY	''
10.52	8.90	0.290	3.3	6	9	1.23	----	1.66	''	''
11.05	4.80	0.240	5.0	5	7	1.29	----	0.83	CLAY	100-110
11.59	7.30	0.180	2.5	5	7	1.34	----	1.33	Silty CLAY to CLAY	''
12.03	5.20	0.170	3.3	5	8	1.38	----	0.90	CLAY	90-100
12.57	5.20	0.180	3.5	5	8	1.43	----	0.90	''	''
13.00	6.90	0.190	2.8	5	7	1.48	----	1.23	Silty CLAY to CLAY	100-110
13.55	8.30	0.220	2.7	6	8	1.54	----	1.51	''	''
14.09	8.20	0.290	3.5	8	11	1.60	----	1.48	CLAY	110-120
14.52	7.60	0.260	3.4	8	11	1.64	----	1.36	''	100-110
15.05	8.20	0.030	0.4	4	6	1.69	----	1.47	Sensitive Fine Grained	85-90
15.55	13.20	0.350	2.7	7	9	1.75	----	1.64	Clayey SILT to Silty CLAY	110-120
16.09	10.40	0.360	3.5	7	9	1.81	----	1.58	Silty CLAY to CLAY	''
16.53	10.50	0.440	4.2	11	14	1.86	----	1.59	CLAY	''
17.07	20.30	0.760	3.7	14	18	1.93	----	2.58	Silty CLAY to CLAY	120-130
18.01	48.70	0.950	2.0	16	21	2.06	35	----	Silty SAND to Sandy SILT	130-140
18.54	13.10	0.890	6.8	13	17	2.12	----	1.61	CLAY	120-130
19.05	25.50	1.260	4.9	26	32	2.19	----	3.25	''	130-140
19.58	11.70	0.540	4.6	12	14	2.26	----	1.76	''	120-130
20.00	8.00	0.260	3.3	8	10	2.30	----	1.37	''	100-110
20.53	10.80	0.460	4.3	11	13	2.36	----	1.60	''	110-120
21.06	10.20	0.440	4.3	10	12	2.42	----	1.50	''	''
21.59	11.80	0.490	4.2	12	14	2.49	----	1.76	''	120-130
22.06	11.70	0.410	3.5	8	9	2.54	----	1.74	Silty CLAY to CLAY	110-120
22.60	10.80	0.420	3.9	11	13	2.60	----	1.58	CLAY	''
23.00	13.70	0.500	3.6	9	10	2.66	----	1.65	Silty CLAY to CLAY	120-130
23.54	10.60	0.360	3.4	7	8	2.72	----	1.54	''	110-120
24.07	9.70	0.310	3.2	6	7	2.78	----	1.39	''	''
24.60	10.20	0.320	3.1	7	8	2.84	----	1.46	''	''
25.02	10.10	0.470	4.7	10	11	2.89	----	1.44	CLAY	''
25.53	10.00	0.370	3.7	10	11	2.95	----	1.42	''	''
26.06	10.30	0.500	4.9	10	11	3.01	----	1.47	''	120-130
26.60	10.80	0.420	3.9	11	12	3.07	----	1.54	''	110-120
27.02	8.00	0.410	5.1	8	9	3.12	----	1.29	''	''
27.55	13.10	0.570	4.4	13	14	3.19	----	1.53	''	120-130
28.08	14.60	0.710	4.9	15	15	3.26	----	1.73	''	''
28.51	10.00	0.630	6.3	10	10	3.31	----	1.39	''	''
29.04	30.00	1.780	5.9	30	31	3.38	----	3.77	''	130-140
29.56	18.30	0.800	4.4	18	19	3.45	----	2.21	''	120-130
30.09	15.40	0.700	4.5	15	16	3.51	----	1.82	''	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-03
DATE : 06-01-2005
Groundwater measured at 4.3 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	32.70	0.980	3.0	16	26	0.07	----	4.36	Clayey SILT to Silty CLAY	130-140
1.00	27.30	1.040	3.8	14	22	0.13	----	3.63	''	''
1.53	23.10	1.200	5.2	23	37	0.20	----	3.07	CLAY	''
2.06	18.30	1.190	6.5	18	29	0.27	----	2.42	''	''
2.55	19.40	1.090	5.6	19	31	0.33	----	2.56	''	''
3.09	14.50	0.800	5.5	15	23	0.40	----	1.91	''	120-130
3.52	13.60	0.680	5.0	14	22	0.46	----	1.78	''	''
4.06	10.60	0.520	4.9	11	17	0.52	----	1.72	''	''
4.56	11.00	0.490	4.5	11	18	0.59	----	1.78	''	''
5.53	11.30	0.460	4.1	11	18	0.71	----	1.82	''	''
6.07	13.20	0.440	3.3	9	14	0.77	----	1.71	Silty CLAY to CLAY	''
6.50	11.20	0.520	4.6	11	18	0.83	----	1.80	CLAY	''
7.04	9.00	0.400	4.4	9	14	0.89	----	1.43	''	110-120
7.58	10.10	0.420	4.2	10	16	0.95	----	1.60	''	''
8.01	11.10	0.320	2.9	7	12	1.00	----	1.77	Silty CLAY to CLAY	''
8.53	13.30	0.560	4.2	13	21	1.07	----	1.70	CLAY	120-130
9.07	12.40	0.480	3.9	12	20	1.13	----	1.58	''	''
9.50	12.10	0.400	3.3	8	13	1.18	----	1.53	Silty CLAY to CLAY	110-120
10.05	6.20	0.330	5.3	6	10	1.24	----	1.12	CLAY	100-110
10.58	8.10	0.250	3.1	5	8	1.30	----	1.49	Silty CLAY to CLAY	''
11.01	9.70	0.280	2.9	6	10	1.35	----	1.50	''	110-120
11.55	13.20	0.520	3.9	13	19	1.41	----	1.67	CLAY	120-130
12.07	13.10	0.370	2.8	7	9	1.47	----	1.65	Clayey SILT to Silty CLAY	110-120
13.03	12.80	0.470	3.7	9	12	1.59	----	1.60	Silty CLAY to CLAY	120-130
13.57	12.10	0.280	2.3	6	8	1.66	----	1.50	Clayey SILT to Silty CLAY	110-120
14.53	10.20	0.260	2.5	7	9	1.77	----	1.55	Silty CLAY to CLAY	''
15.04	12.00	0.450	3.8	12	16	1.83	----	1.48	CLAY	120-130
15.58	11.60	0.290	2.5	6	8	1.89	----	1.78	Clayey SILT to Silty CLAY	110-120
16.00	12.90	0.450	3.5	9	11	1.95	----	1.59	Silty CLAY to CLAY	120-130
16.54	6.80	0.340	5.0	7	9	2.01	----	1.16	CLAY	110-120
17.08	11.30	0.300	2.7	6	7	2.07	----	1.71	Clayey SILT to Silty CLAY	''
18.03	23.20	1.010	4.4	15	19	2.20	----	2.95	Silty CLAY to CLAY	130-140
18.58	16.00	0.780	4.9	16	19	2.27	----	1.98	CLAY	120-130
19.01	45.90	0.720	1.6	15	18	2.32	35	----	Silty SAND to Sandy SILT	''
19.54	33.40	0.650	1.9	13	16	2.39	----	4.29	Sandy SILT to Clayey SILT	''
20.07	11.10	0.320	2.9	7	9	2.45	----	1.65	Silty CLAY to CLAY	110-120
20.59	13.10	0.340	2.6	7	8	2.51	----	1.58	Clayey SILT to Silty CLAY	''
21.01	11.60	0.390	3.4	8	9	2.56	----	1.72	Silty CLAY to CLAY	''
21.51	11.60	0.450	3.9	12	13	2.62	----	1.72	CLAY	120-130
22.04	11.60	0.370	3.2	8	9	2.68	----	1.71	Silty CLAY to CLAY	110-120
22.55	8.90	0.290	3.3	6	7	2.74	----	1.51	''	''
23.08	9.90	0.270	2.7	7	7	2.80	----	1.42	''	''
23.51	10.30	0.360	3.5	7	8	2.85	----	1.48	''	''
24.04	12.10	0.410	3.4	8	9	2.91	----	1.42	''	''
24.57	9.40	0.500	5.3	9	10	2.97	----	1.32	CLAY	''
25.06	11.80	0.410	3.5	8	8	3.03	----	1.71	Silty CLAY to CLAY	''
25.58	13.70	0.420	3.1	9	10	3.09	----	1.62	''	120-130
26.01	18.20	0.680	3.7	12	13	3.14	----	2.22	''	''
26.55	13.70	0.800	5.8	14	14	3.21	----	1.61	CLAY	''
27.07	63.70	3.090	4.9	64	66	3.28	----	8.27	Very Stiff Fine Grained *	130-140
27.54	94.60	3.940	4.2	95	97	3.35	----	12.39	''	''
28.59	266.60	2.580	1.0	53	54	3.48	44	----	SAND	120-130
29.00	215.30	0.990	0.5	43	43	3.52	42	----	''	100-110
29.60	36.40	1.290	3.5	18	18	3.60	----	4.61	Clayey SILT to Silty CLAY	130-140
30.06	83.80	1.470	1.8	28	28	3.66	37	----	Silty SAND to Sandy SILT	''
30.56	35.90	1.100	3.1	18	18	3.73	----	4.54	Clayey SILT to Silty CLAY	''
31.07	11.20	1.090	9.7	11	11	3.79	----	1.55	CLAY	120-130
31.56	19.10	0.710	3.7	13	13	3.86	----	2.29	Silty CLAY to CLAY	''
32.08	23.80	0.990	4.2	16	16	3.93	----	2.91	''	130-140
33.02	13.50	0.540	4.0	14	13	4.04	----	1.53	CLAY	120-130
33.53	13.00	0.540	4.2	13	13	4.11	----	1.46	''	''
34.05	32.90	1.200	3.6	16	16	4.18	----	4.11	Clayey SILT to Silty CLAY	130-140
34.60	74.40	2.610	3.5	30	30	4.25	----	9.64	Sandy SILT to Clayey SILT	''
35.01	18.70	1.390	7.4	19	19	4.31	----	2.21	CLAY	''
35.52	13.30	0.510	3.8	9	9	4.37	----	1.48	Silty CLAY to CLAY	120-130

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-03
DATE : 06-01-2005
Groundwater measured at 4.3 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
36.01	16.50	0.550	3.3	11	11	4.43	----	1.90	''	''
36.53	10.90	0.490	4.5	11	11	4.50	----	1.44	CLAY	''
37.05	10.50	0.430	4.1	11	10	4.56	----	1.37	''	110-120
37.58	13.10	0.500	3.8	9	9	4.62	----	1.44	Silty CLAY to CLAY	120-130
38.02	10.30	0.370	3.6	10	10	4.67	----	1.33	CLAY	110-120
38.54	51.00	2.090	4.1	26	24	4.74	----	6.48	Clayey SILT to Silty CLAY	130-140
39.07	65.80	4.570	6.9	66	62	4.82	----	8.45	Very Stiff Fine Grained *	''
39.57	208.00	3.370	1.6	42	39	4.88	42	----	SAND	''
40.08	35.20	2.210	6.3	35	32	4.95	----	4.36	CLAY	''
40.59	21.70	1.200	5.5	22	20	5.02	----	2.56	''	''
41.04	26.80	1.240	4.6	27	24	5.08	----	3.23	''	''
41.53	54.80	2.530	4.6	37	32	5.15	----	6.96	Silty CLAY to CLAY	''
42.03	52.80	2.390	4.5	35	31	5.21	----	6.69	''	''
42.54	21.20	2.210	10.4	21	18	5.28	----	2.47	CLAY	''
43.04	52.30	3.450	6.6	52	45	5.35	----	6.62	''	''
43.54	47.00	3.680	7.8	47	39	5.42	----	5.91	''	''
44.07	33.90	2.590	7.6	34	28	5.49	----	4.15	''	''
44.56	42.60	1.520	3.6	21	18	5.56	----	5.31	Clayey SILT to Silty CLAY	''
45.05	45.80	1.560	3.4	23	19	5.62	----	5.73	''	''
45.55	29.50	2.350	8.0	30	24	5.69	----	3.55	CLAY	''
46.04	143.80	2.550	1.8	36	29	5.76	39	----	SAND to Silty SAND	''
46.52	253.90	5.990	2.4	85	68	5.82	42	----	Silty SAND to Sandy SILT	''
47.05	207.50	5.740	2.8	69	55	5.89	41	----	''	''
47.53	462.40	7.470	1.6	92	74	5.96	46	----	SAND	''
48.05	572.50	10.550	1.8	115	91	6.03	47	----	''	''
48.54	530.70	6.370	1.2	106	84	6.09	46	----	''	''
49.03	532.30	8.440	1.6	106	83	6.16	46	----	''	''
49.56	303.40	3.900	1.3	61	47	6.23	43	----	''	''
50.04	294.80	7.450	2.5	98	76	6.30	43	----	Silty SAND to Sandy SILT	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-04
DATE : 06-01-2005
Groundwater measured at 2.9 feet
Terminated at 43.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.52	33.50	1.020	3.0	17	27	0.06	----	4.46	Clayey SILT to Silty CLAY	130-140
1.06	18.30	0.600	3.3	9	15	0.13	----	2.43	''	120-130
1.51	9.40	0.310	3.3	6	10	0.18	----	1.55	Silty CLAY to CLAY	110-120
2.04	11.20	0.340	3.0	7	12	0.24	----	1.85	''	''
2.55	12.60	0.410	3.3	8	13	0.30	----	1.66	''	120-130
3.00	15.00	0.580	3.9	10	16	0.36	----	1.98	''	''
3.54	12.80	0.590	4.6	13	20	0.43	----	1.68	CLAY	''
4.09	15.50	0.530	3.4	10	17	0.50	----	2.03	Silty CLAY to CLAY	''
4.53	10.70	0.340	3.2	7	11	0.55	----	1.74	''	110-120
5.07	8.00	0.270	3.4	8	13	0.60	----	1.54	CLAY	100-110
5.52	9.10	0.310	3.4	9	15	0.66	----	1.46	''	110-120
6.05	10.70	0.310	2.9	7	11	0.72	----	1.72	Silty CLAY to CLAY	''
6.51	10.50	0.260	2.5	5	8	0.77	----	1.69	Clayey SILT to Silty CLAY	''
7.04	10.90	0.280	2.6	5	9	0.83	----	1.75	''	''
7.59	9.20	0.280	3.0	6	10	0.89	----	1.46	Silty CLAY to CLAY	''
8.03	10.50	0.300	2.9	7	11	0.94	----	1.67	''	''
8.57	10.10	0.270	2.7	7	11	1.01	----	1.60	''	''
9.07	8.70	0.240	2.8	6	9	1.06	----	1.63	''	100-110
9.52	7.50	0.260	3.5	8	12	1.11	----	1.39	CLAY	''
10.06	8.30	0.170	2.0	4	7	1.16	----	1.54	Clayey SILT to Silty CLAY	''
10.51	8.20	0.210	2.6	5	9	1.21	----	1.52	Silty CLAY to CLAY	''
11.05	5.80	0.130	2.2	4	6	1.26	----	1.03	''	90-100
11.59	6.90	0.190	2.8	5	7	1.32	----	1.25	''	100-110
12.04	8.20	0.240	2.9	5	9	1.36	----	1.50	''	''
12.56	4.30	0.100	2.3	4	7	1.41	----	0.72	CLAY	90-100
13.01	4.90	0.110	2.2	3	5	1.46	----	0.83	Silty CLAY to CLAY	''
13.55	7.20	0.120	1.7	4	6	1.51	----	1.29	Clayey SILT to Silty CLAY	''
14.09	7.50	0.220	2.9	5	8	1.57	----	1.34	Silty CLAY to CLAY	100-110
14.53	9.10	0.280	3.1	6	9	1.62	----	1.38	''	110-120
15.07	7.70	0.270	3.5	8	12	1.67	----	1.37	CLAY	100-110
15.57	3.00	0.210	7.0	3	4	1.72	----	0.43	Organic Material	90-100
16.02	7.40	0.270	3.6	7	11	1.77	----	1.30	CLAY	100-110
16.56	6.30	0.210	3.3	6	9	1.82	----	1.08	''	''
17.01	8.90	0.240	2.7	6	8	1.87	----	1.59	Silty CLAY to CLAY	''
17.54	7.50	0.330	4.4	8	11	1.93	----	1.31	CLAY	110-120
18.08	8.60	0.410	4.8	9	12	1.99	----	1.52	''	''
18.53	11.50	0.660	5.7	12	16	2.05	----	1.75	''	120-130
19.02	15.20	0.540	3.6	10	14	2.11	----	1.89	Silty CLAY to CLAY	''
19.55	25.00	1.360	5.4	25	33	2.18	----	3.19	CLAY	130-140
20.08	21.60	0.600	2.8	11	14	2.25	----	2.73	Clayey SILT to Silty CLAY	120-130
20.53	8.70	0.310	3.6	9	11	2.30	----	1.51	CLAY	110-120
21.05	8.40	0.310	3.7	8	11	2.36	----	1.44	''	''
21.58	8.70	0.340	3.9	9	11	2.42	----	1.50	''	''
22.51	16.40	0.630	3.8	11	14	2.54	----	2.02	Silty CLAY to CLAY	120-130
23.04	13.00	0.420	3.2	9	11	2.61	----	1.56	''	''
23.58	13.70	0.450	3.3	9	11	2.67	----	1.65	''	''
24.02	16.00	0.620	3.9	11	13	2.73	----	1.95	''	''
24.54	17.10	0.690	4.0	11	14	2.79	----	2.09	''	''
25.07	20.90	0.900	4.3	14	16	2.86	----	2.60	''	130-140
25.52	20.80	0.820	3.9	14	16	2.92	----	2.58	''	120-130
26.05	18.50	0.670	3.6	12	14	2.99	----	2.27	''	''
26.58	20.30	1.010	5.0	20	23	3.06	----	2.50	CLAY	130-140
27.02	21.80	0.970	4.4	22	24	3.12	----	2.70	''	''
27.54	16.50	0.370	2.2	8	9	3.18	----	1.99	Clayey SILT to Silty CLAY	120-130
28.07	16.40	0.850	5.2	16	18	3.25	----	1.97	CLAY	''
29.07	74.10	3.880	5.2	74	79	3.38	----	9.65	Very Stiff Fine Grained *	130-140
29.57	73.30	5.420	7.4	73	77	3.45	----	9.54	''	>140
30.04	121.20	6.330	5.2	121	127	3.52	----	15.93	''	''
30.58	74.30	6.680	9.0	74	77	3.59	----	9.67	''	''
31.05	52.80	2.970	5.6	53	54	3.66	----	6.80	CLAY	130-140
31.51	194.70	3.500	1.8	49	50	3.72	42	----	SAND to Silty SAND	''
32.05	216.30	10.910	5.0	216	219	3.80	----	28.59	Very Stiff Fine Grained *	>140
32.56	159.00	9.040	5.7	159	159	3.87	----	20.94	''	''
33.03	118.20	6.950	5.9	118	118	3.93	----	15.50	''	''
33.53	231.70	3.450	1.5	46	46	4.00	43	----	SAND	130-140

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-04
DATE : 06-01-2005
Groundwater measured at 2.9 feet
Terminated at 43.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
34.03	133.60	8.360	6.3	134	133	4.07	----	17.54	Very Stiff Fine Grained *	>140
34.54	106.00	5.070	4.8	106	106	4.14	----	13.86	''	''
35.04	110.90	4.980	4.5	111	110	4.21	----	14.51	''	''
35.57	34.60	2.100	6.1	35	34	4.28	----	4.33	CLAY	130-140
36.06	38.80	2.000	5.2	39	39	4.35	----	4.88	''	''
36.55	39.30	1.860	4.7	26	26	4.42	----	4.95	Silty CLAY to CLAY	''
37.06	45.50	4.030	8.9	46	45	4.49	----	5.77	CLAY	''
37.51	200.80	10.510	5.2	201	199	4.55	----	26.47	Very Stiff Fine Grained *	>140
38.00	25.80	3.110	12.0	26	26	4.61	----	3.13	CLAY	130-140
38.55	131.70	2.290	1.7	33	33	4.69	40	----	SAND to Silty SAND	''
39.04	158.70	2.290	1.4	40	39	4.75	41	----	''	''
39.52	174.50	3.630	2.1	58	57	4.82	41	----	Silty SAND to Sandy SILT	''
40.06	246.80	5.890	2.4	82	80	4.89	43	----	''	''
40.52	224.50	7.980	3.6	112	108	4.96	42	----	SAND to Clayey SAND *	>140
41.03	239.30	10.010	4.2	120	113	5.03	43	----	''	''
41.51	279.60	8.970	3.2	140	131	5.10	44	----	''	''
42.54	561.50	2.050	0.4	94	86	5.20	47	----	Gravelly SAND to SAND	100-110
43.01	596.80	13.450	2.3	298	272	5.27	48	----	SAND to Clayey SAND *	130-140
43.54	331.20	9.570	2.9	166	148	5.34	44	----	''	>140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-05
DATE : 06-02-2005
Groundwater measured at 9.9 feet
Terminated at 31.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.50	44.50	2.180	4.9	30	47	0.06	----	5.93	Silty CLAY to CLAY	130-140
1.01	22.70	1.680	7.4	23	36	0.13	----	3.02	CLAY	''
1.54	13.70	0.950	6.9	14	22	0.19	----	1.81	''	120-130
2.07	9.10	0.580	6.4	9	15	0.26	----	1.50	''	''
3.02	18.60	1.180	6.3	19	30	0.39	----	2.45	''	130-140
3.56	10.50	0.760	7.2	11	17	0.45	----	1.71	''	120-130
4.09	12.60	0.790	6.3	13	20	0.52	----	1.65	''	''
4.51	10.40	0.840	8.1	10	17	0.57	----	1.69	''	''
5.05	4.90	0.320	6.5	5	8	0.63	----	0.92	''	100-110
6.02	4.40	0.260	5.9	4	7	0.73	----	0.81	''	''
6.55	6.10	0.450	7.4	6	10	0.79	----	1.14	''	110-120
7.09	13.90	0.750	5.4	14	21	0.86	----	1.80	''	120-130
7.52	31.50	1.970	6.3	32	47	0.92	----	4.14	''	130-140
8.04	21.80	1.270	5.8	22	31	0.99	----	2.84	''	''
8.57	20.50	1.270	6.2	21	28	1.06	----	2.66	''	''
9.03	16.40	1.170	7.1	16	22	1.12	----	2.11	''	''
9.55	18.90	0.950	5.0	19	25	1.19	----	2.44	''	''
10.08	16.40	0.950	5.8	16	21	1.26	----	2.10	''	120-130
10.51	11.50	0.830	7.2	12	15	1.31	----	1.81	''	''
11.04	6.80	0.490	7.2	7	9	1.37	----	1.22	''	110-120
11.57	17.90	1.610	9.0	18	22	1.44	----	2.29	''	130-140
12.07	29.00	0.940	3.2	15	18	1.51	----	3.77	Clayey SILT to Silty CLAY	''
12.57	25.90	0.590	2.3	10	12	1.58	----	3.35	Sandy SILT to Clayey SILT	120-130
13.10	15.40	0.950	6.2	15	18	1.64	----	1.94	CLAY	''
13.52	5.80	0.230	4.0	6	7	1.69	----	0.99	''	100-110
14.05	7.80	0.290	3.7	8	9	1.74	----	1.39	''	''
14.58	12.20	0.440	3.6	8	9	1.81	----	1.51	Silty CLAY to CLAY	120-130
15.10	15.50	0.130	0.8	6	7	1.86	----	1.94	Sandy SILT to Clayey SILT	90-100
15.57	16.70	0.770	4.6	17	19	1.92	----	2.10	CLAY	120-130
16.10	11.10	0.610	5.5	11	12	1.98	----	1.68	''	''
16.52	10.40	0.500	4.8	10	12	2.03	----	1.56	''	''
17.05	8.40	0.350	4.2	8	9	2.10	----	1.47	''	110-120
17.58	6.60	0.280	4.2	7	7	2.15	----	1.10	''	100-110
18.00	5.80	0.170	2.9	6	6	2.19	----	0.94	''	90-100
18.53	5.90	0.190	3.2	6	6	2.25	----	0.96	''	100-110
19.06	5.80	0.140	2.4	4	4	2.30	----	0.93	Silty CLAY to CLAY	90-100
19.60	6.50	0.190	2.9	7	7	2.35	----	1.06	CLAY	100-110
20.02	4.50	0.150	3.3	5	5	2.39	----	0.66	''	90-100
20.56	4.00	0.100	2.5	4	4	2.44	----	0.56	''	''
21.08	11.60	0.690	5.9	12	12	2.51	----	1.72	''	120-130
21.51	33.40	1.700	5.1	33	35	2.57	----	4.28	''	130-140
22.08	20.30	1.000	4.9	20	21	2.64	----	2.53	''	''
23.03	8.00	0.380	4.8	8	8	2.75	----	1.32	''	110-120
23.55	6.50	0.320	4.9	7	7	2.81	----	1.02	''	100-110
24.07	9.10	0.440	4.8	9	9	2.87	----	1.28	''	110-120
24.60	11.40	0.560	4.9	11	11	2.93	----	1.66	''	120-130
25.02	10.60	0.550	5.2	11	11	2.99	----	1.52	''	''
25.56	11.80	0.550	4.7	12	12	3.05	----	1.71	''	''
26.09	10.20	0.490	4.8	10	10	3.12	----	1.44	''	''
26.51	8.50	0.440	5.2	9	8	3.17	----	1.38	''	110-120
27.04	9.50	0.580	6.1	10	9	3.24	----	1.31	''	120-130
27.56	7.20	0.300	4.2	7	7	3.29	----	1.11	''	100-110
28.09	11.40	0.460	4.0	11	11	3.36	----	1.62	''	120-130
28.51	14.30	0.500	3.5	10	9	3.41	----	1.68	Silty CLAY to CLAY	''
29.01	12.20	0.400	3.3	8	8	3.47	----	1.40	''	110-120
29.54	13.00	0.450	3.5	9	9	3.53	----	1.50	''	120-130
30.07	11.90	0.410	3.4	8	8	3.59	----	1.68	''	110-120
30.59	15.20	0.510	3.4	10	10	3.66	----	1.78	''	120-130
31.01	16.50	0.580	3.5	11	11	3.71	----	1.95	''	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-06
DATE : 06-01-2005
Groundwater measured at 4.0 feet
Terminated at 31.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.58	32.40	1.100	3.4	16	26	0.07	----	4.32	Clayey SILT to Silty CLAY	130-140
1.52	24.20	1.140	4.7	24	39	0.20	----	3.21	CLAY	''
2.05	18.80	0.950	5.1	19	30	0.27	----	2.49	''	''
2.55	18.80	1.000	5.3	19	30	0.33	----	2.48	''	''
3.08	11.20	0.620	5.5	11	18	0.40	----	1.83	''	120-130
4.03	9.30	0.390	4.2	9	15	0.51	----	1.51	''	110-120
4.55	15.00	0.660	4.4	15	24	0.58	----	1.96	''	120-130
5.08	20.80	0.860	4.1	14	22	0.65	----	2.73	Silty CLAY to CLAY	130-140
5.51	12.60	0.590	4.7	13	20	0.70	----	1.63	CLAY	120-130
6.00	31.70	0.370	1.2	11	17	0.76	34	----	Silty SAND to Sandy SILT	110-120
6.53	14.30	0.310	2.2	7	11	0.82	----	1.85	Clayey SILT to Silty CLAY	''
7.05	24.40	0.440	1.8	10	16	0.88	----	3.19	Sandy SILT to Clayey SILT	120-130
7.57	37.50	1.000	2.7	15	24	0.95	----	4.94	''	130-140
8.09	19.10	0.700	3.7	13	20	1.02	----	2.48	Silty CLAY to CLAY	120-130
8.51	23.60	1.150	4.9	24	38	1.07	----	3.08	CLAY	130-140
9.07	12.70	0.600	4.7	13	20	1.14	----	1.62	''	120-130
9.58	17.50	0.900	5.1	18	28	1.21	----	2.25	''	''
10.52	19.60	0.910	4.6	20	30	1.33	----	2.52	''	130-140
11.03	24.30	1.100	4.5	24	36	1.40	----	3.15	''	''
11.54	30.60	1.070	3.5	15	22	1.47	----	3.98	Clayey SILT to Silty CLAY	''
12.06	24.00	0.950	4.0	16	23	1.54	----	3.10	Silty CLAY to CLAY	''
12.57	14.50	0.540	3.7	10	13	1.61	----	1.83	''	120-130
13.09	13.30	0.360	2.7	7	9	1.67	----	1.66	Clayey SILT to Silty CLAY	110-120
13.50	8.70	0.230	2.6	6	8	1.71	----	1.57	Silty CLAY to CLAY	100-110
14.02	11.70	0.300	2.6	6	8	1.77	----	1.80	Clayey SILT to Silty CLAY	110-120
14.53	17.80	0.530	3.0	9	12	1.83	----	2.25	''	120-130
15.05	15.10	0.560	3.7	10	13	1.90	----	1.89	Silty CLAY to CLAY	''
15.54	20.80	0.790	3.8	14	18	1.96	----	2.64	''	''
16.06	31.40	0.540	1.7	13	16	2.02	----	4.05	Sandy SILT to Clayey SILT	''
16.58	7.40	0.290	3.9	7	9	2.08	----	1.27	CLAY	100-110
17.10	6.30	0.150	2.4	4	5	2.13	----	1.05	Silty CLAY to CLAY	90-100
17.51	9.70	0.270	2.8	6	8	2.18	----	1.44	''	110-120
18.03	11.80	0.560	4.7	12	15	2.24	----	1.78	CLAY	120-130
18.54	10.00	0.560	5.6	10	12	2.30	----	1.47	''	''
19.05	9.30	0.280	3.0	6	8	2.36	----	1.35	Silty CLAY to CLAY	110-120
19.57	13.20	0.390	3.0	9	11	2.43	----	1.60	''	120-130
20.08	15.00	0.520	3.5	10	12	2.49	----	1.83	''	''
20.60	18.40	0.790	4.3	18	21	2.56	----	2.28	CLAY	''
21.01	27.80	1.180	4.2	19	21	2.61	----	3.53	Silty CLAY to CLAY	130-140
21.53	12.00	0.530	4.4	12	14	2.68	----	1.42	CLAY	120-130
22.58	23.60	1.460	6.2	24	26	2.82	----	2.96	''	130-140
23.09	19.10	1.230	6.4	19	21	2.89	----	2.35	''	''
23.60	18.10	0.880	4.9	18	20	2.95	----	2.22	''	120-130
24.00	15.90	0.780	4.9	16	17	3.00	----	1.92	''	''
24.50	14.20	0.540	3.8	9	10	3.06	----	1.69	Silty CLAY to CLAY	''
25.02	14.80	0.640	4.3	15	16	3.13	----	1.76	CLAY	''
25.53	10.90	0.410	3.8	11	11	3.19	----	1.55	''	110-120
26.03	9.90	0.330	3.3	7	7	3.24	----	1.38	Silty CLAY to CLAY	''
26.55	10.60	0.340	3.2	7	7	3.30	----	1.49	''	''
27.07	13.10	0.440	3.4	9	9	3.37	----	1.52	''	120-130
27.59	11.90	0.410	3.4	8	8	3.43	----	1.70	''	110-120
28.00	13.40	0.570	4.3	13	14	3.48	----	1.55	CLAY	120-130
28.56	17.10	0.810	4.7	17	17	3.55	----	2.04	''	''
29.08	15.30	0.560	3.7	10	10	3.62	----	1.80	Silty CLAY to CLAY	''
29.60	17.70	0.460	2.6	9	9	3.68	----	2.11	Clayey SILT to Silty CLAY	''
30.01	15.40	0.450	2.9	8	8	3.73	----	1.80	''	''
30.53	18.70	0.670	3.6	12	12	3.80	----	2.24	Silty CLAY to CLAY	''
31.04	38.70	1.670	4.3	26	26	3.87	----	4.90	''	130-140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-07
DATE : 05-31-2005
Groundwater measured at 4.1 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.56	18.20	0.970	5.3	18	29	0.07	----	2.42	''	130-140
1.01	35.60	1.630	4.6	24	38	0.13	----	4.74	Silty CLAY to CLAY	''
1.54	23.30	1.890	8.1	23	37	0.20	----	3.09	CLAY	''
2.07	18.70	1.640	8.8	19	30	0.27	----	2.48	''	''
2.55	17.50	1.450	8.3	18	28	0.33	----	2.31	''	''
3.08	13.90	1.080	7.8	14	22	0.40	----	1.83	''	120-130
3.53	9.80	0.710	7.2	10	16	0.46	----	1.60	''	''
4.07	11.40	0.510	4.5	11	18	0.52	----	1.86	''	''
4.52	7.70	0.410	5.3	8	12	0.58	----	1.48	''	110-120
5.06	4.30	0.210	4.9	4	7	0.63	----	0.80	''	90-100
5.51	6.40	0.270	4.2	6	10	0.67	----	1.21	''	100-110
6.06	5.30	0.290	5.5	5	8	0.73	----	0.99	''	''
6.51	7.10	0.280	3.9	7	11	0.78	----	1.34	''	''
7.06	8.70	0.370	4.3	9	14	0.84	----	1.66	''	110-120
7.51	9.40	0.410	4.4	9	15	0.89	----	1.49	''	''
8.05	9.80	0.460	4.7	10	16	0.96	----	1.55	''	''
8.58	12.00	0.640	5.3	12	19	1.02	----	1.53	''	120-130
9.03	11.40	0.550	4.8	11	18	1.08	----	1.81	''	''
9.50	8.00	0.450	5.6	8	13	1.13	----	1.49	''	110-120
10.05	9.10	0.610	6.7	9	14	1.20	----	1.42	''	120-130
10.59	7.50	0.490	6.5	8	12	1.26	----	1.37	''	110-120
11.03	8.00	0.350	4.4	8	12	1.32	----	1.47	''	''
11.57	9.00	0.300	3.3	9	13	1.38	----	1.39	''	''
12.02	8.40	0.300	3.6	8	12	1.43	----	1.54	''	''
12.57	10.70	0.490	4.6	11	15	1.50	----	1.66	''	120-130
13.01	8.90	0.270	3.0	6	8	1.54	----	1.63	Silty CLAY to CLAY	100-110
13.56	6.50	0.190	2.9	7	9	1.60	----	1.14	CLAY	''
14.01	4.70	0.150	3.2	5	7	1.64	----	0.78	''	90-100
14.54	9.60	0.210	2.2	5	7	1.70	----	1.46	Clayey SILT to Silty CLAY	100-110
15.08	12.10	0.390	3.2	8	11	1.76	----	1.50	Silty CLAY to CLAY	110-120
15.53	11.30	0.570	5.0	11	15	1.82	----	1.73	CLAY	120-130
16.08	8.00	0.330	4.1	8	11	1.88	----	1.41	''	110-120
16.53	8.70	0.300	3.4	9	11	1.93	----	1.55	''	''
17.06	5.30	0.200	3.8	5	7	1.99	----	0.86	''	100-110
17.50	5.10	0.270	5.3	5	7	2.03	----	0.82	''	''
18.03	20.00	0.480	2.4	10	13	2.10	----	2.53	Clayey SILT to Silty CLAY	120-130
18.56	10.00	0.690	6.9	10	13	2.17	----	1.49	CLAY	''
19.06	45.30	1.370	3.0	18	23	2.23	----	5.89	Sandy SILT to Clayey SILT	130-140
19.50	8.80	0.350	4.0	9	11	2.29	----	1.53	CLAY	110-120
20.03	13.40	0.440	3.3	9	11	2.35	----	1.63	Silty CLAY to CLAY	120-130
20.56	11.30	0.430	3.8	11	14	2.41	----	1.68	CLAY	110-120
21.09	11.50	0.410	3.6	8	9	2.47	----	1.71	Silty CLAY to CLAY	''
21.52	10.50	0.430	4.1	11	12	2.52	----	1.54	CLAY	''
22.05	11.50	0.710	6.2	12	13	2.59	----	1.70	''	120-130
22.54	11.90	0.620	5.2	12	14	2.65	----	1.76	''	''
23.08	12.20	0.550	4.5	12	14	2.72	----	1.45	''	''
23.52	14.20	0.550	3.9	9	11	2.77	----	1.71	Silty CLAY to CLAY	''
24.03	24.50	0.910	3.7	16	18	2.84	----	3.08	''	130-140
24.55	14.40	0.590	4.1	14	16	2.91	----	1.73	CLAY	120-130
25.07	14.10	0.450	3.2	9	10	2.97	----	1.68	Silty CLAY to CLAY	''
25.58	12.00	0.450	3.8	12	13	3.04	----	1.40	CLAY	''
26.02	10.40	0.470	4.5	10	11	3.09	----	1.48	''	110-120
26.55	13.80	0.650	4.7	14	15	3.15	----	1.63	''	120-130
27.08	15.40	0.660	4.3	15	16	3.22	----	1.84	''	''
27.51	22.80	0.940	4.1	15	16	3.28	----	2.82	Silty CLAY to CLAY	130-140
28.04	26.40	1.850	7.0	26	27	3.35	----	3.30	CLAY	''
28.56	30.70	2.740	8.9	31	32	3.42	----	3.87	''	''
29.02	140.50	4.390	3.1	56	57	3.48	----	18.50	Sandy SILT to Clayey SILT	''
29.53	172.20	5.540	3.2	69	70	3.55	----	22.72	''	''
30.01	140.60	3.000	2.1	47	47	3.61	40	----	Silty SAND to Sandy SILT	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-08
DATE : 06-27-2005
Groundwater measured at 4.8 feet
Terminated at 48.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	44.10	0.380	0.9	15	24	0.07	36	----	Silty SAND to Sandy SILT	110-120
1.02	36.20	0.300	0.8	12	19	0.11	35	----	''	100-110
1.55	25.10	0.890	3.5	13	20	0.18	----	3.33	Clayey SILT to Silty CLAY	130-140
2.01	30.40	1.960	6.4	30	49	0.25	----	4.04	CLAY	''
2.53	29.30	1.980	6.8	29	47	0.32	----	3.89	''	''
3.02	22.50	1.450	6.4	23	36	0.38	----	2.97	''	''
3.56	16.20	0.860	5.3	16	26	0.45	----	2.13	''	120-130
4.09	20.80	0.590	2.8	10	17	0.52	----	2.74	Clayey SILT to Silty CLAY	''
4.53	21.90	0.650	3.0	11	18	0.57	----	2.88	''	''
5.06	13.20	0.400	3.0	9	14	0.64	----	1.72	Silty CLAY to CLAY	''
5.51	6.80	0.140	2.1	5	7	0.68	----	1.29	''	90-100
6.03	7.20	0.170	2.4	5	8	0.74	----	1.37	''	100-110
6.55	7.60	0.190	2.5	5	8	0.79	----	1.44	''	''
7.00	14.90	0.250	1.7	7	12	0.84	----	1.93	Clayey SILT to Silty CLAY	110-120
7.55	7.00	0.160	2.3	5	7	0.90	----	1.31	Silty CLAY to CLAY	100-110
8.09	11.20	0.380	3.4	7	12	0.96	----	1.79	''	110-120
8.53	14.20	0.570	4.0	14	23	1.02	----	1.83	CLAY	120-130
9.07	15.80	0.590	3.7	11	17	1.08	----	2.03	Silty CLAY to CLAY	''
9.54	18.90	0.790	4.2	13	20	1.14	----	2.44	''	''
10.08	17.30	0.560	3.2	9	13	1.21	----	2.23	Clayey SILT to Silty CLAY	''
10.53	19.90	0.600	3.0	10	15	1.27	----	2.57	''	''
11.07	16.00	0.480	3.0	8	12	1.33	----	2.04	''	''
11.52	12.70	0.290	2.3	6	9	1.39	----	1.60	''	110-120
12.05	13.00	0.350	2.7	7	9	1.45	----	1.64	''	''
12.50	13.30	0.440	3.3	9	12	1.50	----	1.67	Silty CLAY to CLAY	120-130
13.04	13.80	0.460	3.3	9	13	1.57	----	1.74	''	''
13.58	12.40	0.340	2.7	6	8	1.63	----	1.54	Clayey SILT to Silty CLAY	110-120
14.03	10.50	0.190	1.8	5	7	1.68	----	1.61	''	100-110
14.57	10.80	0.250	2.3	5	7	1.74	----	1.65	''	110-120
15.01	10.00	0.260	2.6	7	9	1.79	----	1.52	Silty CLAY to CLAY	''
15.55	15.50	0.300	1.9	8	10	1.85	----	1.94	Clayey SILT to Silty CLAY	''
16.08	11.10	0.230	2.1	6	7	1.91	----	1.69	''	100-110
16.53	13.90	0.230	1.7	7	9	1.96	----	1.72	''	''
17.03	13.30	0.350	2.6	7	8	2.02	----	1.64	''	110-120
17.56	12.90	0.300	2.3	6	8	2.08	----	1.58	''	''
18.01	18.80	0.670	3.6	13	16	2.13	----	2.36	Silty CLAY to CLAY	120-130
18.54	23.00	0.570	2.5	12	14	2.20	----	2.92	Clayey SILT to Silty CLAY	''
19.02	10.50	0.240	2.3	5	6	2.25	----	1.56	''	100-110
19.56	9.00	0.210	2.3	6	7	2.31	----	1.31	Silty CLAY to CLAY	''
20.01	9.30	0.200	2.2	5	6	2.35	----	1.35	Clayey SILT to Silty CLAY	''
20.54	9.30	0.150	1.6	5	6	2.41	----	1.35	''	''
21.07	31.90	0.710	2.2	13	15	2.48	----	4.09	Sandy SILT to Clayey SILT	120-130
21.58	39.80	0.940	2.4	16	18	2.54	----	5.14	''	130-140
22.00	11.90	0.510	4.3	12	14	2.60	----	1.77	CLAY	120-130
22.54	10.90	0.340	3.1	7	8	2.66	----	1.60	Silty CLAY to CLAY	110-120
23.07	14.50	0.320	2.2	7	8	2.72	----	1.75	Clayey SILT to Silty CLAY	''
23.51	19.50	0.460	2.4	10	11	2.77	----	2.42	''	120-130
24.04	31.40	0.920	2.9	16	17	2.85	----	4.00	''	130-140
24.57	11.80	0.320	2.7	6	6	2.91	----	1.72	''	110-120
25.01	10.90	0.220	2.0	5	6	2.95	----	1.57	''	100-110
25.58	13.70	0.470	3.4	9	10	3.02	----	1.63	Silty CLAY to CLAY	120-130
26.02	12.60	0.520	4.1	13	13	3.08	----	1.47	CLAY	''
26.55	16.10	0.670	4.2	16	17	3.15	----	1.94	''	''
27.08	18.00	0.620	3.4	12	13	3.21	----	2.19	Silty CLAY to CLAY	''
27.53	18.50	0.660	3.6	12	13	3.27	----	2.25	''	''
28.02	15.50	0.680	4.4	16	16	3.33	----	1.84	CLAY	''
28.54	48.20	1.850	3.8	24	25	3.40	----	6.20	Clayey SILT to Silty CLAY	130-140
29.08	105.00	2.360	2.2	35	36	3.47	38	----	Silty SAND to Sandy SILT	''
29.57	419.30	3.030	0.7	70	70	3.53	46	----	Gravelly SAND to SAND	110-120
30.03	266.90	2.540	1.0	53	53	3.59	44	----	SAND	120-130
30.50	204.10	3.980	2.0	51	51	3.65	42	----	SAND to Silty SAND	130-140
31.01	245.00	2.390	1.0	49	49	3.71	43	----	SAND	120-130
31.54	18.40	0.810	4.4	18	18	3.78	----	2.20	CLAY	''

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-08
DATE : 06-27-2005
Groundwater measured at 4.8 feet
Terminated at 48.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
32.06	12.90	0.270	2.1	6	6	3.84	----	1.46	Clayey SILT to Silty CLAY	110-120
32.56	12.20	0.230	1.9	6	6	3.89	----	1.37	''	100-110
33.07	13.50	0.360	2.7	7	7	3.95	----	1.54	''	110-120
33.51	13.70	0.540	3.9	14	14	4.01	----	1.56	CLAY	120-130
34.04	12.80	0.400	3.1	9	8	4.07	----	1.44	Silty CLAY to CLAY	110-120
34.57	38.70	1.560	4.0	19	19	4.14	----	4.88	Clayey SILT to Silty CLAY	130-140
35.01	26.30	1.060	4.0	18	17	4.20	----	3.23	Silty CLAY to CLAY	''
35.55	16.10	0.550	3.4	11	11	4.26	----	1.86	''	120-130
36.06	14.90	0.490	3.3	10	10	4.33	----	1.70	''	''
36.59	14.90	0.500	3.4	10	10	4.39	----	1.69	''	''
37.02	15.20	0.460	3.0	8	8	4.45	----	1.73	Clayey SILT to Silty CLAY	''
37.55	12.70	0.480	3.8	8	8	4.51	----	1.39	Silty CLAY to CLAY	''
38.05	17.80	0.570	3.2	9	9	4.58	----	2.07	Clayey SILT to Silty CLAY	''
38.56	15.20	0.580	3.8	10	10	4.64	----	1.72	Silty CLAY to CLAY	''
39.05	45.30	1.490	3.3	23	22	4.71	----	5.73	Clayey SILT to Silty CLAY	130-140
39.56	53.30	2.410	4.5	36	34	4.78	----	6.79	Silty CLAY to CLAY	''
40.07	69.60	3.710	5.3	70	66	4.85	----	8.96	Very Stiff Fine Grained *	''
40.58	48.50	2.990	6.2	49	45	4.91	----	6.14	CLAY	''
41.07	25.90	1.530	5.9	26	24	4.98	----	3.12	''	''
41.55	24.50	0.160	0.7	8	8	5.03	29	----	Silty SAND to Sandy SILT	90-100
42.04	39.40	1.700	4.3	26	24	5.09	----	4.91	Silty CLAY to CLAY	130-140
42.54	59.90	2.150	3.6	30	27	5.16	----	7.64	Clayey SILT to Silty CLAY	''
43.04	63.80	2.990	4.7	43	38	5.23	----	8.16	Silty CLAY to CLAY	''
43.53	43.70	1.800	4.1	22	19	5.29	----	5.47	Clayey SILT to Silty CLAY	''
44.03	39.40	1.380	3.5	20	17	5.36	----	4.90	''	''
44.55	38.90	1.280	3.3	19	16	5.43	----	4.82	''	''
45.05	30.70	1.380	4.5	20	17	5.50	----	3.73	Silty CLAY to CLAY	''
45.50	28.90	1.340	4.6	19	16	5.56	----	3.48	''	''
46.08	197.10	2.190	1.1	39	32	5.63	41	----	SAND	120-130
46.54	345.80	3.240	0.9	69	57	5.69	44	----	''	''
47.01	640.30	3.650	0.6	107	87	5.74	48	----	Gravelly SAND to SAND	110-120
47.51	488.10	5.090	1.0	98	79	5.81	46	----	SAND	120-130
48.01	363.10	8.000	2.2	73	59	5.87	44	----	''	130-140
48.10	234.50	6.400	2.7	78	63	5.88	42	----	Silty SAND to Sandy SILT	''
48.53	297.90	3.290	1.1	60	48	5.94	43	----	SAND	120-130

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)
References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-09
DATE : 06-01-2005
Groundwater measured at 4.7 feet
Terminated at 35.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.60	16.90	0.690	4.1	11	18	0.07	----	2.25	''	120-130
1.03	13.80	0.990	7.2	14	22	0.12	----	1.83	CLAY	''
1.57	24.00	1.810	7.5	24	38	0.20	----	3.19	''	130-140
2.50	18.10	1.520	8.4	18	29	0.32	----	2.39	''	''
3.04	10.70	0.830	7.8	11	17	0.39	----	1.75	''	120-130
3.58	10.70	0.570	5.3	11	17	0.46	----	1.75	''	''
4.01	10.00	0.620	6.2	10	16	0.51	----	1.62	''	''
4.55	24.90	0.610	2.4	10	16	0.58	----	3.28	Sandy SILT to Clayey SILT	''
5.09	25.10	0.420	1.7	10	16	0.65	----	3.30	''	''
5.51	10.80	0.260	2.4	5	9	0.69	----	1.74	Clayey SILT to Silty CLAY	110-120
6.02	33.80	0.250	0.7	11	18	0.75	34	----	Silty SAND to Sandy SILT	100-110
6.56	59.80	0.350	0.6	15	24	0.80	38	----	SAND to Silty SAND	''
7.09	80.80	0.770	1.0	20	32	0.87	39	----	''	120-130
7.52	90.90	1.090	1.2	23	36	0.92	40	----	''	''
8.05	74.70	1.130	1.5	25	40	1.00	39	----	Silty SAND to Sandy SILT	130-140
8.57	111.50	0.720	0.6	22	36	1.06	41	----	SAND	110-120
9.07	128.30	0.590	0.5	26	40	1.11	42	----	''	100-110
9.59	132.70	1.450	1.1	33	51	1.17	42	----	SAND to Silty SAND	120-130
10.00	158.90	1.790	1.1	32	48	1.22	43	----	SAND	''
10.51	149.70	2.030	1.4	37	55	1.29	43	----	SAND to Silty SAND	130-140
11.01	187.00	1.440	0.8	37	54	1.35	44	----	SAND	110-120
11.51	218.80	1.710	0.8	44	62	1.41	45	----	''	''
12.52	202.90	4.090	2.0	51	70	1.55	44	----	SAND to Silty SAND	130-140
13.02	228.50	4.880	2.1	57	77	1.61	45	----	''	''
13.53	224.70	2.750	1.2	45	60	1.68	44	----	SAND	''
14.00	236.40	3.220	1.4	47	62	1.75	45	----	''	''
14.57	177.40	1.970	1.1	35	46	1.82	43	----	''	120-130
15.05	185.20	1.040	0.6	37	48	1.87	43	----	''	110-120
15.60	175.90	4.740	2.7	59	74	1.95	43	----	Silty SAND to Sandy SILT	130-140
16.07	202.80	2.990	1.5	41	51	2.01	43	----	SAND	''
16.57	140.00	3.140	2.2	47	58	2.08	41	----	Silty SAND to Sandy SILT	''
17.07	182.60	4.610	2.5	61	74	2.14	43	----	''	''
17.55	158.10	3.550	2.2	53	63	2.21	42	----	''	''
18.03	247.00	2.200	0.9	49	59	2.27	44	----	SAND	120-130
18.54	277.20	4.250	1.5	55	65	2.34	45	----	''	130-140
19.02	321.90	5.630	1.7	64	74	2.40	46	----	''	''
19.52	180.80	2.870	1.6	45	51	2.47	42	----	SAND to Silty SAND	''
20.07	222.90	3.830	1.7	45	50	2.54	43	----	SAND	''
20.58	367.40	8.620	2.3	184	204	2.61	46	----	SAND to Clayey SAND *	''
21.02	393.00	7.860	2.0	79	86	2.67	46	----	SAND	''
21.53	372.40	9.020	2.4	186	202	2.74	46	----	SAND to Clayey SAND *	''
22.05	316.40	3.870	1.2	63	68	2.81	45	----	SAND	''
22.55	334.30	9.390	2.8	167	177	2.88	45	----	SAND to Clayey SAND *	>140
23.08	351.50	6.350	1.8	70	74	2.95	46	----	SAND	130-140
23.51	420.80	5.730	1.4	84	88	3.01	47	----	''	''
24.03	109.70	4.370	4.0	110	113	3.08	----	14.42	Very Stiff Fine Grained *	''
24.55	16.10	0.350	2.2	8	8	3.14	----	1.94	Clayey SILT to Silty CLAY	110-120
25.52	15.50	0.330	2.1	8	8	3.25	----	1.85	''	''
26.06	14.20	0.420	3.0	7	7	3.32	----	1.67	''	120-130
26.60	15.40	0.380	2.5	8	8	3.39	----	1.83	''	''
27.03	20.30	0.650	3.2	10	10	3.44	----	2.48	''	''
27.57	12.60	0.480	3.8	13	13	3.51	----	1.45	CLAY	''
28.00	16.10	0.540	3.4	11	11	3.56	----	1.91	Silty CLAY to CLAY	''
28.55	10.10	0.400	4.0	10	10	3.63	----	1.38	CLAY	110-120
29.09	13.70	0.320	2.3	7	7	3.69	----	1.58	Clayey SILT to Silty CLAY	''
29.53	18.10	0.630	3.5	12	12	3.74	----	2.16	Silty CLAY to CLAY	120-130
30.08	19.90	0.700	3.5	13	13	3.81	----	2.40	''	''
30.51	21.90	0.950	4.3	15	15	3.87	----	2.66	''	130-140
31.05	20.40	0.710	3.5	10	10	3.94	----	2.46	Clayey SILT to Silty CLAY	120-130
31.59	23.20	0.970	4.2	15	15	4.01	----	2.83	Silty CLAY to CLAY	130-140
32.04	9.80	0.330	3.4	7	6	4.06	----	1.29	''	110-120
32.58	11.50	0.420	3.7	8	8	4.12	----	1.57	''	''
33.09	12.30	0.450	3.7	8	8	4.19	----	1.36	''	120-130
33.52	13.80	0.570	4.1	14	14	4.24	----	1.56	CLAY	''
34.09	12.80	0.430	3.4	9	8	4.31	----	1.42	Silty CLAY to CLAY	''

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-09
DATE : 06-01-2005
Groundwater measured at 4.7 feet
Terminated at 35.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
35.53	14.20	0.001	0.0	6	6	4.43	----	1.60	Sandy SILT to Clayey SILT	<80

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-10
DATE : 05-31-2005
Groundwater measured at 4.5 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.54	29.70	1.190	4.0	20	32	0.06	----	3.96	Silty CLAY to CLAY	''
1.05	13.90	0.530	3.8	9	15	0.13	----	1.84	''	120-130
1.56	9.50	0.690	7.3	10	15	0.19	----	1.57	CLAY	''
2.07	12.60	0.800	6.3	13	20	0.25	----	1.66	''	''
2.56	10.60	0.810	7.6	11	17	0.32	----	1.74	''	''
3.07	8.00	0.500	6.3	8	13	0.37	----	1.56	''	110-120
3.59	6.90	0.480	7.0	7	11	0.43	----	1.34	''	''
4.00	6.40	0.350	5.5	6	10	0.48	----	1.23	''	''
4.51	6.30	0.260	4.1	6	10	0.54	----	1.21	''	100-110
5.03	5.40	0.210	3.9	5	9	0.59	----	1.02	''	''
5.59	6.60	0.320	4.8	7	11	0.65	----	1.26	''	''
6.00	21.30	0.990	4.6	21	34	0.70	----	2.79	''	130-140
6.52	18.40	1.100	6.0	18	29	0.77	----	2.40	''	''
7.01	54.70	0.550	1.0	18	29	0.83	37	----	Silty SAND to Sandy SILT	120-130
7.52	70.80	0.450	0.6	18	28	0.89	39	----	SAND to Silty SAND	100-110
8.02	88.00	0.970	1.1	22	35	0.95	40	----	''	120-130
8.52	104.90	0.540	0.5	21	34	1.00	41	----	SAND	100-110
9.01	121.80	0.900	0.7	24	39	1.06	42	----	''	110-120
9.51	122.70	1.220	1.0	31	49	1.12	42	----	SAND to Silty SAND	120-130
10.00	142.80	1.060	0.7	29	46	1.18	43	----	SAND	110-120
10.59	150.90	1.330	0.9	30	47	1.25	43	----	''	120-130
11.07	154.10	2.510	1.6	39	59	1.32	43	----	SAND to Silty SAND	130-140
11.55	148.10	1.370	0.9	30	44	1.38	43	----	SAND	120-130
12.04	236.80	2.580	1.1	47	69	1.44	45	----	''	''
12.54	164.00	1.440	0.9	33	47	1.50	43	----	''	''
13.03	131.20	1.300	1.0	26	37	1.56	42	----	''	''
13.52	108.10	0.910	0.8	27	37	1.62	40	----	SAND to Silty SAND	''
14.09	173.10	2.730	1.6	43	59	1.70	43	----	''	130-140
14.56	213.90	2.150	1.0	43	58	1.76	44	----	SAND	120-130
15.02	193.80	0.980	0.5	39	52	1.81	43	----	''	100-110
15.52	134.60	1.490	1.1	34	44	1.87	41	----	SAND to Silty SAND	120-130
16.09	174.80	3.720	2.1	58	76	1.95	43	----	Silty SAND to Sandy SILT	130-140
16.56	183.50	1.910	1.0	37	47	2.00	43	----	SAND	120-130
17.03	191.80	5.260	2.7	64	81	2.07	43	----	Silty SAND to Sandy SILT	130-140
17.57	202.50	1.720	0.8	41	51	2.14	43	----	SAND	120-130
18.01	260.60	6.090	2.3	87	107	2.20	45	----	Silty SAND to Sandy SILT	130-140
18.52	260.40	3.100	1.2	52	63	2.27	45	----	SAND	''
19.07	405.80	7.860	1.9	81	97	2.34	47	----	''	''
19.50	379.60	6.100	1.6	76	90	2.40	47	----	''	''
20.01	356.50	5.740	1.6	71	83	2.47	46	----	''	''
20.51	243.00	4.110	1.7	49	56	2.53	44	----	''	''
21.08	290.20	3.680	1.3	58	66	2.61	45	----	''	''
21.56	334.30	2.130	0.6	56	63	2.67	46	----	Gravelly SAND to SAND	110-120
22.08	343.70	7.550	2.2	69	76	2.74	46	----	SAND	130-140
22.52	206.80	6.070	2.9	69	76	2.79	43	----	Silty SAND to Sandy SILT	''
23.03	94.70	1.420	1.5	24	26	2.86	38	----	SAND to Silty SAND	''
23.56	38.50	0.610	1.6	13	14	2.93	33	----	Silty SAND to Sandy SILT	120-130
24.03	30.80	1.200	3.9	15	16	2.99	----	3.91	Clayey SILT to Silty CLAY	130-140
24.58	182.50	3.300	1.8	46	48	3.07	42	----	SAND to Silty SAND	''
25.05	217.70	1.380	0.6	44	46	3.12	43	----	SAND	110-120
25.51	277.90	4.440	1.6	56	58	3.18	44	----	''	130-140
26.05	337.60	7.380	2.2	68	69	3.26	45	----	''	''
26.52	69.70	3.020	4.3	35	36	3.32	----	9.07	Clayey SILT to Silty CLAY	''
27.02	8.10	0.480	5.9	8	8	3.38	----	1.28	CLAY	110-120
27.59	11.40	0.530	4.6	11	11	3.45	----	1.61	''	120-130
28.07	16.40	0.580	3.5	11	11	3.51	----	1.95	Silty CLAY to CLAY	''
28.57	15.50	0.420	2.7	8	8	3.57	----	1.83	Clayey SILT to Silty CLAY	''
29.08	15.60	0.430	2.8	8	8	3.63	----	1.84	''	''
29.59	20.90	0.940	4.5	21	21	3.70	----	2.54	CLAY	130-140
30.51	41.70	0.001	0.0	10	10	3.78	33	----	SAND to Silty SAND	<80

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

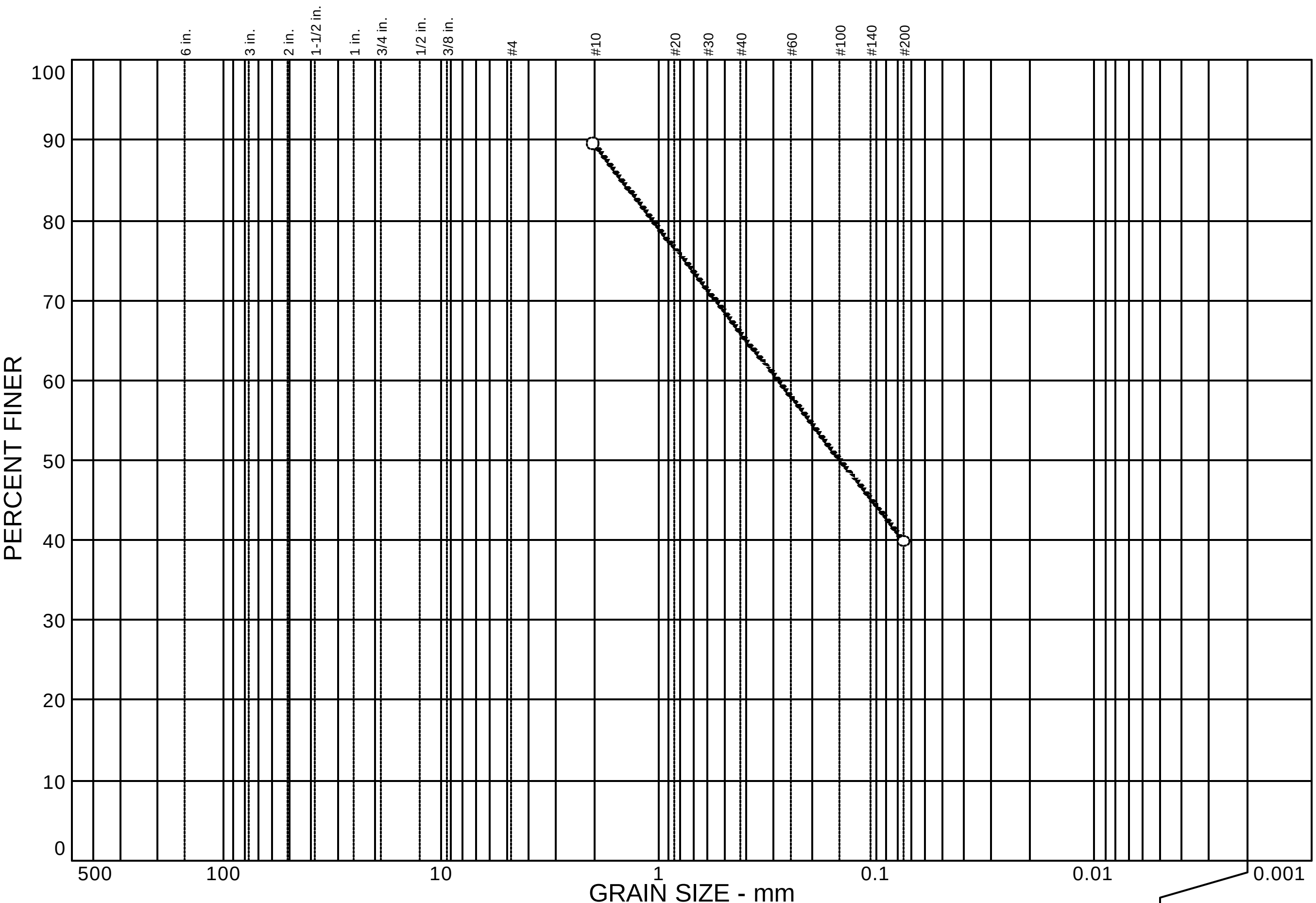
John Sarmiento & Associates
Cone Penetration Testing Service

APPENDIX C

ENGEO Incorporated (2005)

Laboratory Test Results

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			39.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	89.5		
#200	39.8		

* (no specification provided)

Soil Description

Very dark grayish brown clayey Sand

Atterberg Limits

PL= 16 LL= 35 PI= 19

Coefficients

D_{85}= 1.49 D_{60}= 0.285 D_{50}= 0.147
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

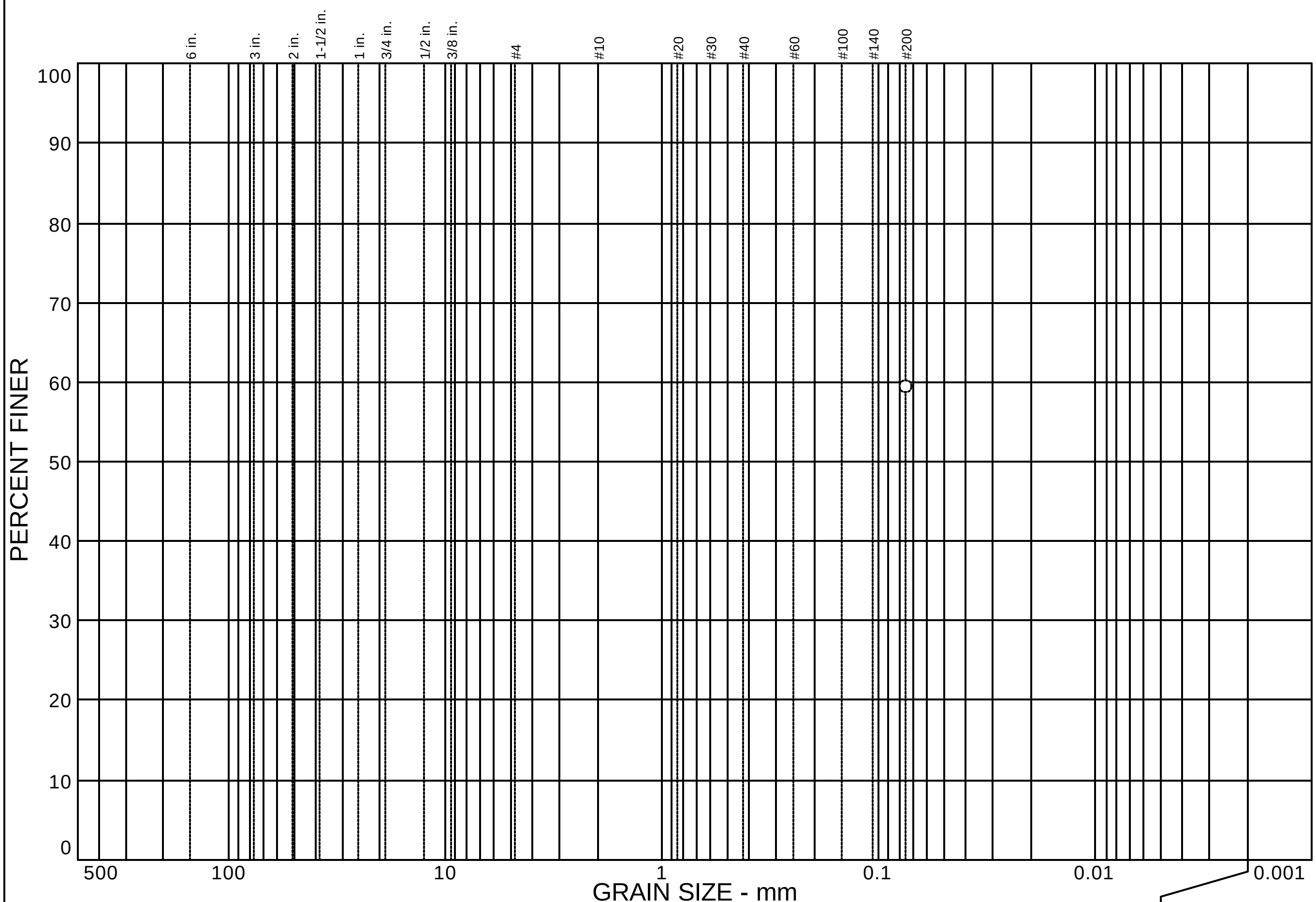
Sample No.: 2-B1@5' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 5 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			59.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.4		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay, trace gravel

Atterberg Limits

PL= 18 LL= 37 PI= 19

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

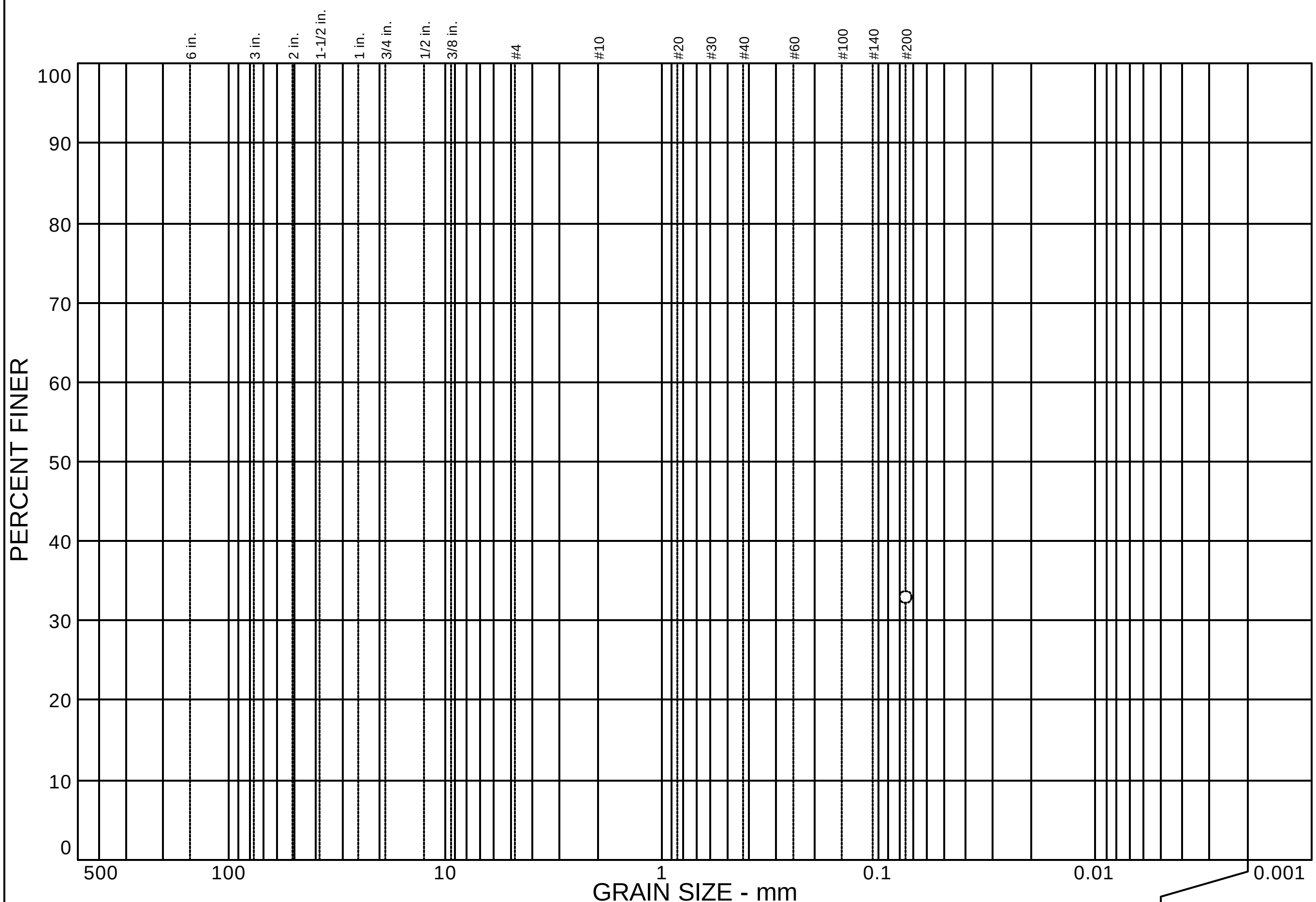
Sample No.: 2-B2@23' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 23 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			32.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	32.8		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 16 LL= 29 PI= 13

Coefficients

$D_{85}=$ $D_{60}=$ $D_{50}=$
$D_{30}=$ $D_{15}=$ $D_{10}=$
$C_u=$ $C_c=$

Classification

USCS= SC AASHTO=

Remarks

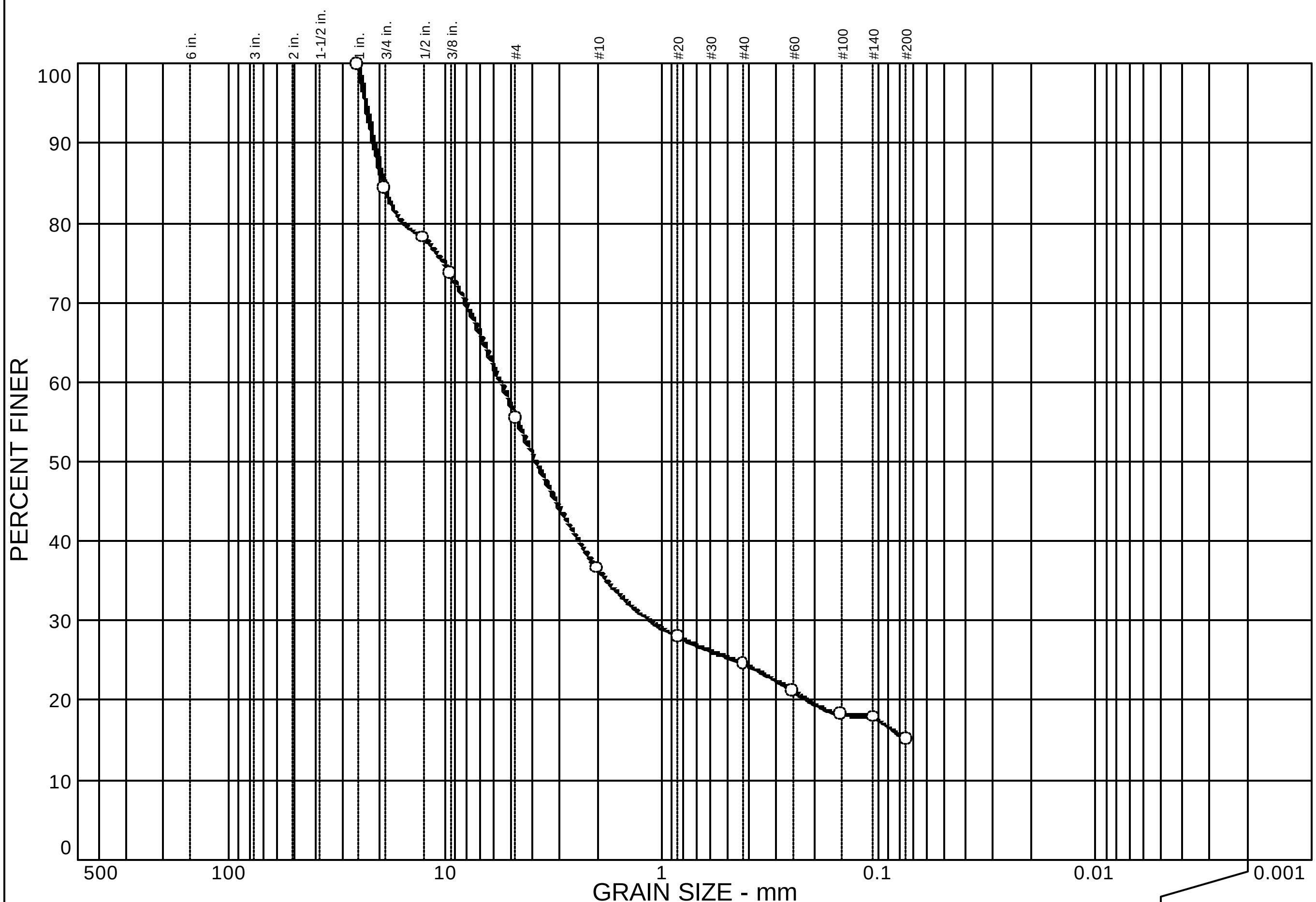
Sample No.: 2-B3@10.5' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 10.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	44.5	40.4	15.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	84.3		
1/2 in.	78.2		
3/8 in.	73.6		
#4	55.5		
#10	36.6		
#20	28.0		
#40	24.6		
#60	21.2		
#100	18.2		
#140	17.9		
#200	15.1		

* (no specification provided)

Soil Description

Dark olive gray silty Gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 19.4 D_{60}= 5.60 D_{50}= 3.84
D_{30}= 1.13 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

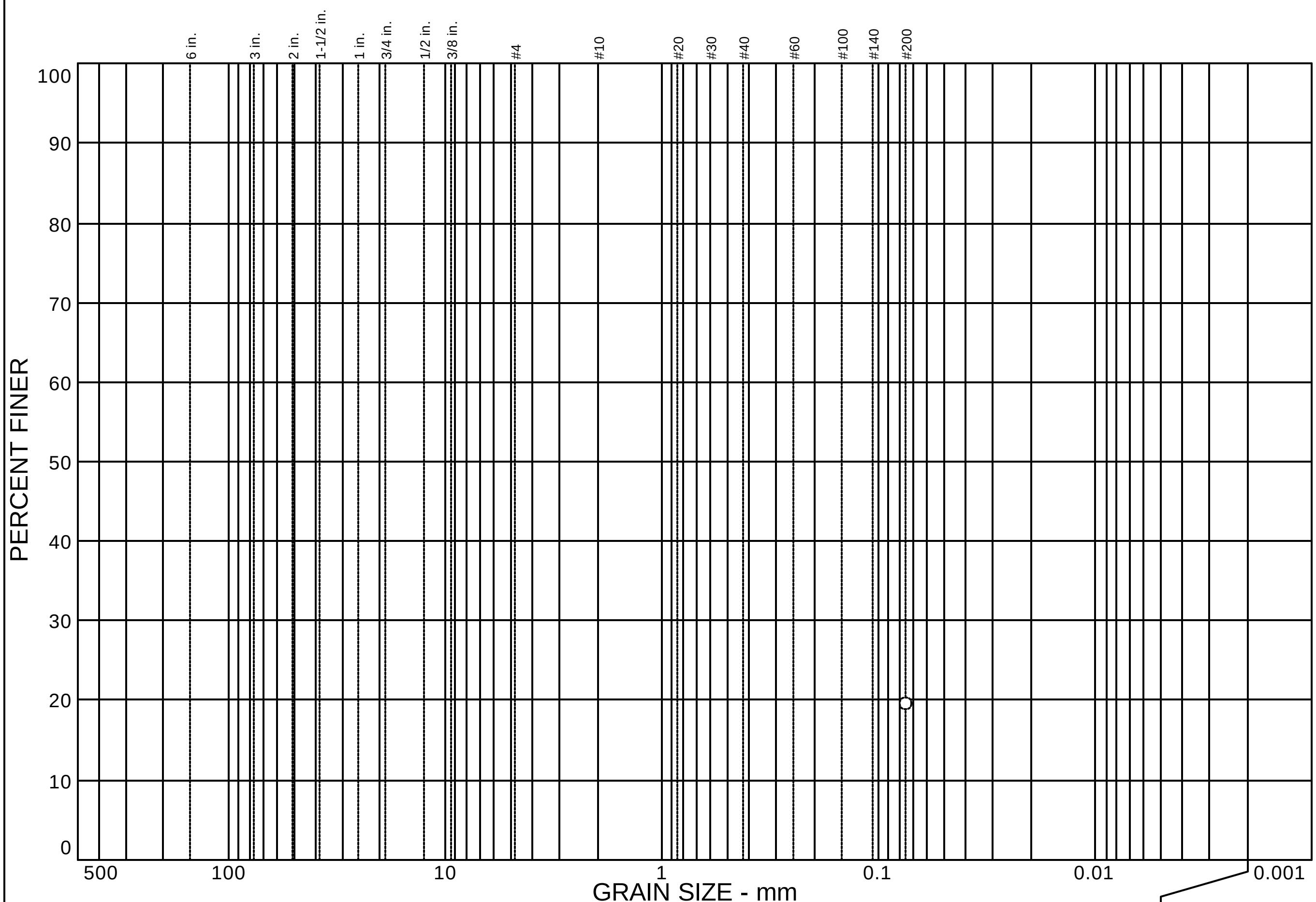
Sample No.: 2-B3@101' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 101 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			19.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	19.5		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 15 LL= 36 PI= 21

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

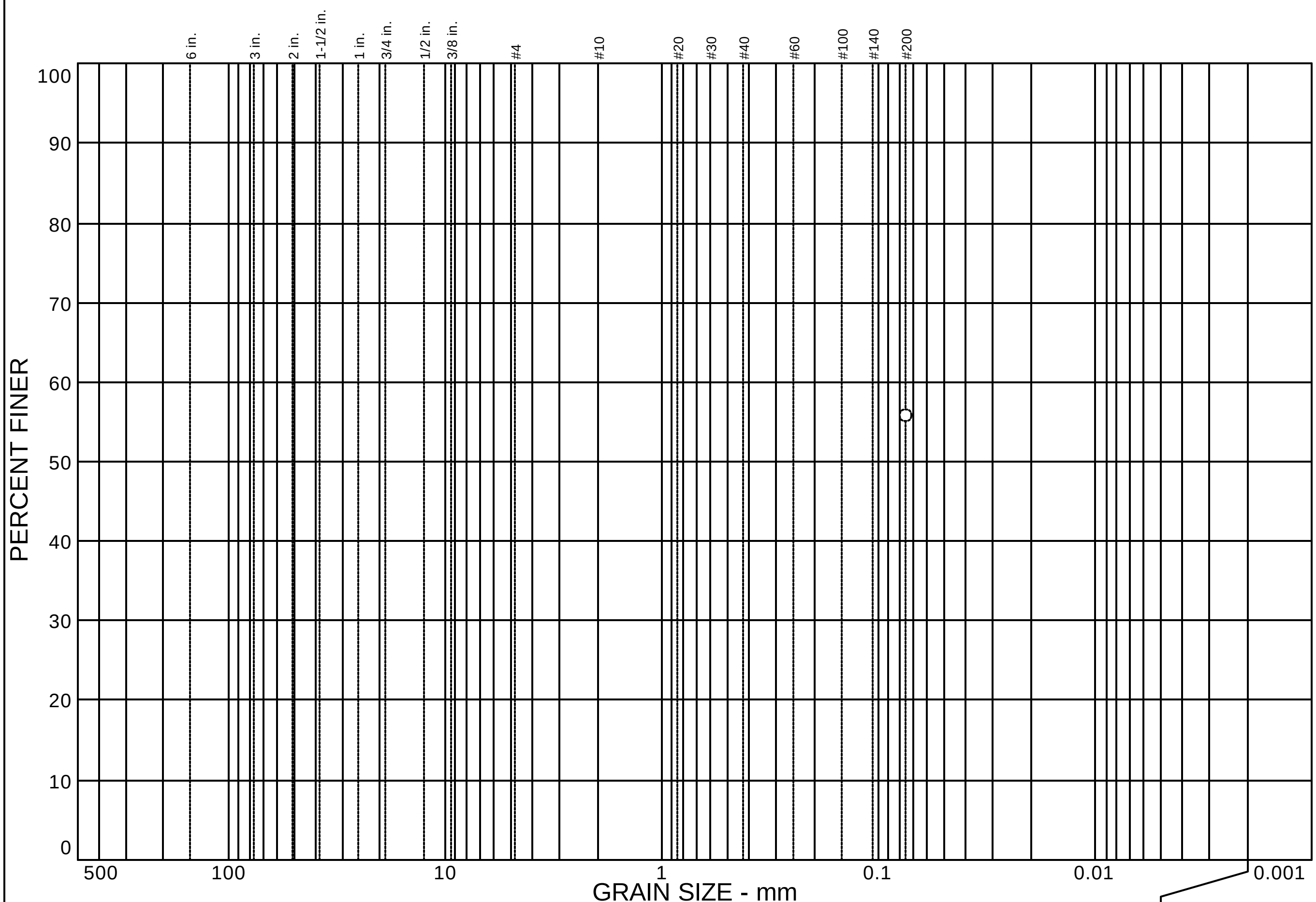
Sample No.: 2-B4@6.5' **Source of Sample:** **Date:** 6-27-05
Location: **Elev./Depth:** 6.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			55.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	55.7		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay

Atterberg Limits

PL= 19 LL= 37 PI= 18

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

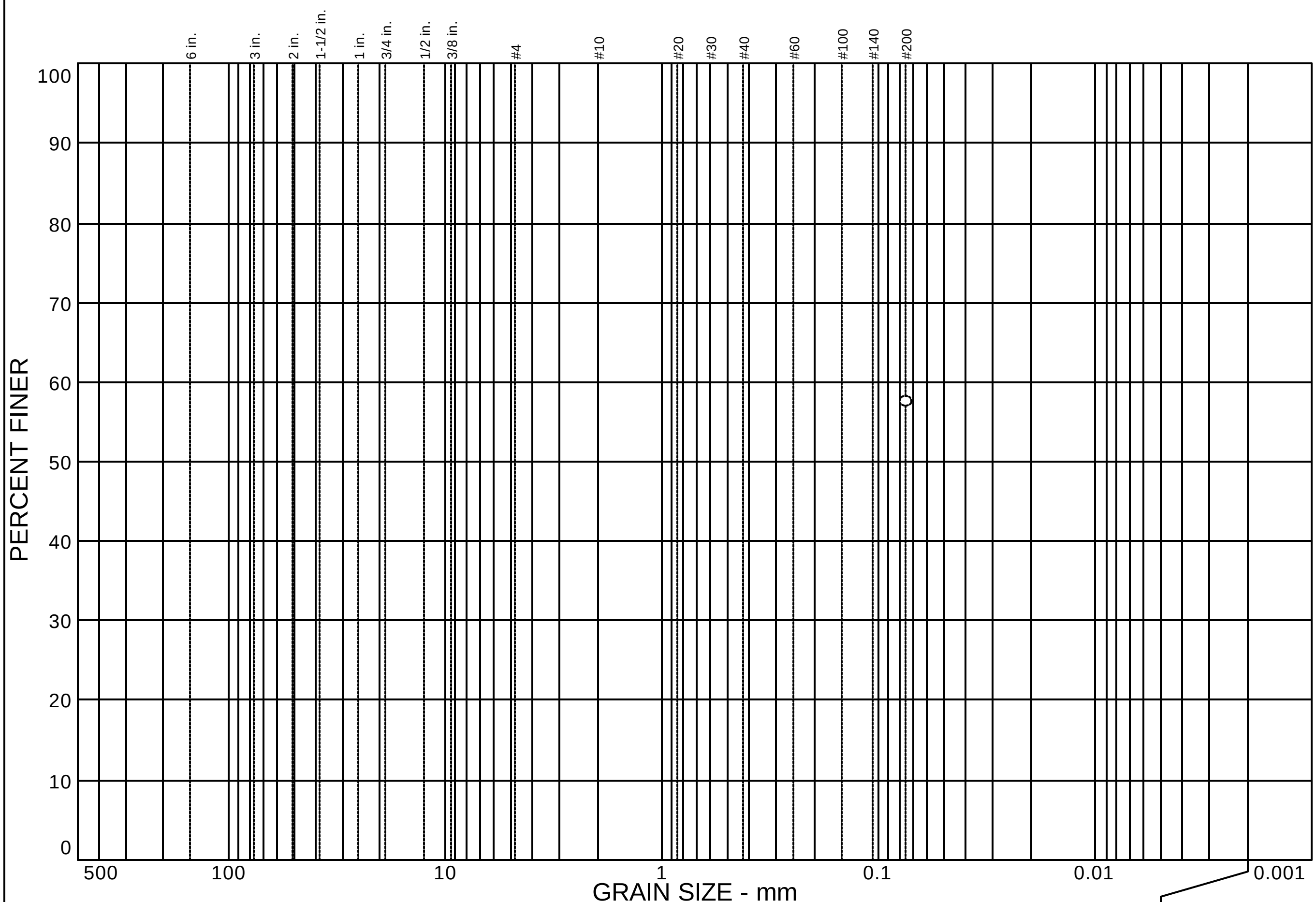
Sample No.: 2-B5@29' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 29 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			57.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	57.5		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay

Atterberg Limits

PL= 18 LL= 39 PI= 21

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

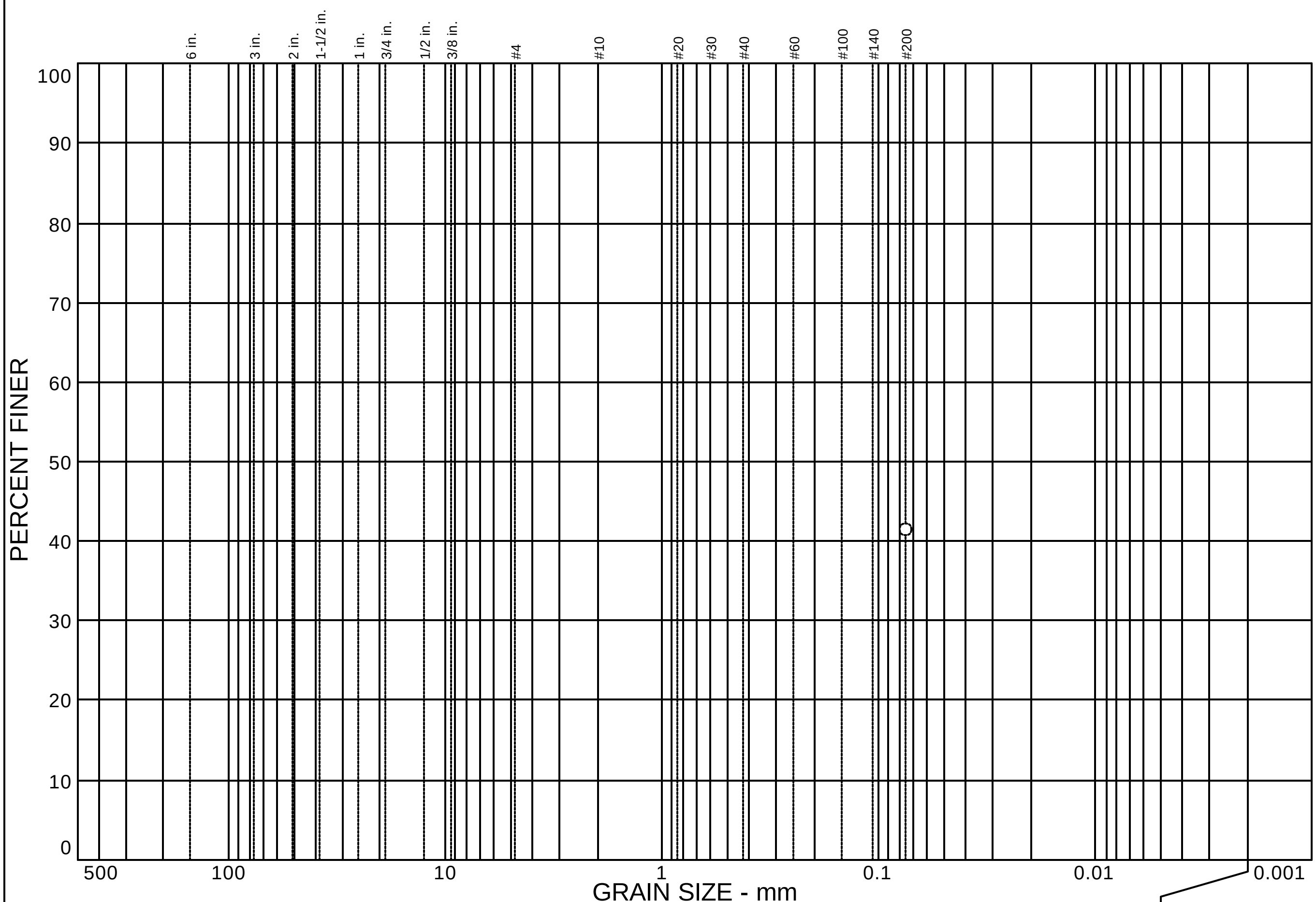
Sample No.: 2-B7@21' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 21 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			41.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	41.3		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 20 LL= 28 PI= 8

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

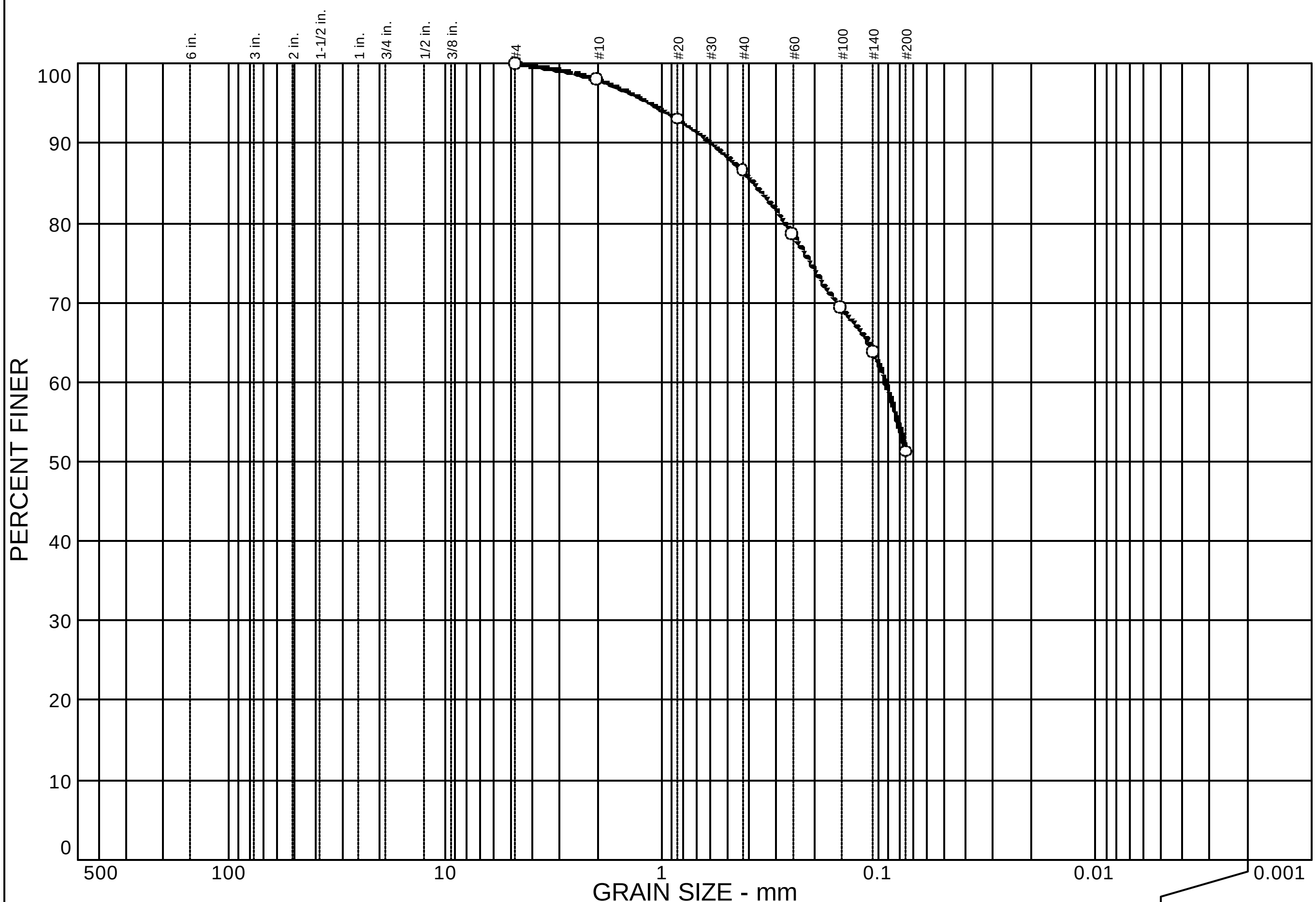
Sample No.: 2-B9@6' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 6 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	48.8	51.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.0		
#20	93.0		
#40	86.5		
#60	78.5		
#100	69.3		
#140	63.7		
#200	51.2		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay to Clayey Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.378 D_{60}= 0.0938 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Sample No.: 2-B11@30' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 30 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	13.2	58.9	27.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
1 in.	100.0		
3/4 in.	100.0		
1/2 in.	97.8		
3/8 in.	94.1		
#4	86.8		
#10	78.1		
#20	69.0		
#40	61.0		
#60	49.2		
#100	38.1		
#140	37.1		
#200	27.9		

* (no specification provided)

Soil Description

Dark grayish brown clayey sand with gravel

Atterberg Limits

PL= 15 LL= 33 PI= 18

Coefficients

D_{85}= 3.93 D_{60}= 0.401 D_{50}= 0.258
D_{30}= 0.0812 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

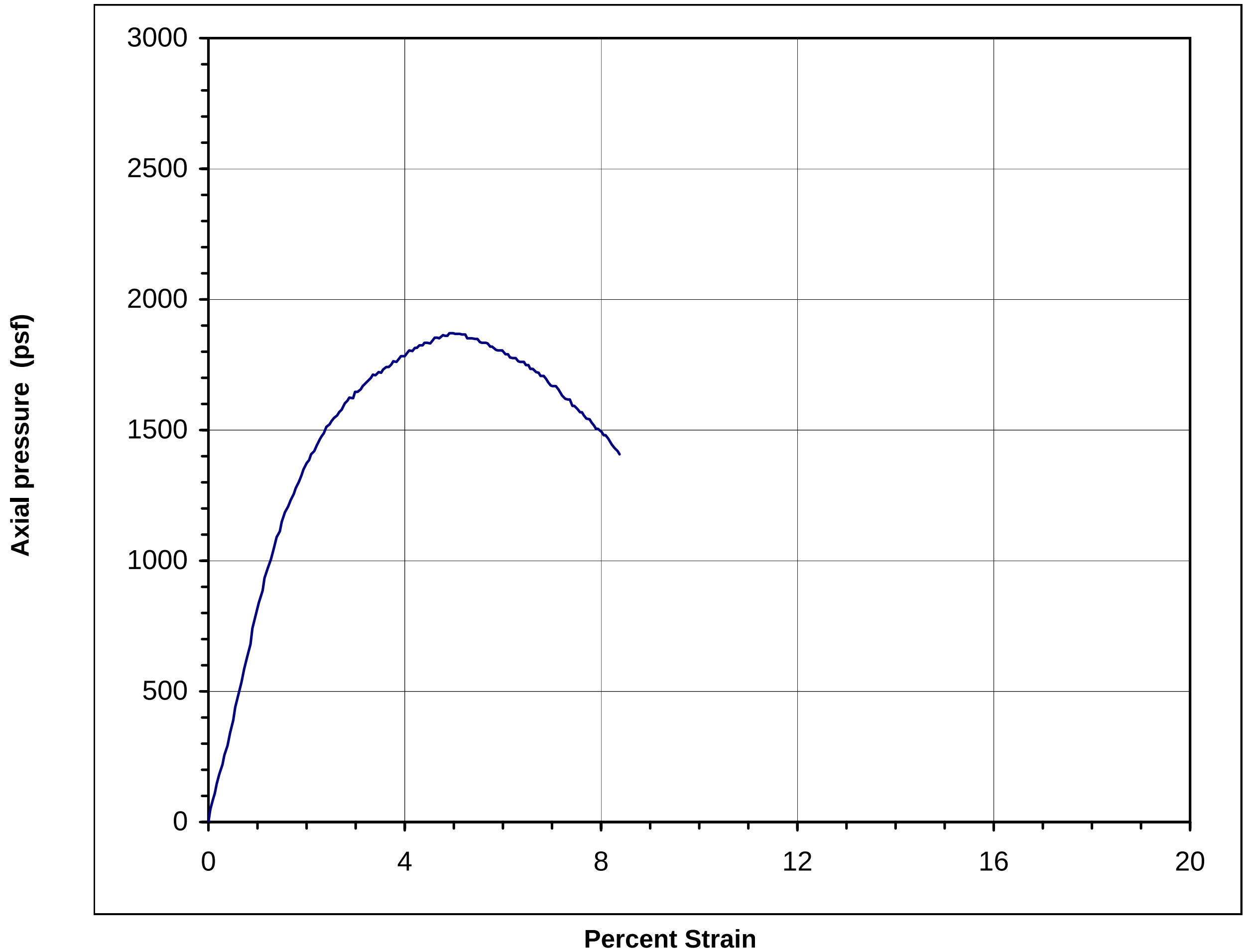
Sample No.: 2-B12@6 **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 6ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Unconfined Compression Test
ASTM Test Method D2166



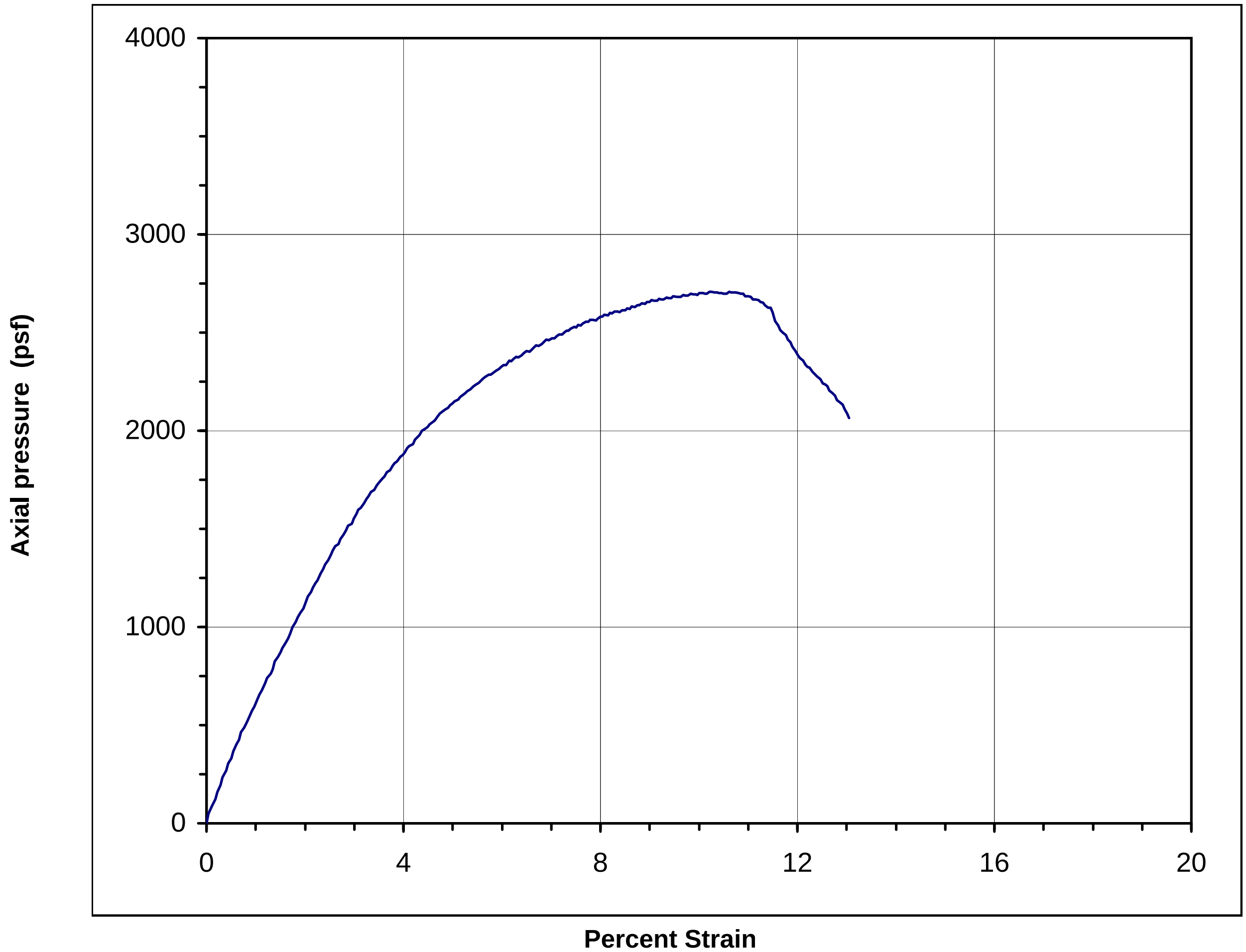
Unconfined Compressive Strength: 1860 psf 0.9 tsf

Sample Description: Dark grayish brown silty Clay with fine sand

Initial Diameter:	2.420	in.	Sample Number:	2-B9@10'	
Initial Height:	4.72	in.	Dry Unit Weight:	81.2	pcf
Strain Rate:	1.602	%/min	Moisture Content:	39.2	%
Total Strain:	8.38	%	Depth of Sample:	10.0	ft.

ENGEO INCORPORATED	SUTTER MEDICAL CENTER Sonoma County, California	Job No.: 6486.2.003.01 Sample Number: 2-B9@10' Date: 6/21/2005	Figure No.

Unconfined Compression Test
ASTM Test Method D2166



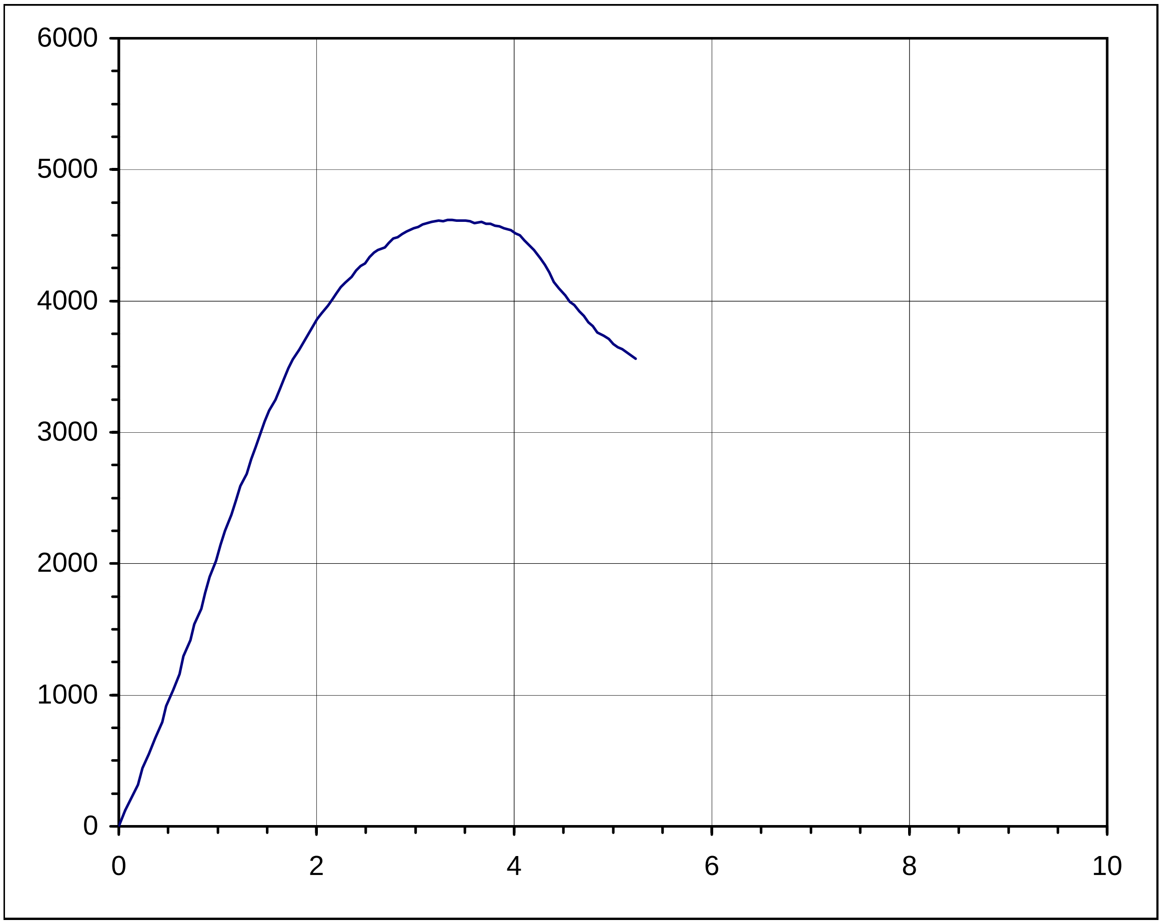
Unconfined Compressive Strength:		**2700 psf**		**1.4 tsf**	

Sample Description: **Dark grayish brown Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B10@11'	
Initial Height:	**4.70**	**in.**	**Dry Unit Weight:**	**88.6**	**pcf**
Strain Rate:	**1.532**	**%/min**	**Moisture Content:**	**33.2**	**%**
Total Strain:	**13.05**	**%**	**Depth of Sample:**	**11.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER**	**Job No.:** 6486.2.003.01	**Figure No.**
		Sample Number: 2-B10@11'	
	Sonoma County, California	**Date:** 6/21/2005	

Unconfined Compression Test
ASTM Test Method D2166



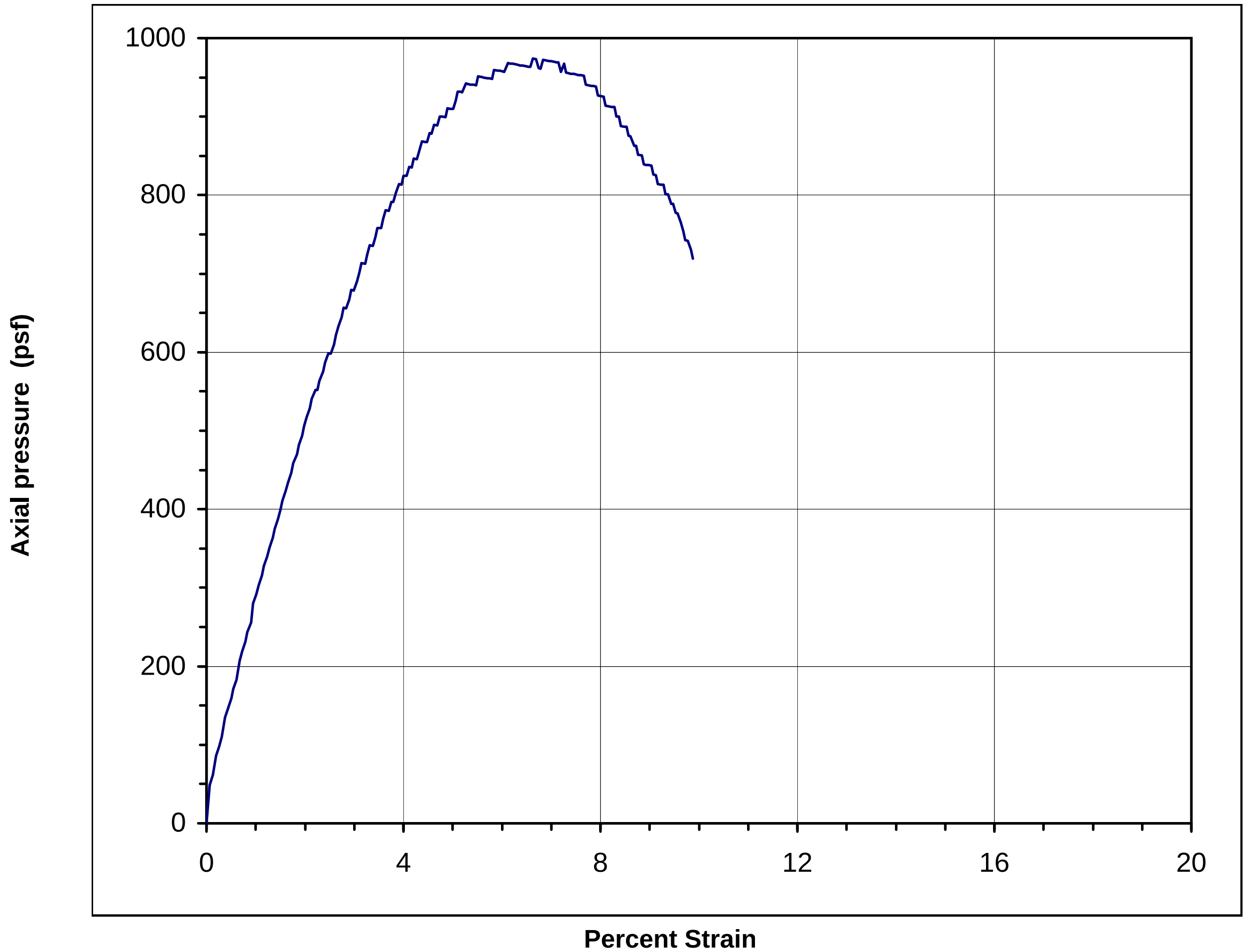
Unconfined Compressive Strength: **4610 psf** **2.3 tsf**

Sample Description: **Dark grayish brown Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B11@26'	
Initial Height:	**4.71**	**in.**	**Dry Unit Weight:**	**88.6**	**pcf**
Strain Rate:	**1.535**	**%/min**	**Moisture Content:**	**32.9**	**%**
Total Strain:	**5.23**	**%**	**Depth of Sample:**	**26.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:**	**6486.2.003.01**	**Figure No.**
		Sample Number:	**2-B11@26'**	
		Date:	**6/21/2005**	

Unconfined Compression Test
ASTM Test Method D2166



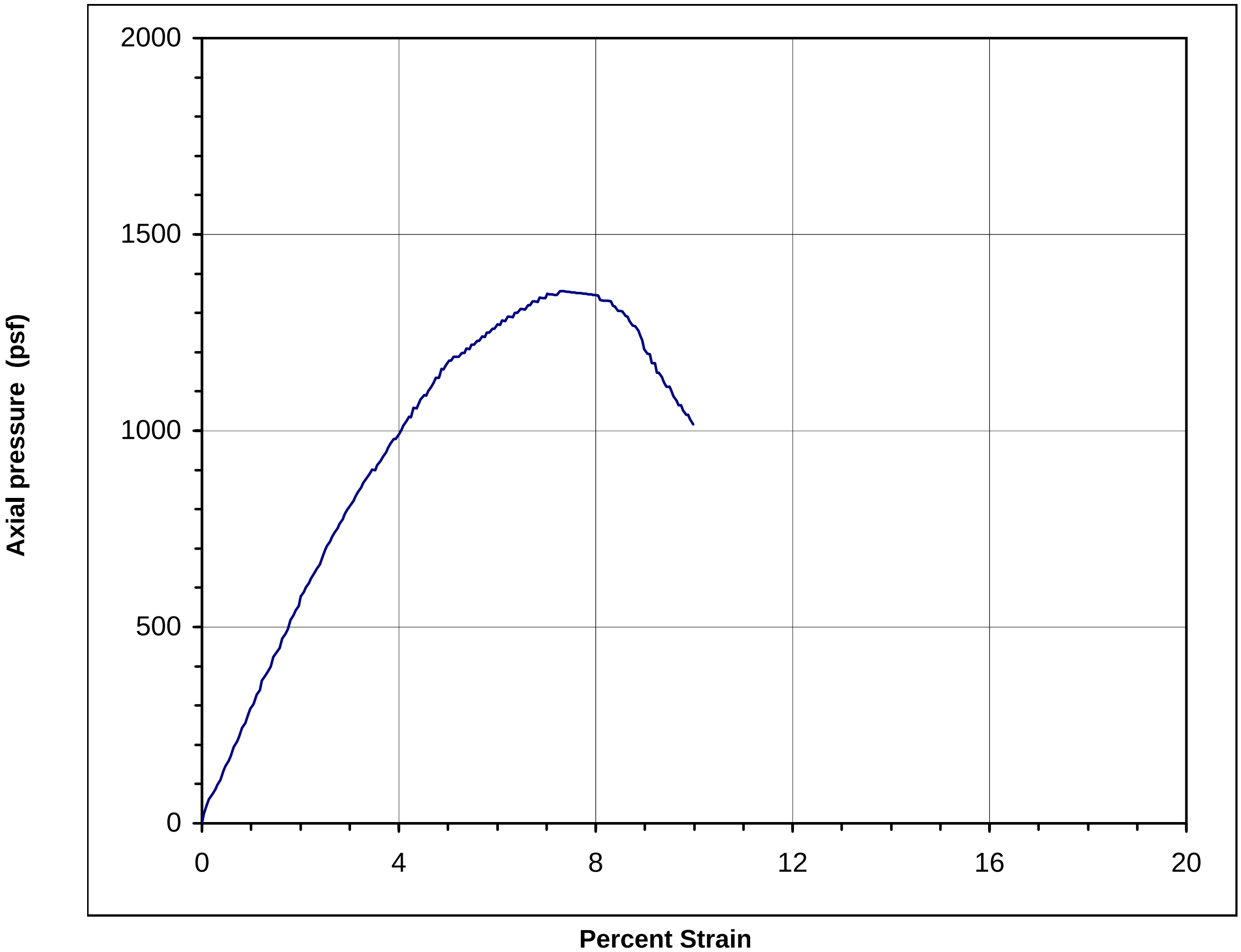
Unconfined Compressive Strength:	**970 psf**	**0.5 tsf**

Sample Description: **Dark grayish brown silty Clay**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B12@26'	
Initial Height:	**4.70**	**in.**	**Dry Unit Weight:**	**87.9**	**pcf**
Strain Rate:	**1.615**	**%/min**	**Moisture Content:**	**33.9**	**%**
Total Strain:	**9.88**	**%**	**Depth of Sample:**	**26.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01	**Figure No.**
		Sample Number: 2-B12@26'	
		Date: 6/21/2005	

Unconfined Compression Test
ASTM Test Method D2166



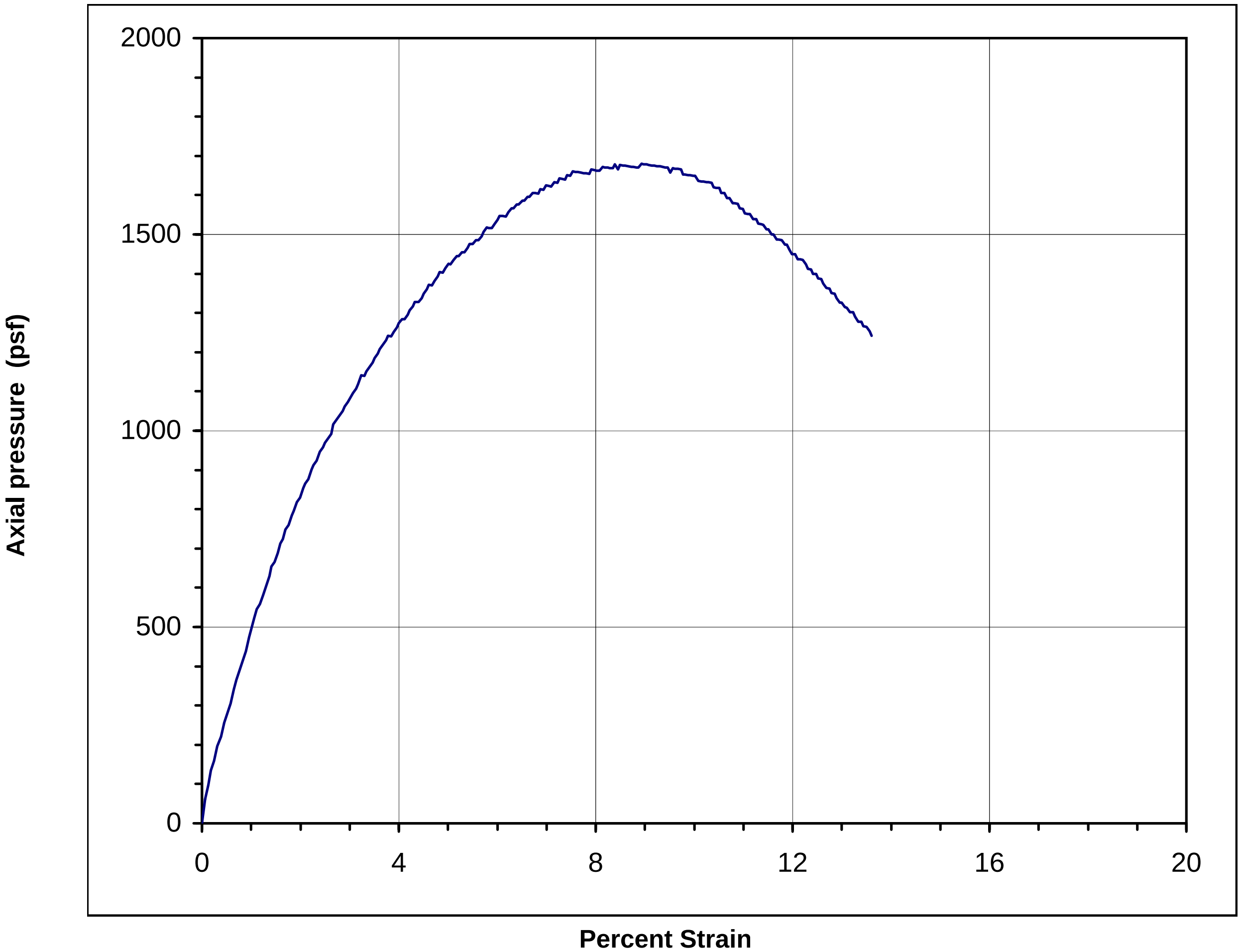
Unconfined Compressive Strength: 1350 psf 0.7 tsf

Sample Description: Very dark grayish brown silty Clay with fine sand

Initial Diameter:	2.420	in.	Sample Number:	2-B12@41'	
Initial Height:	4.91	in.	Dry Unit Weight:	70.8	pcf
Strain Rate:	1.592	%/min	Moisture Content:	51.1	%
Total Strain:	9.99	%	Depth of Sample:	41.0	ft.

ENGEO INCORPORATED	SUTTER MEDICAL CENTER	Job No.: 6486.2.003.01	Figure No.
		Sample Number: 2-B12@41'	
	Sonoma County, California	Date: 6/23/2005	

Unconfined Compression Test
ASTM Test Method D2166



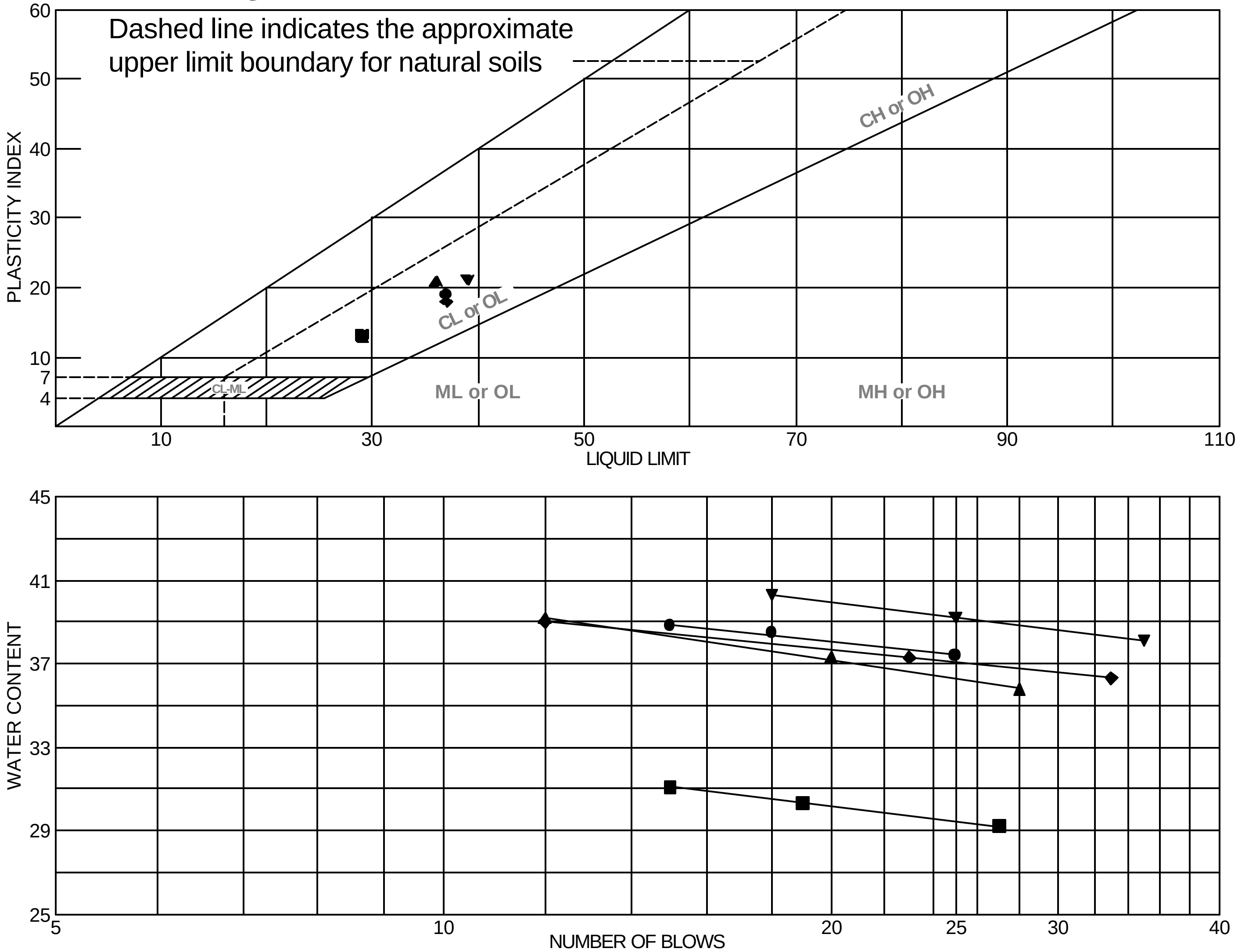
Unconfined Compressive Strength: **1670 psf** **0.8 tsf**

Sample Description: **Dark gryaish brown silty Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B1@8.5'	
Initial Height:	**4.97**	**in.**	**Dry Unit Weight:**	**89.3**	**pcf**
Strain Rate:	**1.680**	**%/min**	**Moisture Content:**	**32.6**	**%**
Total Strain:	**13.61**	**%**	**Depth of Sample:**	**8.5**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01 **Sample Number:** 2-B1@8.5' **Date:** 6/23/2005	**Figure No.**

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown sandy Clay, trace gravel	37	18	19		59.4	CL
■	Dark grayish brown clayey Sand	29	16	13		32.8	SC
▲	Dark grayish brown clayey Sand	36	15	21		19.5	SC
◆	Dark grayish brown sandy Clay	37	19	18		55.7	CL
▼	Dark grayish brown sandy Clay	39	18	21		57.5	CL

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

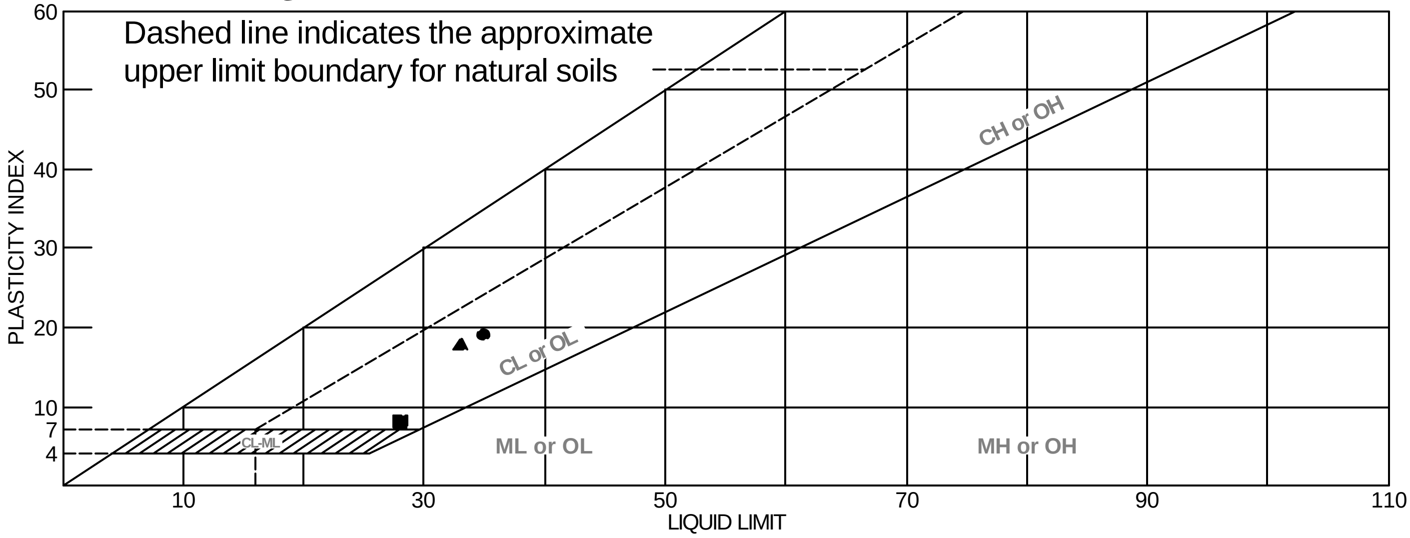
● **Source:** **Sample No.:** 2-B2@23'
■ **Source:** **Sample No.:** 2-B3@10.5'
▲ **Source:** **Sample No.:** 2-B4@6.5'
◆ **Source:** **Sample No.:** 2-B5@29'
▼ **Source:** **Sample No.:** 2-B7@21'

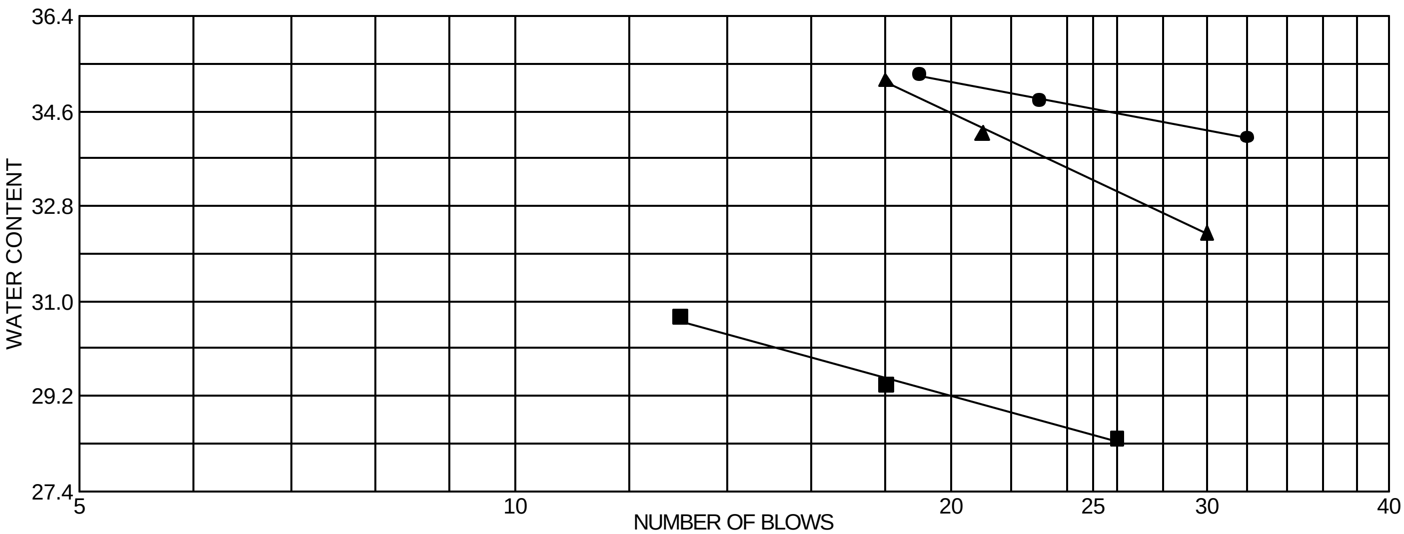
Remarks:
● (2-B2@23')
■ (2-B3@10.5')
▲ (2-B4@6.5')
◆ (2-B5@29')
▼ (2-B7@21')

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very dark grayish brown clayey SAND	35	16	19	66.1	39.8	SC
■	Dark grayish brown clayey SAND	28	20	8		41.3	SC
▲	Dark grayish brown clayey SAND with gravel	33	15	18	61.0	27.9	SC

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

● **Source:** **Sample No.:** 2-B1@5'

■ **Source:** **Sample No.:** 2-B9@6'

▲ **Source:** **Sample No.:** 2-B12@6'

Remarks:

● (2-B1@5')

■ (2-B9@6')

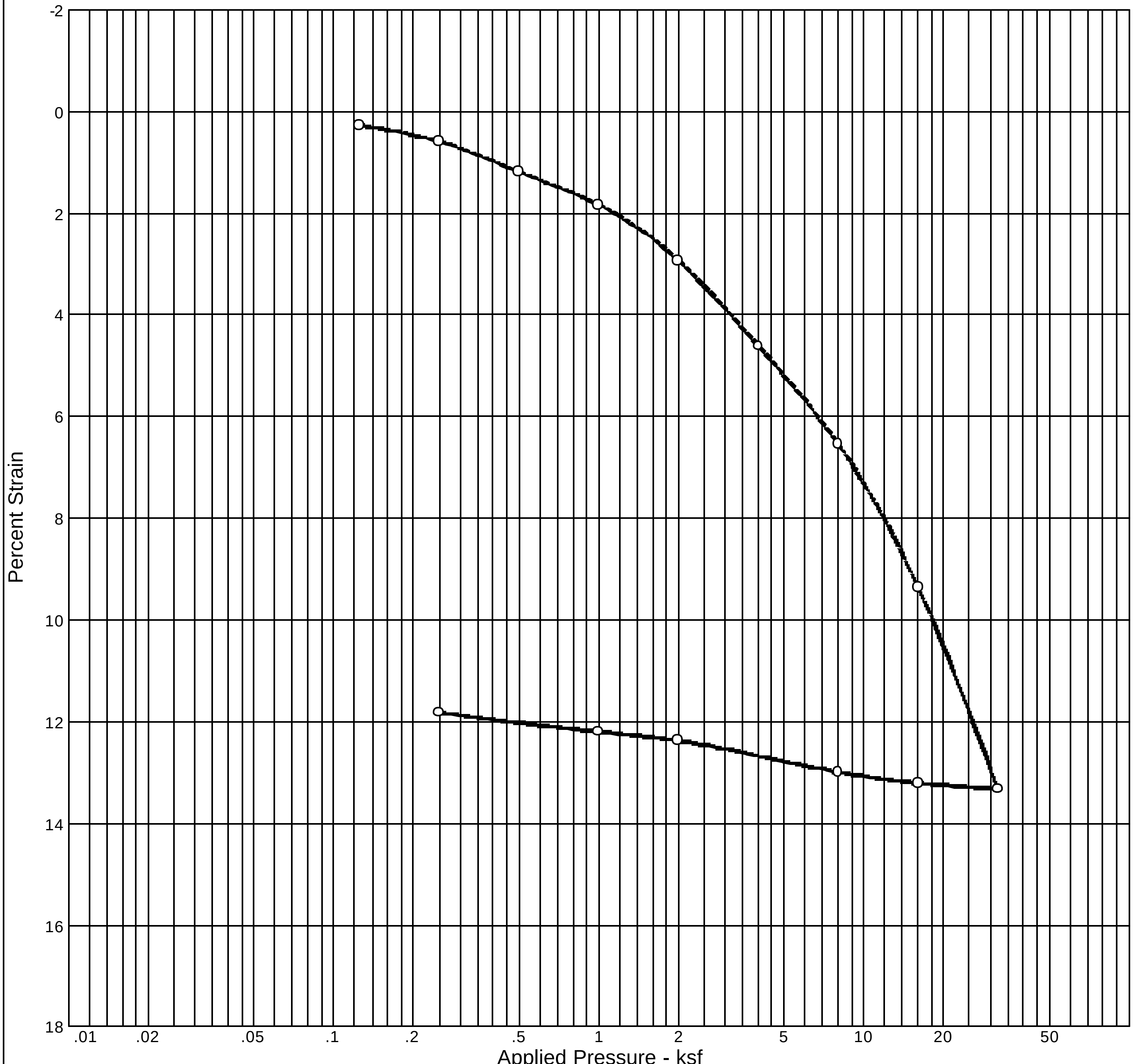
▲ (2-B12@6')

ENGEO INCORPORATED

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.9 %	42.0 %	71.0			2.20	SM		0.934

MATERIAL DESCRIPTION

Dark grayish brown silty Sand with clayey pockets

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: **Sample No.:** 2-B3 @ 21.5' **Elev./Depth:** 21.5 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

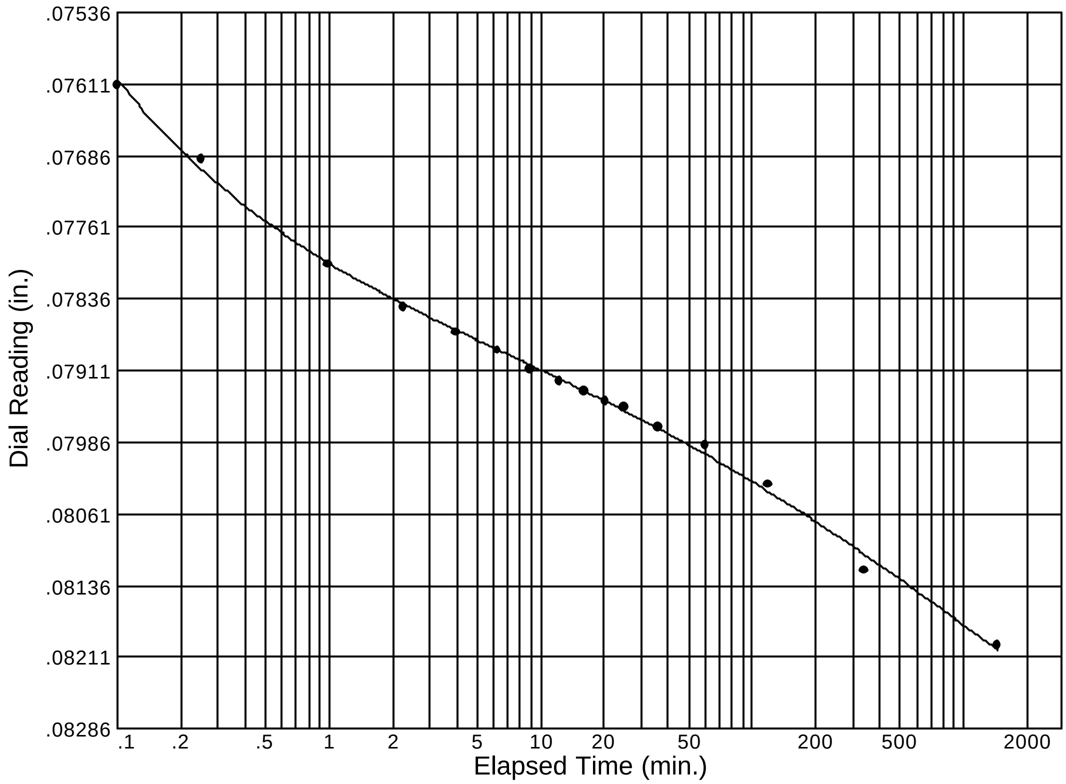
Remarks:

Plate

Dial Reading vs. Time

Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

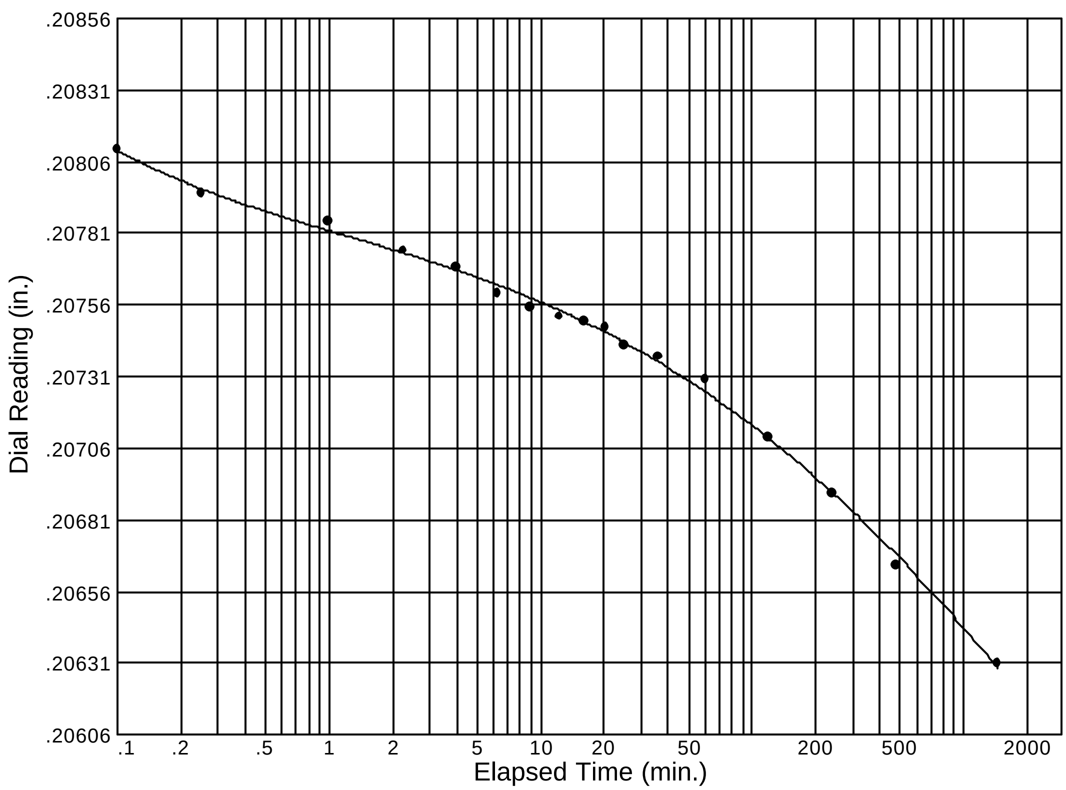
Source: Sample No.: 2-B3 @ 21.5' Elev./Depth: 21.5 ft.



Load No.= 4
Load= 1.00 ksf
D_0 = 0.07475
D_{50} = 0.07830
D_{100} = 0.08184
T_{50} = 1.77 min.

C_v @ T_{50}
0.39 ft.^{2}/day

C_α = 0.001



Load No.= 13
Load= 1.00 ksf
D_0 = 0.20822
D_{50} = 0.20784
D_{100} = 0.20747
T_{50} = 0.78 min.

C_v @ T_{50}
0.70 ft.^{2}/day

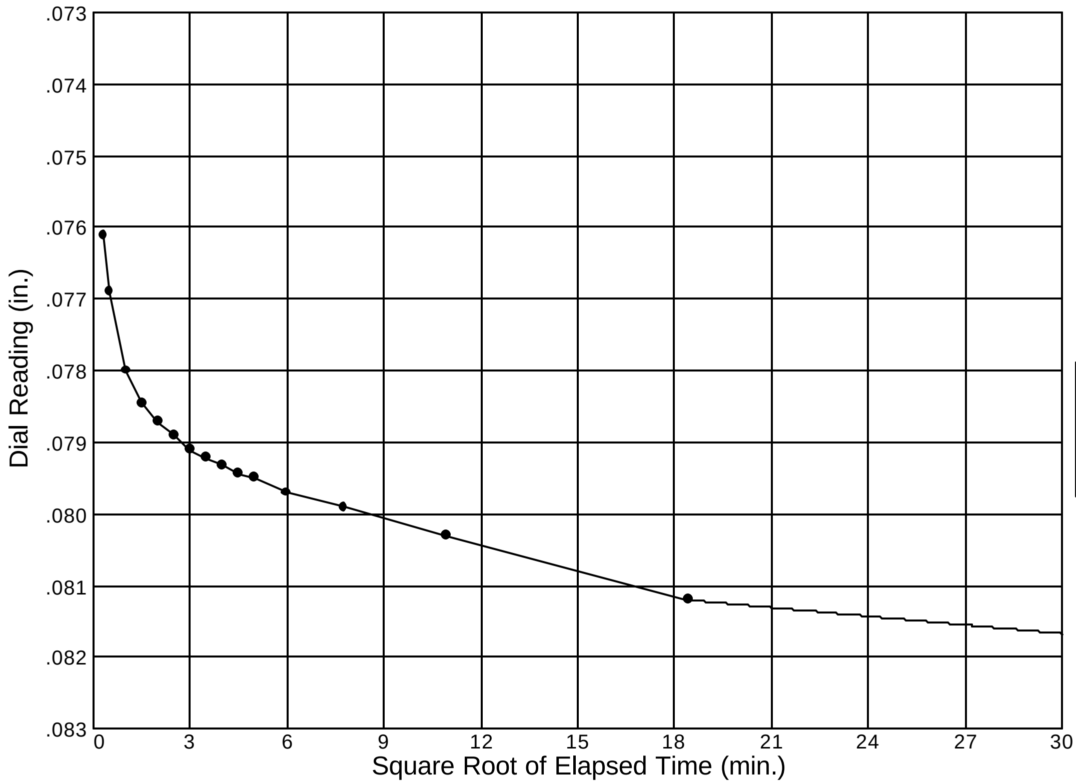
Plate

ENGEO, INC.

Dial Reading vs. Time

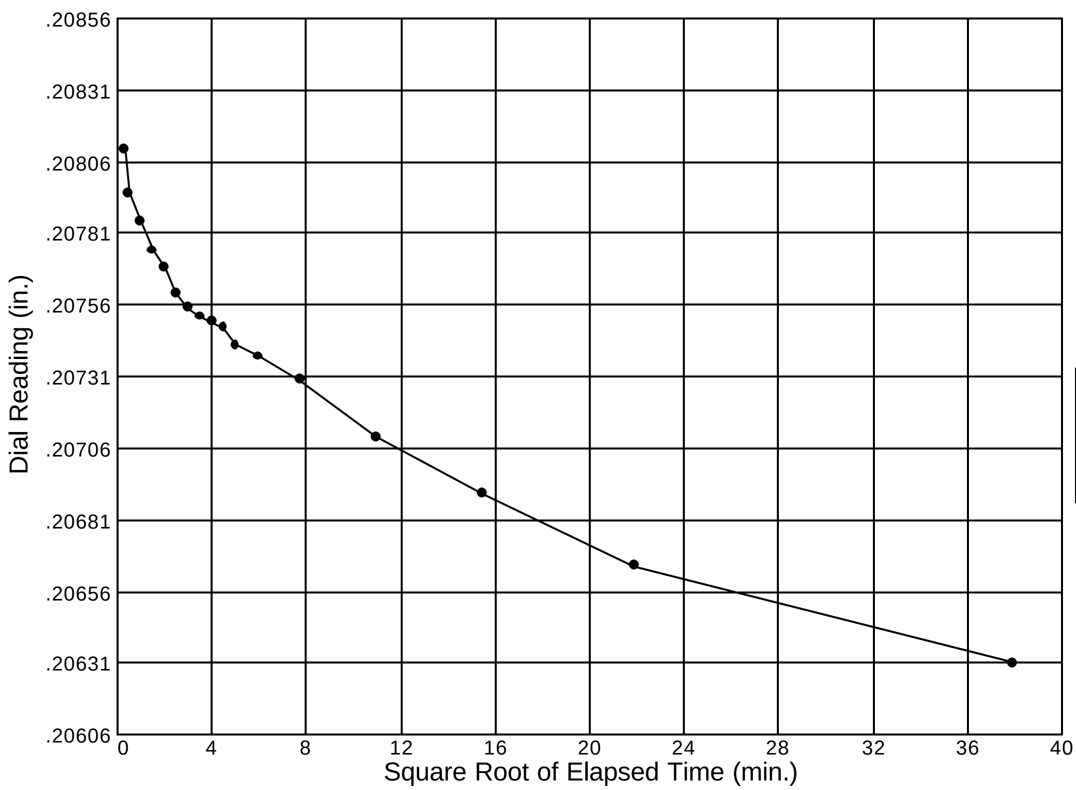
Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B3 @ 21.5' Elev./Depth: 21.5 ft.



Load No.= 4
Load= 1.00 ksf
D_0 = 0.07541
D_{90} = 0.07819
D_{100} = 0.07850
T_{90} = 1.47 min.

C_v @ T_{90}
2.01 ft.^{2}/day



Load No.= 13
Load= 1.00 ksf
D_0 = 0.20809
D_{90} = 0.20755
D_{100} = 0.20749
T_{90} = 9.18 min.

C_v @ T_{90}
0.26 ft.^{2}/day

Plate

ENGEO, INC.

CONSOLIDATION TEST REPORT

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.8 %	29.3 %	90.0			2.5	CL		0.734

MATERIAL DESCRIPTION

Very dark grayish brown sandy Clay

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: **Sample No.:** 2-B11@11' **Elev./Depth:** 11.0 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

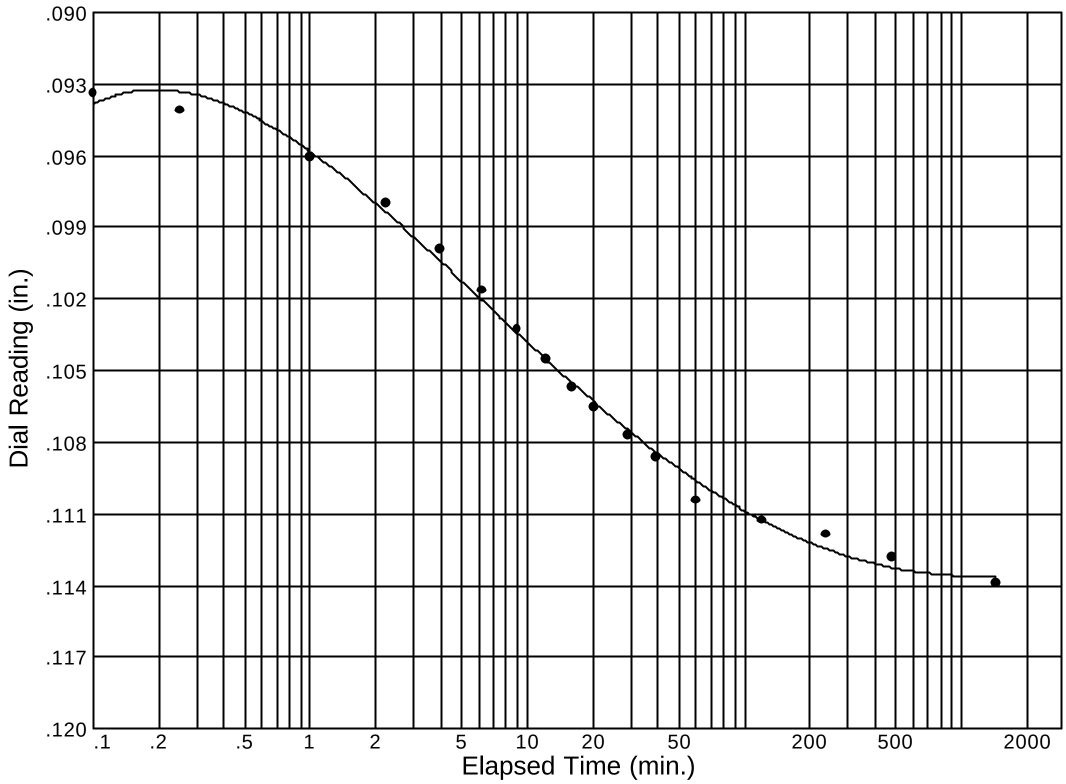
Remarks:

Plate

Dial Reading vs. Time

Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B11@11' Elev./Depth: 11.0 ft.



Load No.= 6

Load= 4.29 ksf

D_0 = 0.09038

D_{50} = 0.10058

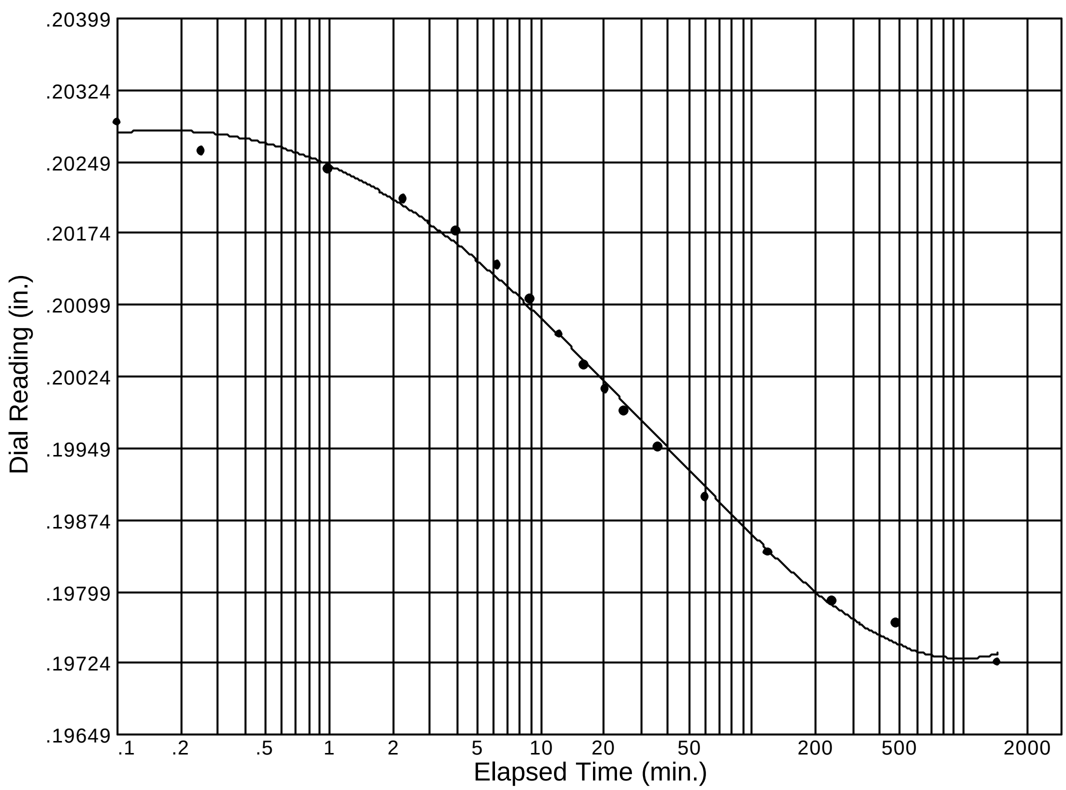
D_{100} = 0.11079

T_{50} = 4.14 min.

C_v @ T_{50}

0.11 ft.^{2}/day

C_α = 0.002



Load No.= 12

Load= 4.29 ksf

D_0 = 0.20328

D_{50} = 0.20066

D_{100} = 0.19804

T_{50} = 12.35 min.

C_v @ T_{50}

0.03 ft.^{2}/day

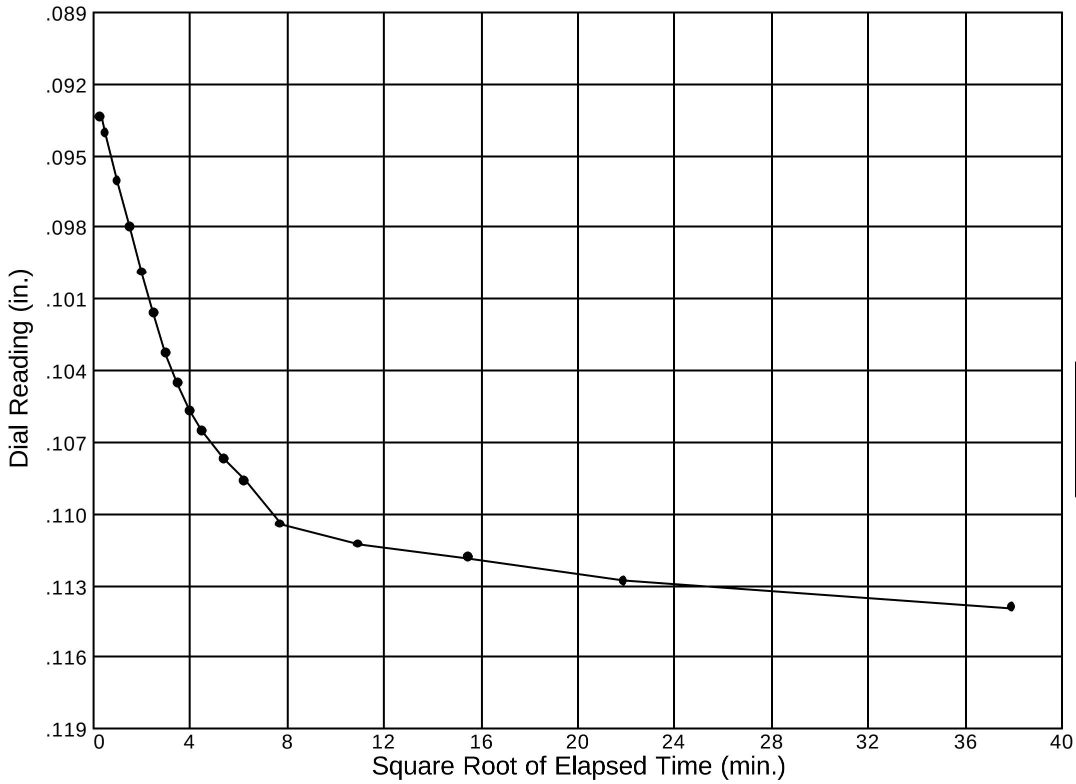
Plate

ENGEO, INC.

Dial Reading vs. Time

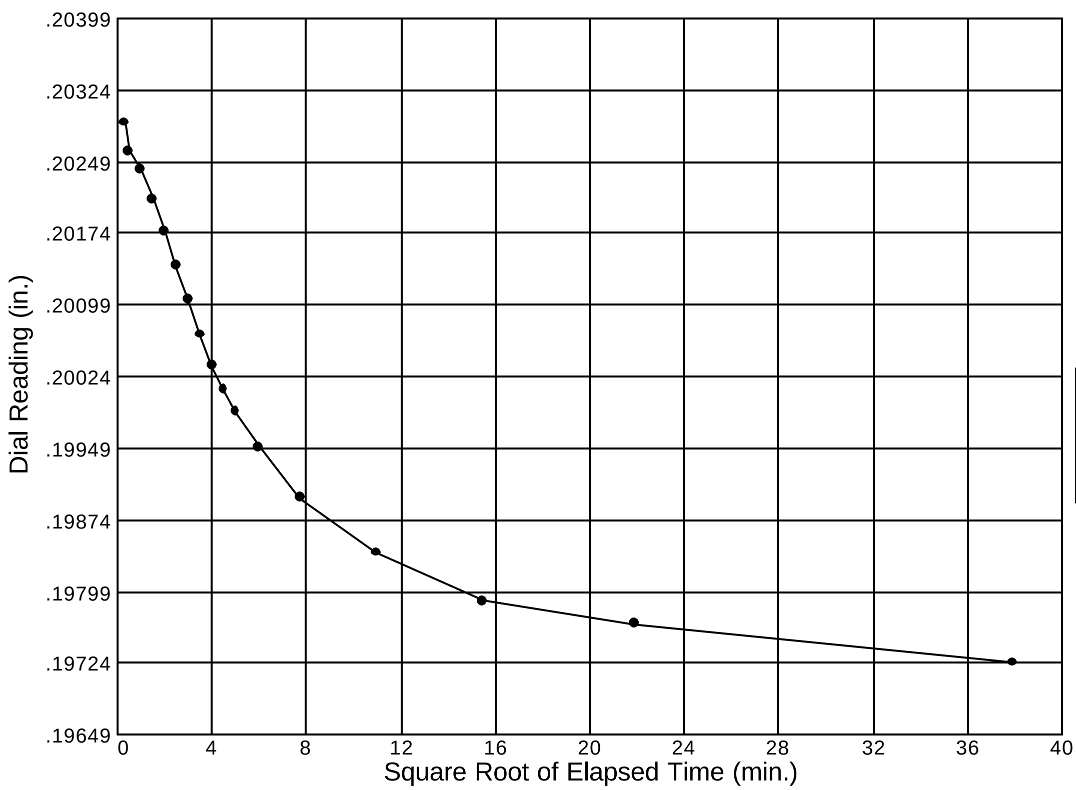
Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B11@11 Elev./Depth: 11.0 ft.



Load No.= 6
Load= 4.29 ksf
D_0 = 0.09248
D_{90} = 0.10659
D_{100} = 0.10816
T_{90} = 20.61 min.

C_v @ T_{90}
0.09 ft.^{2}/day



Load No.= 12
Load= 4.29 ksf
D_0 = 0.20297
D_{90} = 0.19919
D_{100} = 0.19877
T_{90} = 49.35 min.

C_v @ T_{90}
0.03 ft.^{2}/day

Plate

ENGEO, INC.

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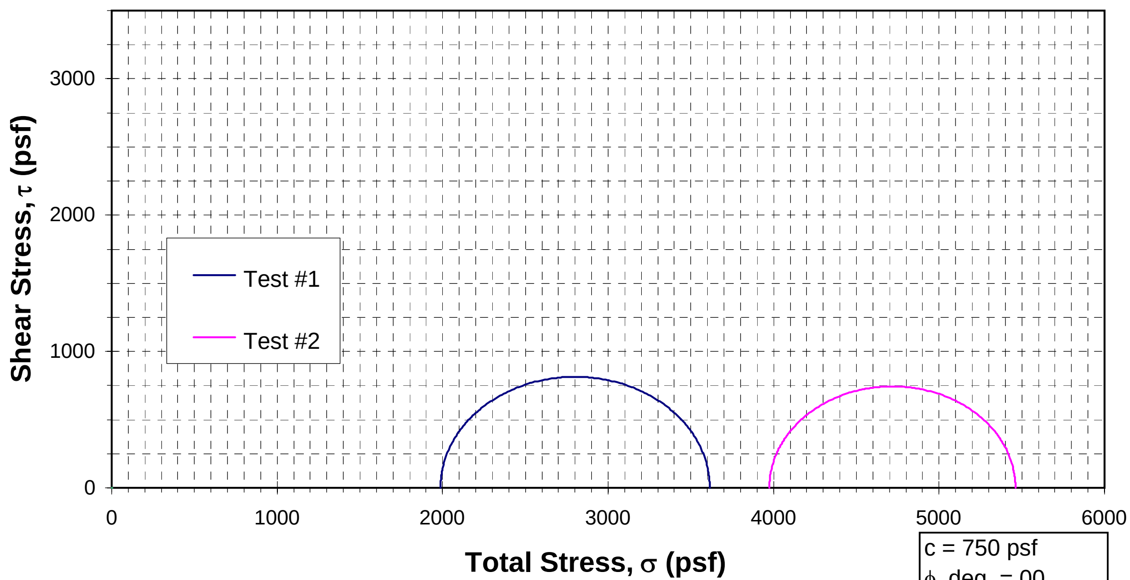
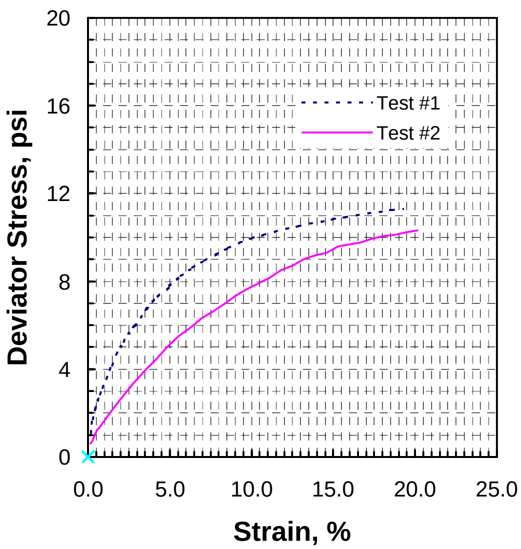
TRIAXIAL COMPRESSION TEST REPORT

TRIAXIAL TEST - UNCONSOLIDATED UNDRAINED (UU)



c = 750 psf
ϕ, deg. = 00
tan ϕ = --



Test Data

Test No.	1	2		
Initial				
Water Content, %	35%	44%		
Dry Density, pcf	87.2	79.5		
Saturation, %	99%	99%		
Void Ratio	0.97	1.32		
Minor Principal Stress, psf	1987.2	3974.4		
Maximum Deviator Stress, psf	1627.2	1487.5		
Time of Failure, min	120	120		
Rate of Strain Increments, %/min	1	1		
Initial Diameter, in	2.42	2.40		
Initial Height, in	3.50	3.60		
B- Value				

Test No.	Description of Specimens:	Sample No.	Sample Depth	LL	PI
1	Very dark gray silty sand	2-B4@18.5'	18.5 ft.		
2	Dark grayish brown sandy Silt	2-B1@17'	17 ft.		

Comments:		
Sample are wet and soft.	Boring Number:	B4 & B1
	Project Name:	Sutter Medical Center, Santa Rosa, Sonama C
	Project Number:	6486.2.003.01
	Technician:	Mohan
	Date:	6/28/2005

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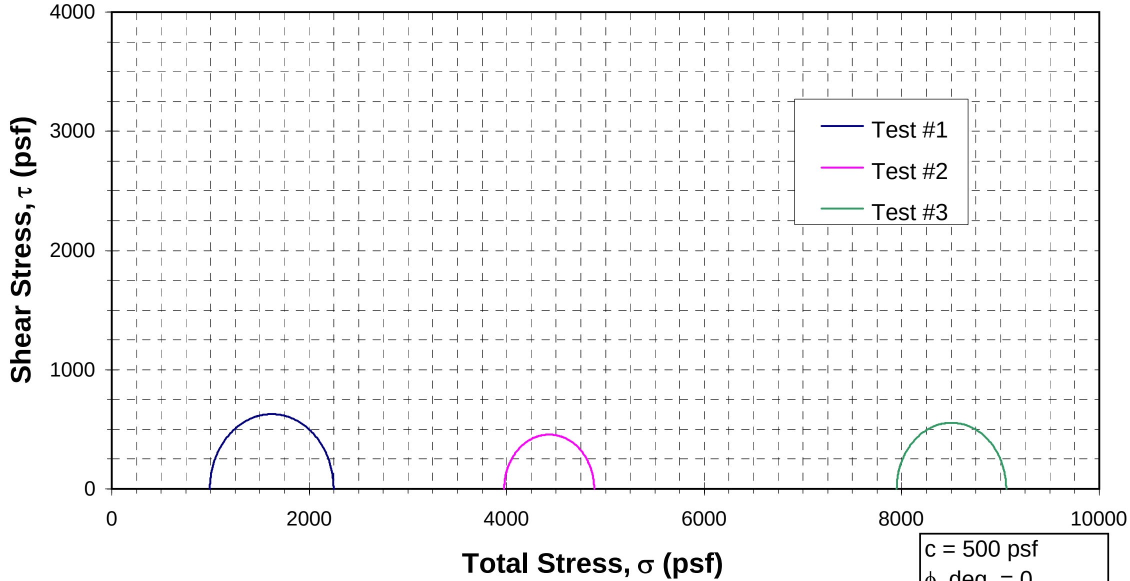
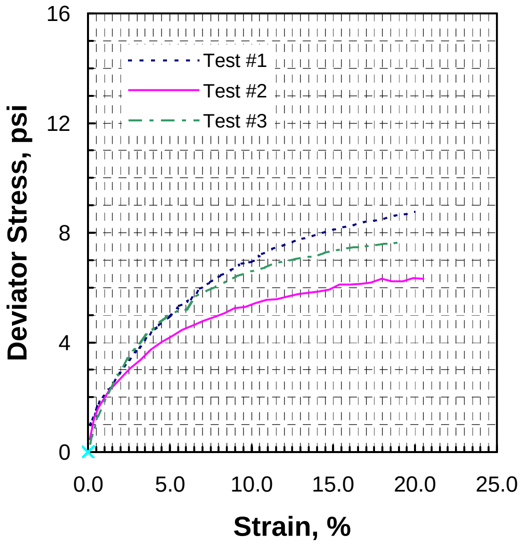
TRIAXIAL COMPRESSION TEST REPORT

TRIAXIAL TEST - UNCONSOLIDATED UNDRAINED (UU)



c = 500 psf
ϕ, deg. = 0
tan ϕ = --



Test Data

Test No.	1	2	3	4
Initial				
Water Content, %	38%	36%	36%	
Dry Density, pcf	84.1	85.2	87.4	
Saturation, %	99%	99%	100%	
Void Ratio	1.08	0.98	1.00	
Minor Principal Stress, psf	993.6	3974.4	7948.8	
Maximum Deviator Stress, psf	1252.8	910.1	1108.8	
Time of Failure, min	125	126	132	
Rate of Strain Increments, %/min	1	1	1	
Initial Diameter, in	2.42	2.42	2.42	
Initial Height, in	4.00	3.90	4.15	
B- Value				

Test No.	Description of Specimens:	Sample No.	Sample Depth	LL	PI
1	Dark grayish Clayey Sand	2-B5 @ 14'	14 ft.		
2	Very dark grayish brown Sandy Clay	2-B8 @ 15.5'	15.5 ft.		
3	Very dark grayish brown sandy Clay	2-B6 @ 16'	16 ft.		

Comments:		
Samples are wet and soft	Boring Number:	B5, B6 & B8
	Project Name:	Sutter Medical Center, Santa Rosa, Sonama C
	Project Number:	6486.2.003.01
	Technician:	Mohan
	Date:	6/28/2005

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B2@6'**
Sample Description:	**Dark grayish brown silty Clay with fine sand. Trace gravel**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.42 in.
Pre-test sample wt:	152.8 g	Sp.Gravity (est.):	
Tare Weight:	8.4 g		
Gross Wet Wt (g):	160.4 g	Net Wet Sample Wt.:	152.0 g
Gross Dry Wt. (g):	130.3 g	Net Dry Sample Wt.:	121.9 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**25.3%**	**24.7%**
Dry Density:	**101.0 pcf**	**102.8 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3933
Displacement:	-0.67% (Net Compression)

SWELL DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.3933
Final LVDT Reading:	0.3819
Displacement:	-1.14% (Net Swell)

TOTAL DISPLACEMENT: -1.81%

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B3@6'**
Sample Description:	**Very dark yellowish brown clayey Sand**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.42 in.
Pre-test sample wt:	140.0 g	Sp.Gravity (est.):	
Tare Weight:	9.6 g		
Gross Wet Wt (g):	148.5 g	Net Wet Sample Wt.:	138.9 g
Gross Dry Wt. (g):	119.0 g	Net Dry Sample Wt.:	109.4 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**28.0%**	**27.0%**
Dry Density:	**90.6 pcf**	**94.4 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3876
Displacement:	-1.24% (Net Compression)

SWELL DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.3876
Final LVDT Reading:	0.3601
Displacement:	-2.75% (Net Swell)

TOTAL DISPLACEMENT: -3.99%

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B5@4'**
Sample Description:	**Dark grayish brown silty Clay**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.375 in.
Pre-test sample wt:	136.0 g	Sp.Gravity (est.):	
Tare Weight:	9.3 g		
Gross Wet Wt (g):	143.5 g	Net Wet Sample Wt.:	134.2 g
Gross Dry Wt. (g):	112.5 g	Net Dry Sample Wt.:	103.2 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**31.8%**	**30.0%**
Dry Density:	**88.7 pcf**	**90.7 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.3488 kg
Surcharge Pressure:	500 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3932
Displacement:	-0.68% (Net Compression)

SWELL DATA

Load :	0.3488 kg
Surcharge Pressure:	500 psf
Initial LVDT Reading:	0.3932
Final LVDT Reading:	0.3782
Displacement:	-1.50% (Net Swell)

TOTAL DISPLACEMENT: -2.18%

EN GEO Incorporated

SULFATE TEST RESULTS

CALTRANS Test Method 417

Project Name: Sutter Medical Center

Project Number: 6486.2.003.01

Tested By: Marco Herrera

Date: June 23, 2005

Measurements less than 15 mg/kg are reported as Not Detectable (ND)

Sample Number	Sample Location	Matrix	Water Soluble Sulfate (SO_4) in Soil	
			mg/kg	% by Weight
1	2-B4 @ 23'	Soil	6	0.001
2	2-B4 @ 39'	Soil	33	0.003
3	2-B5 @ 14'	Soil	14	0.001
4	2-B6 @ 6'	Soil	6	0.001
5	2-B8 @ 31'	Soil	6	0.001
6	2-B1 @ 21'	Soil	30	0.003
7	2-B7 @ 6'	Soil	12	0.001
8	2-B7 @ 36'	Soil	33	0.003

EN GEO Incorporated

SULFATE TEST RESULTS

CALTRANS Test Method 417

Project Name: Sutter Medical Center

Project Number: 6486.2.003.01

Tested By: Marco Herrera

Date: June 25, 2005

Measurements less than 15 mg/kg are reported as Not Detectable (ND)

Sample Number	Sample Location	Matrix	Water Soluble Sulfate (SO_4) in Soil	
			mg/kg	% by Weight
1	2-B12@16'	Soil	36	0.004

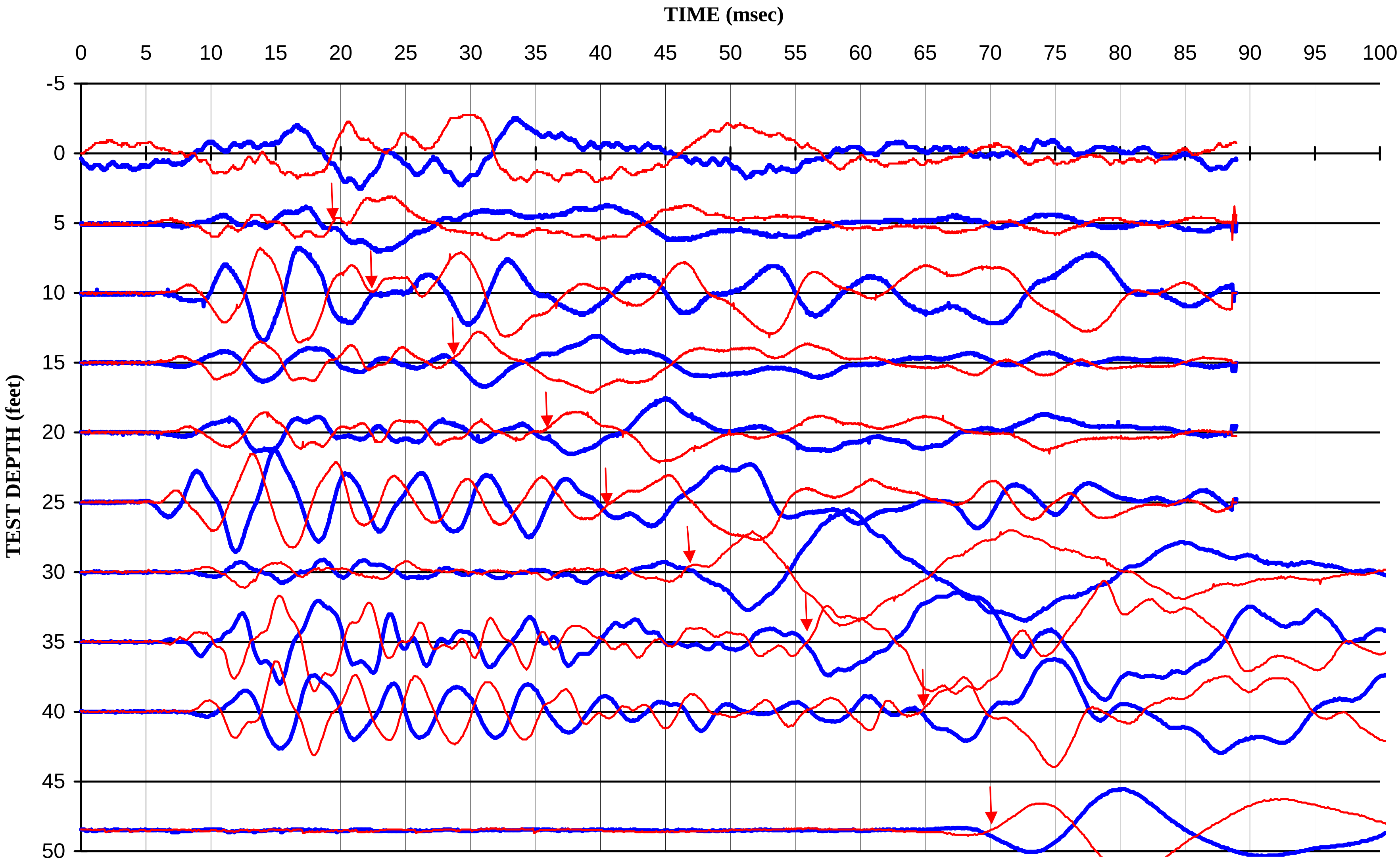
APPENDIX D

Downhole Shear Wave Velocity Survey

John Sarmiento and Associates (2005)

2-CPT27 and 2-CPT8

Shear Wave Propogation Profile at CPT-8
Sutter Hospital, Santa Rosa

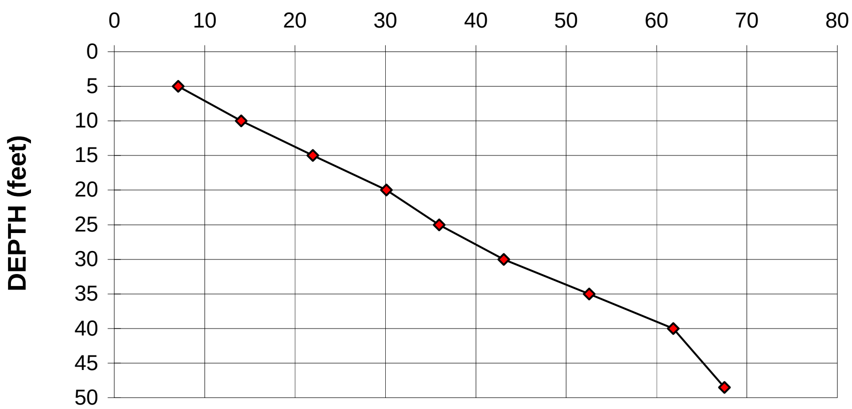


John Sarmiento & Associates

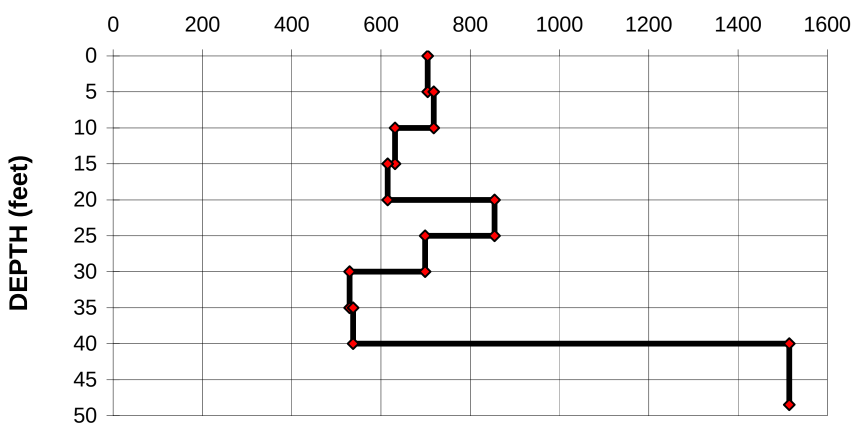
Downhole Geophysical Survey at CPT-8
Sutter Hospital Site, Santa Rosa, Ca

test depth (ft)	horiz. distance (ft)	incidence angle (deg)	arrival time (msec)	corrected vertical time (msec)	Shear wave wave velocity for depth interval (ft/sec)	(m/sec)
0			0.0	0.0		
5	12.5	68.2	19.1	7.09	705	215
10	12.5	51.3	22.5	14.06	718	219
15	12.5	39.8	28.6	21.97	632	193
20	12.5	32.0	35.5	30.10	615	187
25	12.5	26.6	40.2	35.96	854	260
30	12.5	22.6	46.7	43.11	699	213
35	12.5	19.7	55.8	52.55	530	161
40	12.5	17.4	64.8	61.85	538	164
48.5	12.5	14.5	69.7	67.49	1515	462

SHEAR WAVE ARRIVAL TIMES
Corrected Time (msec)

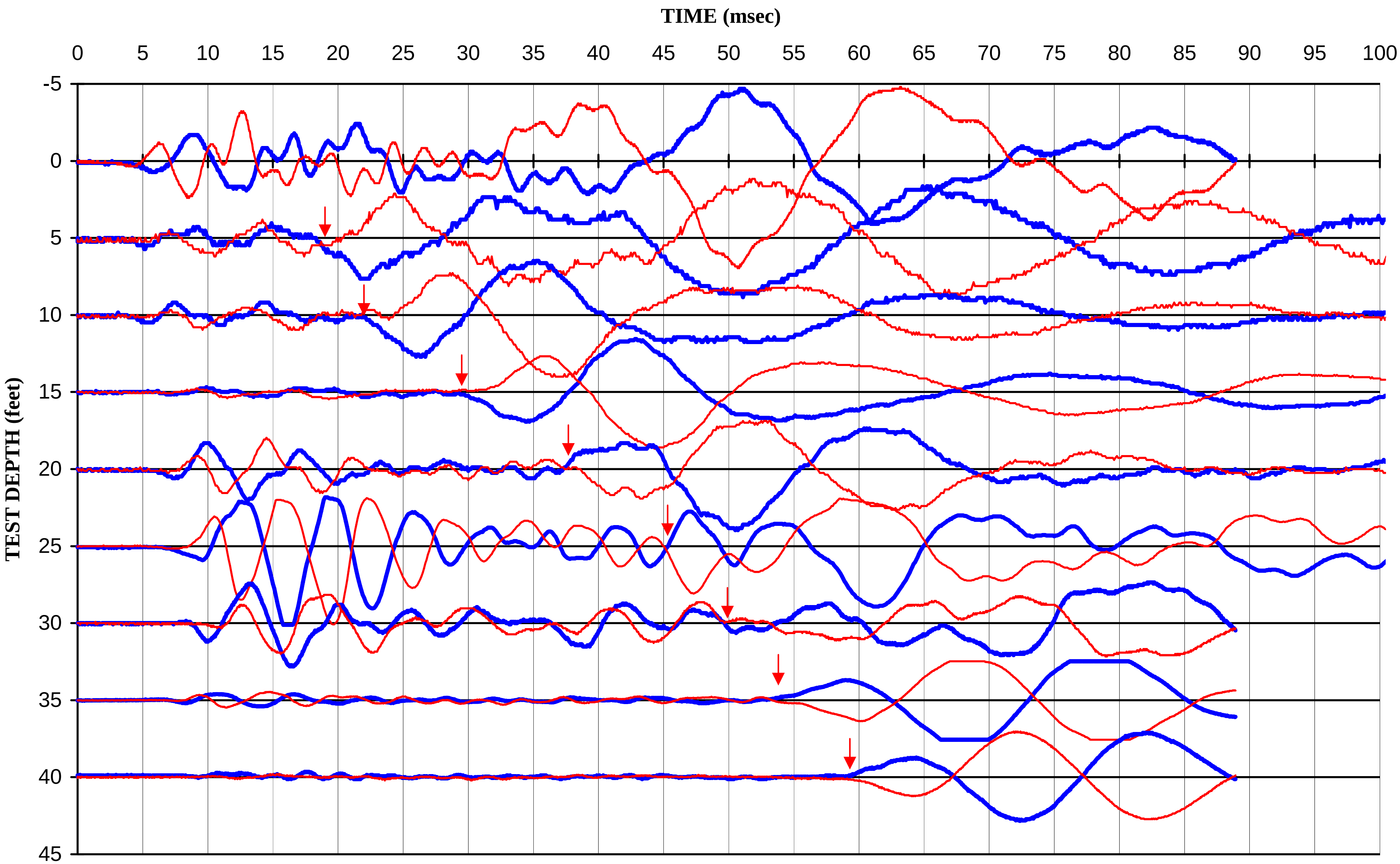


SHEAR WAVE VELOCITIES (ft./sec.)



John Sarmiento & Associates
Menlo Park, CA

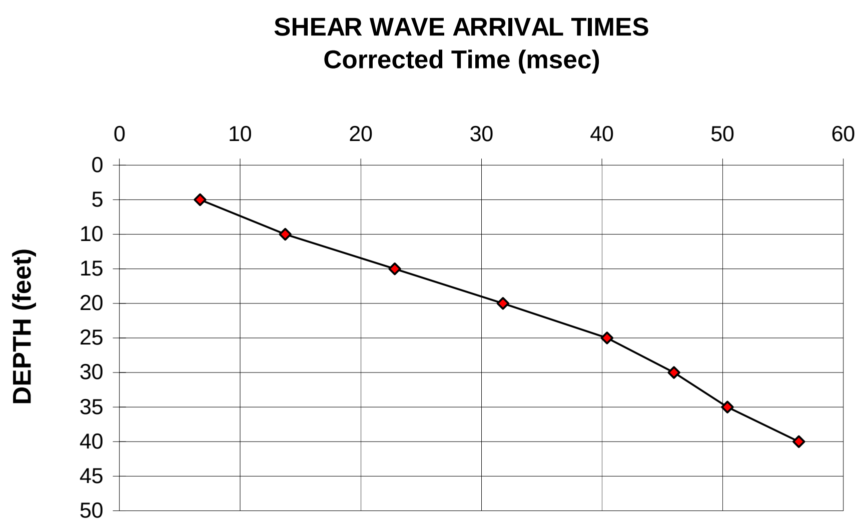
Shear Wave Propogation Profile at CPT-27
Sutter Hospital, Santa Rosa

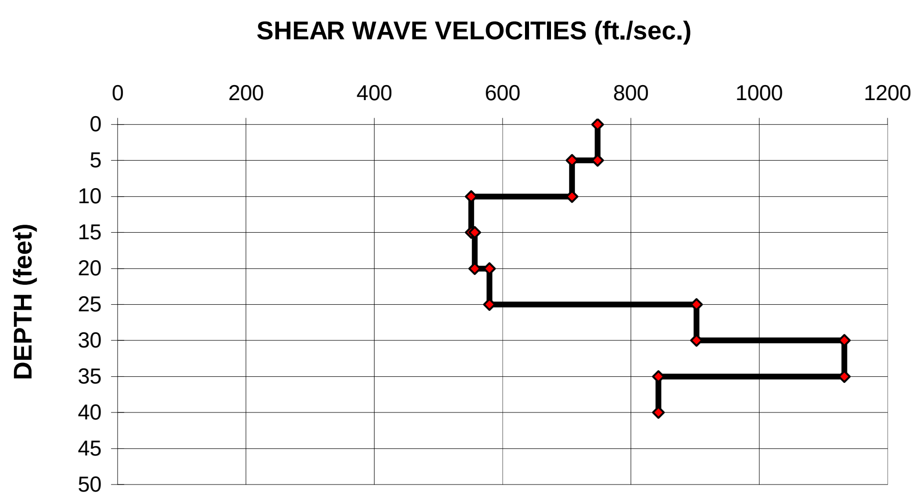


John Sarmiento & Associates

Downhole Geophysical Survey at CPT-27
Sutter Hospital Site, Santa Rosa, Ca

test depth (ft)	horiz. distance (ft)	incidence angle (deg)	arrival time (msec)	corrected vertical time (msec)	Shear wave wave velocity for depth interval (ft/sec)	(m/sec)
0			0.0	0.0		
5	12.5	68.2	18.0	6.69	748	228
10	12.5	51.3	22.0	13.74	708	216
15	12.5	39.8	29.7	22.82	551	168
20	12.5	32.0	37.5	31.80	557	170
25	12.5	26.6	45.2	40.43	579	177
30	12.5	22.6	49.8	45.97	902	275
35	12.5	19.7	53.5	50.38	1133	345
40	12.5	17.4	59.0	56.31	843	257





John Sarmiento & Associates
Menlo Park, CA

GEOTECHNICAL EXPLORATION

SUTTER MEDICAL CENTER
SANTA ROSA, CALIFORNIA

MAY 2006
6486.2.003.01

VOLUME 2

ENGEO INCORPORATED

GEOTECHNICAL EXPLORATION REPORT

PROPOSED HOSPITAL BUILDING
SUTTER MEDICAL CENTER OF SANTA ROSA / LUTHER BURBANK CENTER FOR THE ARTS
SONOMA COUNTY, CALIFORNIA

VOLUME 2 OF 2

SUBMITTED

TO

SUTTER MEDICAL CENTER

SANTA ROSA, CALIFORNIA

PREPARED

BY

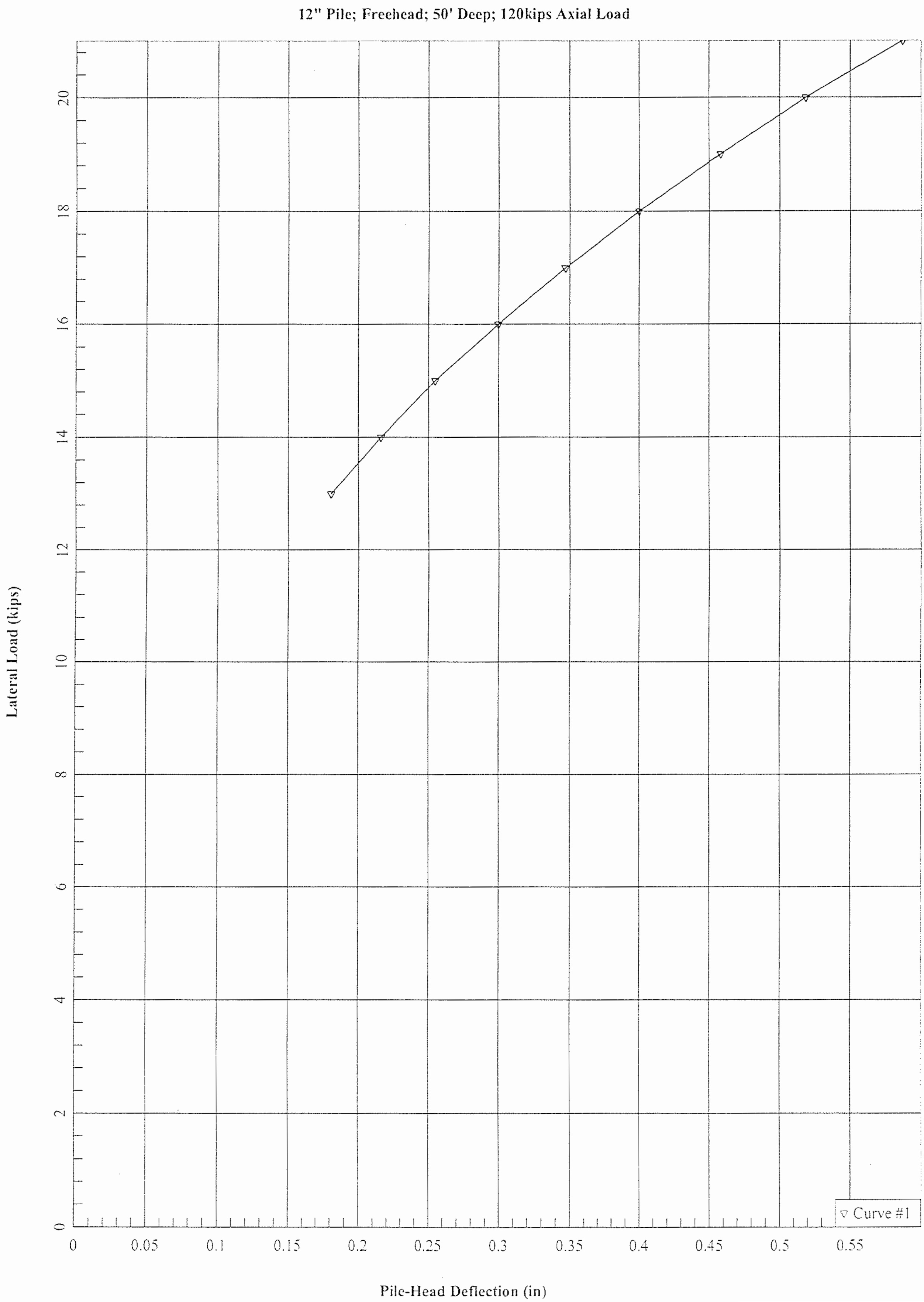
ENGEO INCORPORATED

PROJECT NO. 6486.2.003.01

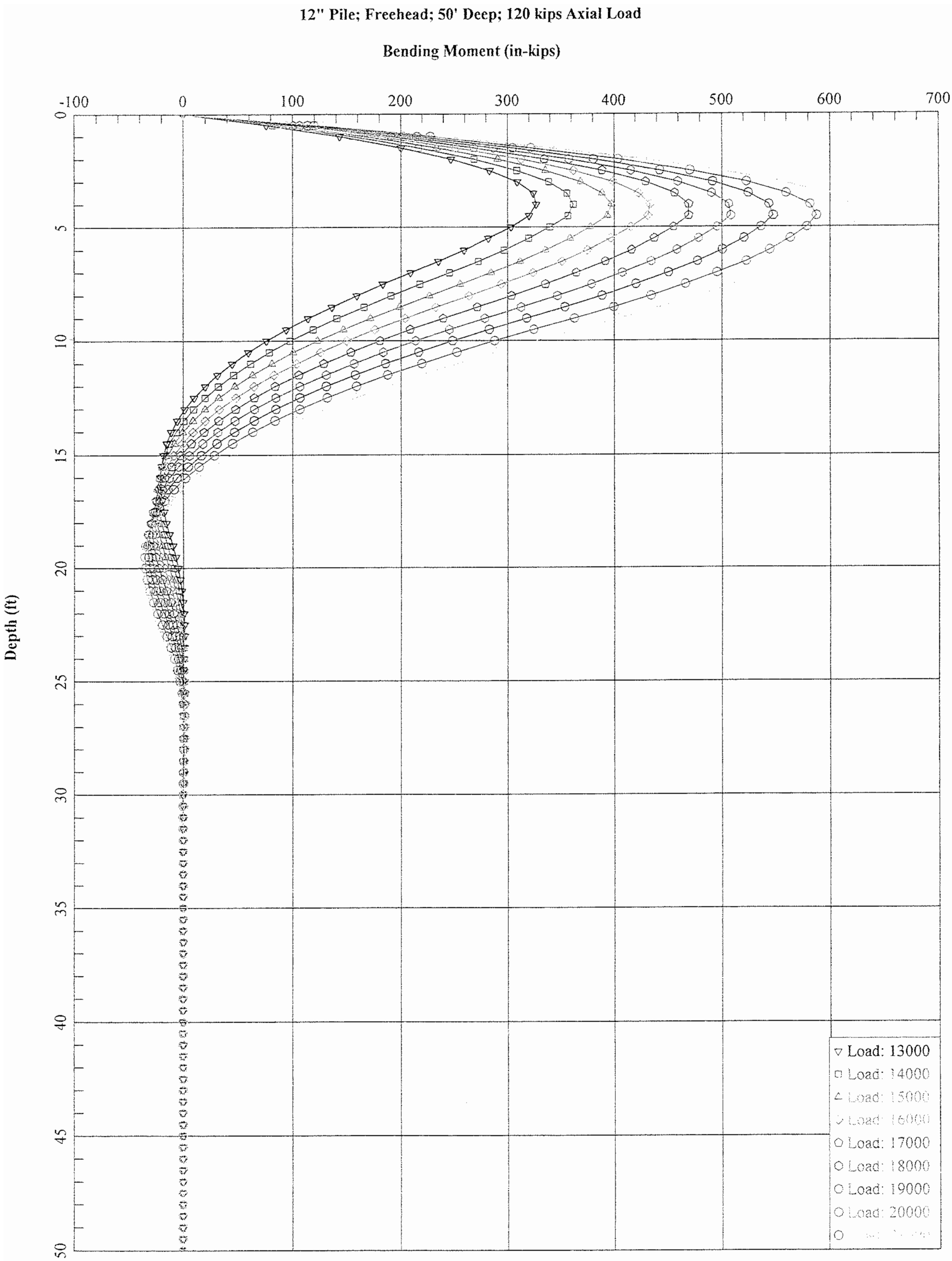
MAY 22, 2006

APPENDIX E

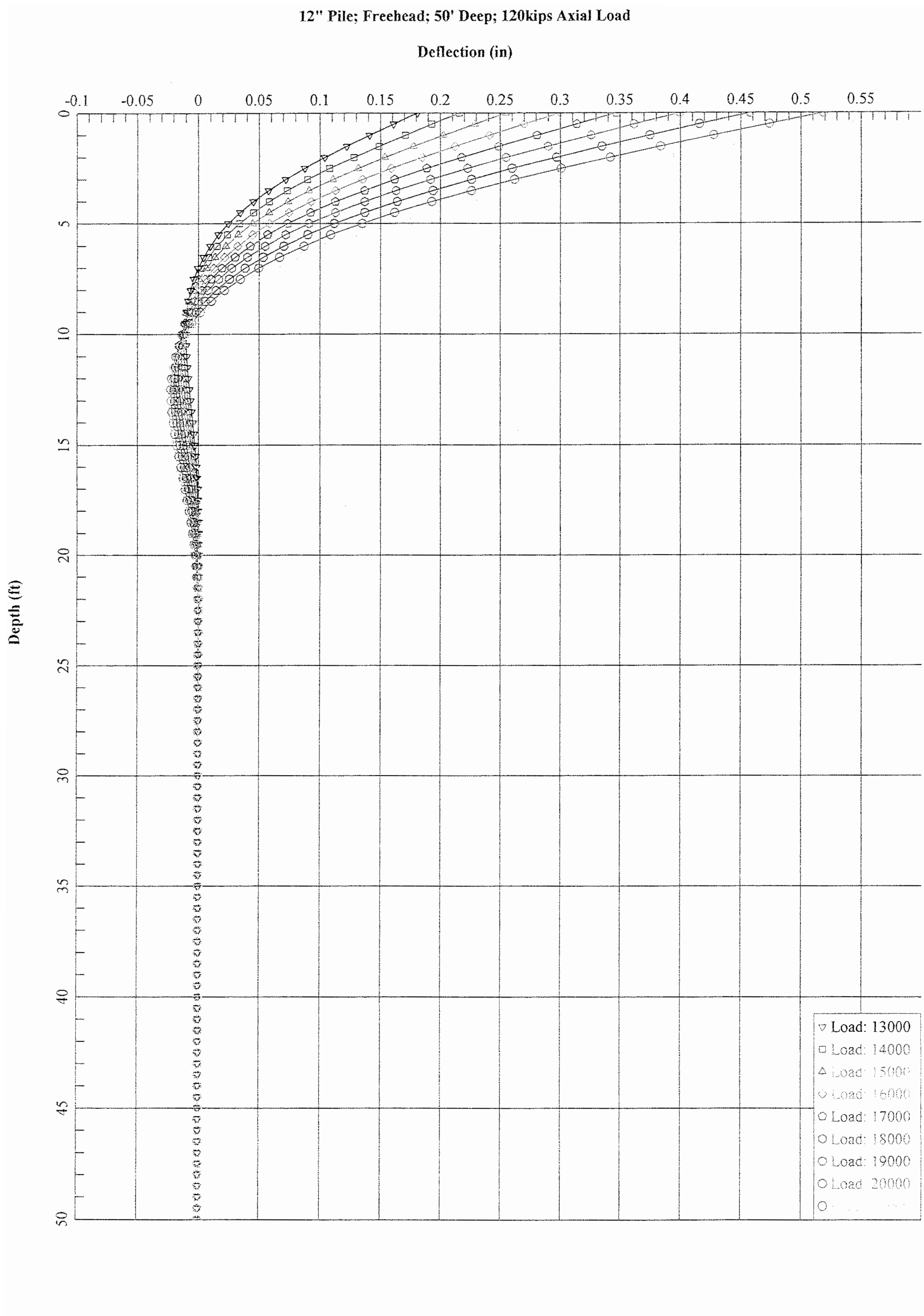
L-Pile Analyses



12" Pile; Freehead; 50' Deep; 120kips Axial Load
Lateral Load (kips)
0
2
4
6
8
10
12
14
16
18
20
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
▽ Curve #1
Pile-Head Deflection (in)



12" Pile; Freehead; 50' Deep; 120 kips Axial Load
Bending Moment (in-kips)
Depth (ft)
-100
0
100
200
300
400
500
600
700
0
5
10
15
20
25
30
35
40
45
50
Load: 13000
Load: 14000
Load: 15000
Load: 16000
Load: 17000
Load: 18000
Load: 19000
Load: 20000


12" Pile; Freehead; 50' Deep; 120kips Axial Load
Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 13000
Load: 14000
Load: 15000
Load: 16000
Load: 17000
Load: 18000
Load: 19000
Load: 20000

Licensed to: LEROY CHAN

ENGEO, INC.

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 12" sq Concrete Pile; Axial L=120kips; Freehead;

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	12.000	.173E+04	.144E+03	.442E+07
600.00	12.000	.173E+04	.144E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN

```
X AT THE BOTTOM OF THE LAYER      =     360.00 IN
MODULUS OF SUBGRADE REACTION      =   .300E+02 LBS/IN**3

LAYER  3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER         =     360.00 IN
X AT THE BOTTOM OF THE LAYER      =     420.00 IN
MODULUS OF SUBGRADE REACTION      =   .800E+03 LBS/IN**3

LAYER  4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER         =     420.00 IN
X AT THE BOTTOM OF THE LAYER      =     480.00 IN
MODULUS OF SUBGRADE REACTION      =   .100E+03 LBS/IN**3

LAYER  5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER         =     480.00 IN
X AT THE BOTTOM OF THE LAYER      =     720.00 IN
MODULUS OF SUBGRADE REACTION      =   .125E+03 LBS/IN**3


DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
                  8 POINTS
            X,IN     WEIGHT,LBS/IN**3
             .00         .67E-01
           60.00         .67E-01
           60.00         .22E-01
          360.00         .22E-01
          360.00         .28E-01
          480.00         .28E-01
          480.00         .30E-01
          720.00         .30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
                 10 POINTS
            X,IN       C,LBS/IN**2      PHI,DEGREES      E50
             .00        .139E+02           .000        .700E-02
           60.00        .139E+02           .000        .700E-02
           60.00        .347E+01           .000        .200E-01
          360.00        .347E+01           .000        .200E-01
          360.00        .139E+02           .000        .500E-02
          420.00        .139E+02           .000        .500E-02
          420.00        .694E+01           .000        .150E-01
          480.00        .694E+01           .000        .150E-01
          480.00        .000E+00         .260E+02      -----
          720.00        .000E+00         .260E+02      -----


BOUNDARY AND LOADING CONDITIONS
------------------------------


    LOADING NUMBER   1

    BOUNDARY-CONDITION CODE                  =          1
    LATERAL LOAD AT THE PILE HEAD            =    .130E+05 LBS
    MOMENT AT THE PILE HEAD                  =    .000E+00 IN-LBS
    AXIAL LOAD AT THE PILE HEAD              =    .120E+06 LBS


    LOADING NUMBER   2
```

```
BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .140E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   3

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .150E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   4

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .160E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   5

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .170E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   6

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .180E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   7

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .190E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   8

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .200E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS


LOADING NUMBER   9

BOUNDARY-CONDITION CODE                    =        1
LATERAL LOAD AT THE PILE HEAD              =   .210E+05 LBS
MOMENT AT THE PILE HEAD                    =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                =   .120E+06 LBS
```

FINITE-DIFFERENCE PARAMETERS

NUMBER OF PILE INCREMENTS	=	100
DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE	=	.100E-04 IN
MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS	=	100
MAXIMUM ALLOWABLE DEFLECTION	=	.10E+03 IN

OUTPUT CODES

KOUTPT = 1
KPYOP = 0
INC = 1

O U T P U T   I N F O R M A T I O N
****

```
**************************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING                    *
**************************************************
```

LOADING NUMBER 1

BOUNDARY CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.130E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.181E+00	-.118E-07	.130E+05	-.334E-02	.833E+03	.763E+10	-.241E+03
6.0	.161E+00	.761E+05	.115E+05	-.331E-02	.110E+04	.763E+10	-.256E+03
12.0	.141E+00	.143E+06	.994E+04	-.322E-02	.133E+04	.763E+10	-.269E+03
18.0	.122E+00	.200E+06	.829E+04	-.309E-02	.153E+04	.763E+10	-.279E+03
24.0	.104E+00	.247E+06	.659E+04	-.291E-02	.169E+04	.763E+10	-.288E+03
30.0	.874E-01	.283E+06	.485E+04	-.271E-02	.182E+04	.763E+10	-.294E+03
36.0	.718E-01	.309E+06	.307E+04	-.247E-02	.191E+04	.763E+10	-.298E+03
42.0	.577E-01	.324E+06	.128E+04	-.222E-02	.196E+04	.763E+10	-.299E+03
48.0	.451E-01	.327E+06	-.505E+03	-.197E-02	.197E+04	.763E+10	-.297E+03
54.0	.341E-01	.320E+06	-.227E+04	-.171E-02	.195E+04	.763E+10	-.291E+03
60.0	.245E-01	.303E+06	-.336E+04	-.147E-02	.188E+04	.763E+10	-.736E+02
66.0	.165E-01	.282E+06	-.376E+04	-.124E-02	.181E+04	.763E+10	-.565E+02
72.0	.969E-02	.259E+06	-.407E+04	-.103E-02	.173E+04	.763E+10	-.474E+02
78.0	.415E-02	.235E+06	-.432E+04	-.831E-03	.165E+04	.763E+10	-.357E+02
84.0	-.279E-03	.209E+06	-.438E+04	-.656E-03	.156E+04	.763E+10	.146E+02
90.0	-.372E-02	.183E+06	-.423E+04	-.502E-03	.147E+04	.763E+10	.344E+02
96.0	-.630E-02	.159E+06	-.401E+04	-.368E-03	.138E+04	.763E+10	.410E+02
102.0	-.814E-02	.136E+06	-.375E+04	-.252E-03	.130E+04	.763E+10	.447E+02
108.0	-.933E-02	.114E+06	-.348E+04	-.154E-03	.123E+04	.763E+10	.468E+02
114.0	-.998E-02	.942E+05	-.319E+04	-.718E-04	.116E+04	.763E+10	.478E+02
120.0	-.102E-01	.759E+05	-.290E+04	-.487E-05	.110E+04	.763E+10	.482E+02

126.0	-.100E-01	.593E+05	-.262E+04	.483E-04	.104E+04	.763E+10	.479E+02
132.0	-.961E-02	.445E+05	-.233E+04	.891E-04	.988E+03	.763E+10	.472E+02
138.0	-.897E-02	.312E+05	-.205E+04	.119E-03	.942E+03	.763E+10	.462E+02
144.0	-.818E-02	.197E+05	-.178E+04	.139E-03	.902E+03	.763E+10	.448E+02
150.0	-.730E-02	.972E+04	-.151E+04	.150E-03	.867E+03	.763E+10	.431E+02
156.0	-.638E-02	.130E+04	-.126E+04	.155E-03	.838E+03	.763E+10	.412E+02
162.0	-.544E-02	-.564E+04	-.102E+04	.153E-03	.853E+03	.763E+10	.391E+02
168.0	-.454E-02	-.112E+05	-.793E+03	.147E-03	.872E+03	.763E+10	.368E+02
174.0	-.369E-02	-.154E+05	-.579E+03	.136E-03	.887E+03	.763E+10	.343E+02
180.0	-.290E-02	-.183E+05	-.381E+03	.123E-03	.897E+03	.763E+10	.317E+02
186.0	-.221E-02	-.201E+05	-.199E+03	.108E-03	.903E+03	.763E+10	.289E+02
192.0	-.161E-02	-.209E+05	-.344E+02	.916E-04	.906E+03	.763E+10	.260E+02
198.0	-.111E-02	-.207E+05	.113E+03	.753E-04	.905E+03	.763E+10	.230E+02
204.0	-.708E-03	-.196E+05	.241E+03	.595E-04	.901E+03	.763E+10	.198E+02
210.0	-.397E-03	-.178E+05	.350E+03	.447E-04	.895E+03	.763E+10	.163E+02
216.0	-.171E-03	-.155E+05	.436E+03	.316E-04	.887E+03	.763E+10	.123E+02
222.0	-.177E-04	-.127E+05	.490E+03	.206E-04	.877E+03	.763E+10	.578E+01
228.0	.759E-04	-.963E+04	.479E+03	.118E-04	.867E+03	.763E+10	-.941E+01
234.0	.124E-03	-.693E+04	.418E+03	.530E-05	.857E+03	.763E+10	-.111E+02
240.0	.139E-03	-.462E+04	.350E+03	.758E-06	.849E+03	.763E+10	-.115E+02
246.0	.133E-03	-.273E+04	.282E+03	-.213E-05	.843E+03	.763E+10	-.113E+02
252.0	.114E-03	-.124E+04	.215E+03	-.369E-05	.838E+03	.763E+10	-.108E+02
258.0	.888E-04	-.140E+03	.153E+03	-.424E-05	.834E+03	.763E+10	-.991E+01
264.0	.630E-04	.604E+03	.970E+02	-.406E-05	.835E+03	.763E+10	-.884E+01
270.0	.401E-04	.103E+04	.477E+02	-.341E-05	.837E+03	.763E+10	-.761E+01
276.0	.221E-04	.118E+04	.616E+01	-.254E-05	.837E+03	.763E+10	-.623E+01
282.0	.958E-05	.111E+04	-.267E+02	-.165E-05	.837E+03	.763E+10	-.472E+01
288.0	.232E-05	.863E+03	-.496E+02	-.871E-06	.836E+03	.763E+10	-.294E+01
294.0	-.865E-06	.512E+03	-.521E+02	-.330E-06	.835E+03	.763E+10	.211E+01
300.0	-.164E-05	.238E+03	-.379E+02	-.347E-07	.834E+03	.763E+10	.262E+01
306.0	-.128E-05	.583E+02	-.228E+02	.819E-07	.834E+03	.763E+10	.241E+01
312.0	-.653E-06	-.348E+02	-.972E+01	.911E-07	.833E+03	.763E+10	.193E+01
318.0	-.189E-06	-.585E+02	-.114E+00	.544E-07	.834E+03	.763E+10	.127E+01
324.0	-.821E-09	-.363E+02	.433E+01	.171E-07	.833E+03	.763E+10	.209E+00
330.0	.161E-07	-.662E+01	.324E+01	.223E-09	.833E+03	.763E+10	-.558E+00
336.0	.185E-08	.263E+01	.584E+00	-.134E-08	.833E+03	.763E+10	-.252E+00
342.0	-.133E-10	.398E+00	-.219E+00	-.154E-09	.833E+03	.763E+10	.535E-01
348.0	-.398E-13	-.279E-02	-.332E-01	.111E-11	.833E+03	.763E+10	.624E-02
354.0	.162E-15	-.338E-05	.233E-03	.533E-14	.833E+03	.763E+10	-.818E-04
360.0	.242E-13	-.257E-05	.130E-06	.299E-14	.833E+03	.763E+10	-.109E-08
366.0	.361E-13	-.183E-05	.115E-06	.126E-14	.833E+03	.763E+10	-.172E-08
372.0	.393E-13	-.119E-05	.953E-07	.750E-16	.833E+03	.763E+10	-.198E-08
378.0	.370E-13	-.683E-06	.742E-07	-.662E-15	.833E+03	.763E+10	-.196E-08
384.0	.314E-13	-.300E-06	.543E-07	-.105E-14	.833E+03	.763E+10	-.175E-08
390.0	.244E-13	-.298E-07	.373E-07	-.118E-14	.833E+03	.763E+10	-.142E-08
396.0	.172E-13	.149E-06	.241E-07	-.113E-14	.833E+03	.763E+10	-.105E-08
402.0	.108E-13	.261E-06	.148E-07	-.971E-15	.833E+03	.763E+10	-.687E-09
408.0	.557E-14	.328E-06	.909E-08	-.739E-15	.833E+03	.763E+10	-.370E-09
414.0	.191E-14	.371E-06	.640E-08	-.465E-15	.833E+03	.763E+10	-.132E-09
420.0	.101E-19	.405E-06	-.309E-07	-.159E-15	.833E+03	.763E+10	-.682E-08
426.0	-.107E-19	.667E-11	-.338E-07	-.843E-21	.833E+03	.763E+10	.629E-08
432.0	-.295E-24	-.226E-11	-.556E-12	.890E-21	.833E+03	.763E+10	.174E-12
438.0	.597E-25	-.879E-16	.189E-12	.246E-25	.833E+03	.763E+10	-.351E-13
444.0	.298E-29	.126E-16	.732E-17	-.497E-26	.833E+03	.763E+10	-.176E-17
450.0	-.333E-30	.774E-21	-.105E-17	-.249E-30	.833E+03	.763E+10	.196E-18
456.0	-.241E-34	-.706E-22	-.645E-22	.278E-31	.833E+03	.763E+10	.142E-22
462.0	.186E-35	-.590E-26	.589E-23	.201E-35	.833E+03	.763E+10	-.110E-23
468.0	.176E-39	.395E-27	.492E-27	-.155E-36	.833E+03	.763E+10	-.104E-27
474.0	-.104E-40	.129E-31	-.329E-28	-.261E-40	.833E+03	.763E+10	.613E-29
480.0	-.136E-39	.104E-31	-.401E-33	-.169E-40	.833E+03	.763E+10	.234E-35
486.0	-.213E-39	.810E-32	-.369E-33	-.960E-41	.833E+03	.763E+10	.374E-35
492.0	-.251E-39	.602E-32	-.324E-33	-.404E-41	.833E+03	.763E+10	.452E-35
498.0	-.262E-39	.422E-32	-.274E-33	-.208E-43	.833E+03	.763E+10	.481E-35

504.0	-.252E-39	.272E-32	-.223E-33	.271E-41	.833E+03	.763E+10	.474E-35
510.0	-.229E-39	.154E-32	-.174E-33	.438E-41	.833E+03	.763E+10	.441E-35
516.0	-.199E-39	.630E-33	-.129E-33	.524E-41	.833E+03	.763E+10	.391E-35
522.0	-.166E-39	-.239E-34	-.904E-34	.547E-41	.833E+03	.763E+10	.334E-35
528.0	-.133E-39	-.463E-33	-.578E-34	.528E-41	.833E+03	.763E+10	.274E-35
534.0	-.103E-39	-.725E-33	-.316E-34	.481E-41	.833E+03	.763E+10	.215E-35
540.0	-.757E-40	-.849E-33	-.114E-34	.420E-41	.833E+03	.763E+10	.161E-35
546.0	-.525E-40	-.868E-33	.344E-35	.352E-41	.833E+03	.763E+10	.114E-35
552.0	-.334E-40	-.812E-33	.135E-34	.286E-41	.833E+03	.763E+10	.741E-36
558.0	-.182E-40	-.709E-33	.197E-34	.226E-41	.833E+03	.763E+10	.411E-36
564.0	-.627E-41	-.579E-33	.227E-34	.176E-41	.833E+03	.763E+10	.144E-36
570.0	.290E-41	-.439E-33	.231E-34	.136E-41	.833E+03	.763E+10	-.679E-37
576.0	.999E-41	-.304E-33	.215E-34	.106E-41	.833E+03	.763E+10	-.238E-36
582.0	.157E-40	-.183E-33	.182E-34	.872E-42	.833E+03	.763E+10	-.380E-36
588.0	.205E-40	-.870E-34	.134E-34	.766E-42	.833E+03	.763E+10	-.505E-36
594.0	.248E-40	-.234E-34	.734E-35	.722E-42	.833E+03	.763E+10	-.624E-36
600.0	.291E-40	.000E+00	.000E+00	.713E-42	.833E+03	.763E+10	-.743E-36

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .884E-08 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.219E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .181E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.334E-02
MAXIMUM BENDING MOMENT = .327E+06 LBS-IN
MAXIMUM SHEAR FORCE = .130E+05 LBS
NO. OF ITERATIONS = 29
NO. OF ZERO DEFLECTION POINTS = 12

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .140E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.216E+00	.000E+00	.140E+05	-.384E-02	.833E+03	.763E+10	-.252E+03
6.0	.193E+00	.822E+05	.124E+05	-.381E-02	.112E+04	.763E+10	-.268E+03
12.0	.171E+00	.155E+06	.108E+05	-.372E-02	.137E+04	.763E+10	-.281E+03
18.0	.149E+00	.217E+06	.907E+04	-.357E-02	.159E+04	.763E+10	-.293E+03
24.0	.128E+00	.269E+06	.728E+04	-.338E-02	.177E+04	.763E+10	-.303E+03
30.0	.108E+00	.309E+06	.544E+04	-.315E-02	.191E+04	.763E+10	-.310E+03
36.0	.899E-01	.339E+06	.357E+04	-.290E-02	.201E+04	.763E+10	-.315E+03
42.0	.733E-01	.356E+06	.167E+04	-.262E-02	.207E+04	.763E+10	-.317E+03
48.0	.584E-01	.362E+06	-.231E+03	-.234E-02	.209E+04	.763E+10	-.317E+03
54.0	.453E-01	.357E+06	-.212E+04	-.206E-02	.207E+04	.763E+10	-.313E+03
60.0	.337E-01	.340E+06	-.330E+04	-.178E-02	.201E+04	.763E+10	-.818E+02

66.0	.238E-01	.320E+06	-.374E+04	-.152E-02	.194E+04	.763E+10	-.639E+02
72.0	.155E-01	.297E+06	-.410E+04	-.128E-02	.187E+04	.763E+10	-.553E+02
78.0	.847E-02	.273E+06	-.440E+04	-.106E-02	.178E+04	.763E+10	-.453E+02
84.0	.277E-02	.246E+06	-.463E+04	-.853E-03	.169E+04	.763E+10	-.312E+02
90.0	-.177E-02	.218E+06	-.464E+04	-.671E-03	.159E+04	.763E+10	.269E+02
96.0	-.528E-02	.191E+06	-.445E+04	-.510E-03	.150E+04	.763E+10	.387E+02
102.0	-.788E-02	.166E+06	-.420E+04	-.370E-03	.141E+04	.763E+10	.442E+02
108.0	-.971E-02	.141E+06	-.392E+04	-.249E-03	.132E+04	.763E+10	.474E+02
114.0	-.109E-01	.119E+06	-.363E+04	-.147E-03	.125E+04	.763E+10	.492E+02
120.0	-.115E-01	.980E+05	-.334E+04	-.613E-04	.117E+04	.763E+10	.501E+02
126.0	-.116E-01	.789E+05	-.303E+04	.825E-05	.111E+04	.763E+10	.503E+02
132.0	-.114E-01	.615E+05	-.273E+04	.635E-04	.105E+04	.763E+10	.500E+02
138.0	-.108E-01	.460E+05	-.244E+04	.106E-03	.993E+03	.763E+10	.492E+02
144.0	-.101E-01	.322E+05	-.215E+04	.136E-03	.945E+03	.763E+10	.480E+02
150.0	-.921E-02	.200E+05	-.186E+04	.157E-03	.903E+03	.763E+10	.466E+02
156.0	-.822E-02	.959E+04	-.159E+04	.169E-03	.867E+03	.763E+10	.448E+02
162.0	-.718E-02	.750E+03	-.132E+04	.173E-03	.836E+03	.763E+10	.429E+02
168.0	-.614E-02	-.655E+04	-.107E+04	.170E-03	.856E+03	.763E+10	.407E+02
174.0	-.514E-02	-.124E+05	-.837E+03	.163E-03	.876E+03	.763E+10	.383E+02
180.0	-.419E-02	-.168E+05	-.614E+03	.152E-03	.892E+03	.763E+10	.358E+02
186.0	-.332E-02	-.200E+05	-.407E+03	.137E-03	.903E+03	.763E+10	.331E+02
192.0	-.254E-02	-.219E+05	-.217E+03	.121E-03	.909E+03	.763E+10	.303E+02
198.0	-.187E-02	-.227E+05	-.438E+02	.103E-03	.912E+03	.763E+10	.274E+02
204.0	-.131E-02	-.226E+05	.111E+03	.852E-04	.912E+03	.763E+10	.243E+02
210.0	-.849E-03	-.215E+05	.247E+03	.679E-04	.908E+03	.763E+10	.210E+02
216.0	-.493E-03	-.197E+05	.363E+03	.516E-04	.902E+03	.763E+10	.175E+02
222.0	-.229E-03	-.172E+05	.456E+03	.371E-04	.893E+03	.763E+10	.136E+02
228.0	-.472E-04	-.143E+05	.521E+03	.247E-04	.883E+03	.763E+10	.802E+01
234.0	.674E-04	-.110E+05	.518E+03	.148E-04	.872E+03	.763E+10	-.904E+01
240.0	.130E-03	-.809E+04	.457E+03	.724E-05	.861E+03	.763E+10	-.113E+02
246.0	.154E-03	-.555E+04	.388E+03	.187E-05	.853E+03	.763E+10	-.119E+02
252.0	.152E-03	-.344E+04	.317E+03	-.166E-05	.845E+03	.763E+10	-.119E+02
258.0	.134E-03	-.175E+04	.247E+03	-.370E-05	.839E+03	.763E+10	-.114E+02
264.0	.108E-03	-.468E+03	.181E+03	-.457E-05	.835E+03	.763E+10	-.106E+02
270.0	.795E-04	.432E+03	.121E+03	-.458E-05	.835E+03	.763E+10	-.955E+01
276.0	.530E-04	.987E+03	.670E+02	-.403E-05	.837E+03	.763E+10	-.835E+01
282.0	.312E-04	.124E+04	.210E+02	-.315E-05	.838E+03	.763E+10	-.699E+01
288.0	.152E-04	.124E+04	-.164E+02	-.217E-05	.838E+03	.763E+10	-.551E+01
294.0	.514E-05	.105E+04	-.444E+02	-.127E-05	.837E+03	.763E+10	-.384E+01
300.0	-.398E-12	.713E+03	-.559E+02	-.577E-06	.836E+03	.763E+10	.176E-01
306.0	-.178E-05	.378E+03	-.478E+02	-.148E-06	.835E+03	.763E+10	.269E+01
312.0	-.177E-05	.140E+03	-.317E+02	.559E-07	.834E+03	.763E+10	.269E+01
318.0	-.111E-05	-.191E+01	-.167E+02	.110E-06	.833E+03	.763E+10	.230E+01
324.0	-.451E-06	-.608E+02	-.469E+01	.854E-07	.834E+03	.763E+10	.170E+01
330.0	-.825E-07	-.583E+02	.335E+01	.386E-07	.834E+03	.763E+10	.964E+00
336.0	.116E-07	-.207E+02	.478E+01	.755E-08	.833E+03	.763E+10	-.504E+00
342.0	.814E-08	-.988E+00	.186E+01	-.961E-09	.833E+03	.763E+10	-.435E+00
348.0	.390E-10	.171E+01	.825E-01	-.678E-09	.833E+03	.763E+10	-.592E-01
354.0	-.208E-11	.352E-02	-.142E+00	-.546E-11	.833E+03	.763E+10	.220E-01
360.0	-.266E-10	.266E-02	-.136E-03	-.303E-11	.833E+03	.763E+10	.103E-05
366.0	-.385E-10	.188E-02	-.120E-03	-.125E-11	.833E+03	.763E+10	.158E-05
372.0	-.415E-10	.122E-02	-.991E-04	-.262E-13	.833E+03	.763E+10	.180E-05
378.0	-.388E-10	.694E-03	-.769E-04	.727E-12	.833E+03	.763E+10	.177E-05
384.0	-.328E-10	.298E-03	-.561E-04	.112E-11	.833E+03	.763E+10	.158E-05
390.0	-.254E-10	.193E-04	-.383E-04	.124E-11	.833E+03	.763E+10	.128E-05
396.0	-.179E-10	-.164E-03	-.245E-04	.118E-11	.833E+03	.763E+10	.944E-06
402.0	-.112E-10	-.277E-03	-.148E-04	.101E-11	.833E+03	.763E+10	.615E-06
408.0	-.577E-11	-.344E-03	-.897E-05	.767E-12	.833E+03	.763E+10	.331E-06
414.0	-.197E-11	-.386E-03	-.619E-05	.481E-12	.833E+03	.763E+10	.118E-06
420.0	-.104E-16	-.419E-03	.321E-04	.165E-12	.833E+03	.763E+10	.606E-05
426.0	.110E-16	-.688E-08	.349E-04	.866E-18	.833E+03	.763E+10	-.562E-05
432.0	.305E-21	.234E-08	.573E-09	-.919E-18	.833E+03	.763E+10	-.155E-09
438.0	-.616E-22	.907E-13	-.195E-09	-.254E-22	.833E+03	.763E+10	.314E-10

444.0	-.308E-26	-.131E-13	-.756E-14	.514E-23	.833E+03	.763E+10	.157E-14
450.0	.344E-27	-.799E-18	.109E-14	.257E-27	.833E+03	.763E+10	-.175E-15
456.0	.249E-31	.730E-19	.665E-19	-.287E-28	.833E+03	.763E+10	-.127E-19
462.0	-.192E-32	.609E-23	-.608E-20	-.207E-32	.833E+03	.763E+10	.979E-21
468.0	-.182E-36	-.408E-24	-.508E-24	.160E-33	.833E+03	.763E+10	.927E-25
474.0	.107E-37	-.133E-28	.340E-25	.269E-37	.833E+03	.763E+10	-.547E-26
480.0	.141E-36	-.108E-28	.414E-30	.174E-37	.833E+03	.763E+10	-.209E-32
486.0	.220E-36	-.837E-29	.381E-30	.991E-38	.833E+03	.763E+10	-.334E-32
492.0	.260E-36	-.621E-29	.335E-30	.418E-38	.833E+03	.763E+10	-.404E-32
498.0	.270E-36	-.435E-29	.283E-30	.215E-40	.833E+03	.763E+10	-.430E-32
504.0	.260E-36	-.281E-29	.230E-30	-.280E-38	.833E+03	.763E+10	-.423E-32
510.0	.236E-36	-.159E-29	.180E-30	-.453E-38	.833E+03	.763E+10	-.393E-32
516.0	.206E-36	-.650E-30	.134E-30	-.541E-38	.833E+03	.763E+10	-.349E-32
522.0	.172E-36	.247E-31	.933E-31	-.565E-38	.833E+03	.763E+10	-.298E-32
528.0	.138E-36	.478E-30	.597E-31	-.545E-38	.833E+03	.763E+10	-.244E-32
534.0	.106E-36	.749E-30	.326E-31	-.497E-38	.833E+03	.763E+10	-.192E-32
540.0	.781E-37	.876E-30	.117E-31	-.433E-38	.833E+03	.763E+10	-.144E-32
546.0	.542E-37	.896E-30	-.355E-32	-.364E-38	.833E+03	.763E+10	-.102E-32
552.0	.345E-37	.839E-30	-.140E-31	-.295E-38	.833E+03	.763E+10	-.661E-33
558.0	.188E-37	.732E-30	-.204E-31	-.234E-38	.833E+03	.763E+10	-.366E-33
564.0	.647E-38	.598E-30	-.234E-31	-.181E-38	.833E+03	.763E+10	-.129E-33
570.0	-.299E-38	.453E-30	-.239E-31	-.140E-38	.833E+03	.763E+10	.606E-34
576.0	-.103E-37	.313E-30	-.222E-31	-.110E-38	.833E+03	.763E+10	.213E-33
582.0	-.162E-37	.189E-30	-.187E-31	-.900E-39	.833E+03	.763E+10	.339E-33
588.0	-.211E-37	.899E-31	-.138E-31	-.791E-39	.833E+03	.763E+10	.451E-33
594.0	-.257E-37	.242E-31	-.758E-32	-.746E-39	.833E+03	.763E+10	.557E-33
600.0	-.301E-37	.000E+00	.000E+00	-.736E-39	.833E+03	.763E+10	.664E-33

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.840E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .827E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .216E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.384E-02
MAXIMUM BENDING MOMENT = .362E+06 LBS-IN
MAXIMUM SHEAR FORCE = .140E+05 LBS
NO. OF ITERATIONS = 29
NO. OF ZERO DEFLECTION POINTS = 11

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .150E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.255E+00	-.471E-07	.150E+05	-.438E-02	.833E+03	.763E+10	-.263E+03

6.0	.229E+00	.884E+05	.134E+05	-.434E-02	.114E+04	.763E+10	-.279E+03
12.0	.203E+00	.167E+06	.117E+05	-.424E-02	.141E+04	.763E+10	-.294E+03
18.0	.178E+00	.234E+06	.985E+04	-.409E-02	.165E+04	.763E+10	-.307E+03
24.0	.154E+00	.291E+06	.798E+04	-.388E-02	.184E+04	.763E+10	-.317E+03
30.0	.132E+00	.336E+06	.605E+04	-.363E-02	.200E+04	.763E+10	-.326E+03
36.0	.111E+00	.369E+06	.408E+04	-.336E-02	.211E+04	.763E+10	-.332E+03
42.0	.914E-01	.389E+06	.207E+04	-.306E-02	.219E+04	.763E+10	-.335E+03
48.0	.740E-01	.398E+06	.616E+02	-.275E-02	.222E+04	.763E+10	-.336E+03
54.0	.584E-01	.394E+06	-.195E+04	-.244E-02	.220E+04	.763E+10	-.333E+03
60.0	.447E-01	.378E+06	-.322E+04	-.213E-02	.215E+04	.763E+10	-.899E+02
66.0	.328E-01	.359E+06	-.370E+04	-.184E-02	.208E+04	.763E+10	-.711E+02
72.0	.226E-01	.336E+06	-.410E+04	-.157E-02	.200E+04	.763E+10	-.628E+02
78.0	.139E-01	.312E+06	-.445E+04	-.132E-02	.192E+04	.763E+10	-.535E+02
84.0	.678E-02	.285E+06	-.474E+04	-.108E-02	.182E+04	.763E+10	-.420E+02
90.0	.964E-03	.256E+06	-.493E+04	-.869E-03	.172E+04	.763E+10	-.219E+02
96.0	-.364E-02	.227E+06	-.489E+04	-.679E-03	.162E+04	.763E+10	.342E+02
102.0	-.718E-02	.199E+06	-.466E+04	-.511E-03	.152E+04	.763E+10	.429E+02
108.0	-.978E-02	.172E+06	-.439E+04	-.365E-03	.143E+04	.763E+10	.475E+02
114.0	-.116E-01	.147E+06	-.410E+04	-.240E-03	.134E+04	.763E+10	.502E+02
120.0	-.127E-01	.123E+06	-.379E+04	-.134E-03	.126E+04	.763E+10	.518E+02
126.0	-.132E-01	.101E+06	-.348E+04	-.461E-04	.118E+04	.763E+10	.525E+02
132.0	-.132E-01	.813E+05	-.316E+04	.257E-04	.112E+04	.763E+10	.525E+02
138.0	-.129E-01	.633E+05	-.285E+04	.826E-04	.105E+04	.763E+10	.521E+02
144.0	-.122E-01	.470E+05	-.254E+04	.126E-03	.997E+03	.763E+10	.512E+02
150.0	-.114E-01	.326E+05	-.224E+04	.157E-03	.947E+03	.763E+10	.499E+02
156.0	-.103E-01	.200E+05	-.194E+04	.178E-03	.903E+03	.763E+10	.484E+02
162.0	-.922E-02	.906E+04	-.166E+04	.189E-03	.865E+03	.763E+10	.466E+02
168.0	-.806E-02	-.172E+03	-.138E+04	.193E-03	.834E+03	.763E+10	.445E+02
174.0	-.691E-02	-.780E+04	-.112E+04	.190E-03	.860E+03	.763E+10	.423E+02
180.0	-.579E-02	-.139E+05	-.875E+03	.181E-03	.882E+03	.763E+10	.399E+02
186.0	-.473E-02	-.186E+05	-.644E+03	.168E-03	.898E+03	.763E+10	.373E+02
192.0	-.377E-02	-.219E+05	-.428E+03	.152E-03	.909E+03	.763E+10	.346E+02
198.0	-.290E-02	-.239E+05	-.230E+03	.134E-03	.916E+03	.763E+10	.317E+02
204.0	-.215E-02	-.248E+05	-.484E+02	.115E-03	.920E+03	.763E+10	.287E+02
210.0	-.152E-02	-.247E+05	.114E+03	.958E-04	.919E+03	.763E+10	.255E+02
216.0	-.100E-02	-.236E+05	.258E+03	.769E-04	.915E+03	.763E+10	.222E+02
222.0	-.597E-03	-.217E+05	.380E+03	.590E-04	.909E+03	.763E+10	.187E+02
228.0	-.294E-03	-.191E+05	.481E+03	.430E-04	.900E+03	.763E+10	.148E+02
234.0	-.812E-04	-.160E+05	.554E+03	.292E-04	.889E+03	.763E+10	.961E+01
240.0	.563E-04	-.125E+05	.557E+03	.180E-04	.877E+03	.763E+10	-.852E+01
246.0	.135E-03	-.932E+04	.498E+03	.941E-05	.866E+03	.763E+10	-.114E+02
252.0	.169E-03	-.655E+04	.427E+03	.317E-05	.856E+03	.763E+10	-.123E+02
258.0	.173E-03	-.421E+04	.353E+03	-.106E-05	.848E+03	.763E+10	-.124E+02
264.0	.156E-03	-.231E+04	.280E+03	-.363E-05	.841E+03	.763E+10	-.120E+02
270.0	.129E-03	-.844E+03	.210E+03	-.487E-05	.836E+03	.763E+10	-.112E+02
276.0	.980E-04	.220E+03	.146E+03	-.511E-05	.834E+03	.763E+10	-.102E+02
282.0	.679E-04	.914E+03	.880E+02	-.467E-05	.837E+03	.763E+10	-.906E+01
288.0	.420E-04	.128E+04	.376E+02	-.380E-05	.838E+03	.763E+10	-.773E+01
294.0	.222E-04	.137E+04	-.426E+01	-.276E-05	.838E+03	.763E+10	-.625E+01
300.0	.891E-05	.123E+04	-.368E+02	-.173E-05	.838E+03	.763E+10	-.461E+01
306.0	.142E-05	.932E+03	-.580E+02	-.883E-06	.837E+03	.763E+10	-.250E+01
312.0	-.168E-05	.539E+03	-.575E+02	-.304E-06	.835E+03	.763E+10	.264E+01
318.0	-.223E-05	.242E+03	-.409E+02	.288E-08	.834E+03	.763E+10	.290E+01
324.0	-.165E-05	.489E+02	-.243E+02	.117E-06	.834E+03	.763E+10	.262E+01
330.0	-.828E-06	-.495E+02	-.101E+02	.117E-06	.834E+03	.763E+10	.209E+01
336.0	-.243E-06	-.727E+02	.314E+00	.689E-07	.834E+03	.763E+10	.139E+01
342.0	-.135E-08	-.458E+02	.521E+01	.223E-07	.833E+03	.763E+10	.248E+00
348.0	.244E-07	-.102E+02	.398E+01	.256E-09	.833E+03	.763E+10	-.640E+00
354.0	.172E-08	.188E+01	.973E+00	-.304E-08	.833E+03	.763E+10	-.232E+00
360.0	-.121E-07	.144E+01	-.712E-01	-.173E-08	.833E+03	.763E+10	.102E-02
366.0	-.191E-07	.103E+01	-.634E-01	-.761E-09	.833E+03	.763E+10	.167E-02
372.0	-.212E-07	.677E+00	-.528E-01	-.905E-10	.833E+03	.763E+10	.195E-02
378.0	-.201E-07	.395E+00	-.414E-01	.331E-09	.833E+03	.763E+10	.194E-02

384.0	-.172E-07	.180E+00	-.305E-01	.557E-09	.833E+03	.763E+10	.174E-02
390.0	-.135E-07	.276E-01	-.212E-01	.639E-09	.833E+03	.763E+10	.142E-02
396.0	-.955E-08	-.746E-01	-.138E-01	.621E-09	.833E+03	.763E+10	.106E-02
402.0	-.601E-08	-.139E+00	-.865E-02	.536E-09	.833E+03	.763E+10	.692E-03
408.0	-.312E-08	-.179E+00	-.549E-02	.411E-09	.833E+03	.763E+10	.374E-03
414.0	-.107E-08	-.206E+00	-.398E-02	.260E-09	.833E+03	.763E+10	.134E-03
420.0	-.573E-14	-.227E+00	.172E-01	.894E-10	.833E+03	.763E+10	.696E-02
426.0	.600E-14	-.376E-05	.190E-01	.478E-15	.833E+03	.763E+10	-.637E-02
432.0	.166E-18	.127E-05	.313E-06	-.500E-15	.833E+03	.763E+10	-.176E-06
438.0	-.335E-19	.494E-10	-.106E-06	-.138E-19	.833E+03	.763E+10	.356E-07
444.0	-.168E-23	-.710E-11	-.411E-11	.279E-20	.833E+03	.763E+10	.178E-11
450.0	.187E-24	-.434E-15	.591E-12	.140E-24	.833E+03	.763E+10	-.199E-12
456.0	.135E-28	.396E-16	.362E-16	-.156E-25	.833E+03	.763E+10	-.144E-16
462.0	-.105E-29	.331E-20	-.330E-17	-.113E-29	.833E+03	.763E+10	.111E-17
468.0	-.990E-34	-.221E-21	-.276E-21	.871E-31	.833E+03	.763E+10	.105E-21
474.0	.584E-35	-.724E-26	.185E-22	.146E-34	.833E+03	.763E+10	-.621E-23
480.0	.765E-34	-.586E-26	.225E-27	.948E-35	.833E+03	.763E+10	-.237E-29
486.0	.120E-33	-.455E-26	.207E-27	.539E-35	.833E+03	.763E+10	-.379E-29
492.0	.141E-33	-.338E-26	.182E-27	.227E-35	.833E+03	.763E+10	-.458E-29
498.0	.147E-33	-.237E-26	.154E-27	.118E-37	.833E+03	.763E+10	-.488E-29
504.0	.141E-33	-.153E-26	.125E-27	-.152E-35	.833E+03	.763E+10	-.480E-29
510.0	.129E-33	-.862E-27	.977E-28	-.246E-35	.833E+03	.763E+10	-.447E-29
516.0	.112E-33	-.354E-27	.726E-28	-.294E-35	.833E+03	.763E+10	-.397E-29
522.0	.933E-34	.134E-28	.508E-28	-.307E-35	.833E+03	.763E+10	-.338E-29
528.0	.749E-34	.260E-27	.325E-28	-.297E-35	.833E+03	.763E+10	-.277E-29
534.0	.577E-34	.407E-27	.177E-28	-.270E-35	.833E+03	.763E+10	-.218E-29
540.0	.425E-34	.476E-27	.638E-29	-.236E-35	.833E+03	.763E+10	-.164E-29
546.0	.295E-34	.487E-27	-.193E-29	-.198E-35	.833E+03	.763E+10	-.116E-29
552.0	.188E-34	.456E-27	-.760E-29	-.161E-35	.833E+03	.763E+10	-.751E-30
558.0	.102E-34	.398E-27	-.111E-28	-.127E-35	.833E+03	.763E+10	-.416E-30
564.0	.352E-35	.325E-27	-.127E-28	-.986E-36	.833E+03	.763E+10	-.146E-30
570.0	-.163E-35	.247E-27	-.130E-28	-.761E-36	.833E+03	.763E+10	.688E-31
576.0	-.561E-35	.170E-27	-.121E-28	-.597E-36	.833E+03	.763E+10	.242E-30
582.0	-.879E-35	.103E-27	-.102E-28	-.490E-36	.833E+03	.763E+10	.385E-30
588.0	-.115E-34	.489E-28	-.752E-29	-.430E-36	.833E+03	.763E+10	.512E-30
594.0	-.140E-34	.132E-28	-.412E-29	-.406E-36	.833E+03	.763E+10	.632E-30
600.0	-.164E-34	.000E+00	.000E+00	-.400E-36	.833E+03	.763E+10	.754E-30

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.870E-08 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.112E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .255E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.438E-02
MAXIMUM BENDING MOMENT = .398E+06 LBS-IN
MAXIMUM SHEAR FORCE = .150E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 11

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .160E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.300E+00	.706E-07	.160E+05	-.495E-02	.833E+03	.763E+10	-.273E+03
6.0	.270E+00	.946E+05	.143E+05	-.491E-02	.116E+04	.763E+10	-.291E+03
12.0	.241E+00	.179E+06	.125E+05	-.481E-02	.145E+04	.763E+10	-.307E+03
18.0	.212E+00	.252E+06	.106E+05	-.464E-02	.171E+04	.763E+10	-.321E+03
24.0	.185E+00	.313E+06	.867E+04	-.442E-02	.192E+04	.763E+10	-.332E+03
30.0	.159E+00	.362E+06	.665E+04	-.415E-02	.209E+04	.763E+10	-.342E+03
36.0	.135E+00	.399E+06	.458E+04	-.385E-02	.222E+04	.763E+10	-.349E+03
42.0	.113E+00	.423E+06	.248E+04	-.353E-02	.230E+04	.763E+10	-.353E+03
48.0	.928E-01	.434E+06	.349E+03	-.319E-02	.234E+04	.763E+10	-.355E+03
54.0	.747E-01	.432E+06	-.178E+04	-.285E-02	.233E+04	.763E+10	-.354E+03
60.0	.586E-01	.416E+06	-.314E+04	-.252E-02	.228E+04	.763E+10	-.984E+02
66.0	.445E-01	.397E+06	-.367E+04	-.220E-02	.221E+04	.763E+10	-.787E+02
72.0	.322E-01	.375E+06	-.412E+04	-.189E-02	.214E+04	.763E+10	-.707E+02
78.0	.217E-01	.351E+06	-.452E+04	-.161E-02	.205E+04	.763E+10	-.620E+02
84.0	.129E-01	.324E+06	-.486E+04	-.134E-02	.196E+04	.763E+10	-.521E+02
90.0	.562E-02	.294E+06	-.513E+04	-.110E-02	.186E+04	.763E+10	-.395E+02
96.0	-.279E-03	.264E+06	-.521E+04	-.880E-03	.175E+04	.763E+10	.146E+02
102.0	-.494E-02	.233E+06	-.505E+04	-.685E-03	.164E+04	.763E+10	.378E+02
108.0	-.850E-02	.204E+06	-.480E+04	-.513E-03	.154E+04	.763E+10	.453E+02
114.0	-.111E-01	.176E+06	-.452E+04	-.363E-03	.145E+04	.763E+10	.495E+02
120.0	-.129E-01	.150E+06	-.421E+04	-.235E-03	.135E+04	.763E+10	.520E+02
126.0	-.139E-01	.126E+06	-.390E+04	-.126E-03	.127E+04	.763E+10	.534E+02
132.0	-.144E-01	.104E+06	-.358E+04	-.361E-04	.119E+04	.763E+10	.540E+02
138.0	-.143E-01	.832E+05	-.325E+04	.373E-04	.112E+04	.763E+10	.540E+02
144.0	-.139E-01	.646E+05	-.293E+04	.954E-04	.106E+04	.763E+10	.535E+02
150.0	-.132E-01	.479E+05	-.261E+04	.140E-03	.100E+04	.763E+10	.525E+02
156.0	-.123E-01	.330E+05	-.230E+04	.171E-03	.948E+03	.763E+10	.512E+02
162.0	-.111E-01	.200E+05	-.200E+04	.192E-03	.903E+03	.763E+10	.496E+02
168.0	-.994E-02	.880E+04	-.171E+04	.204E-03	.864E+03	.763E+10	.478E+02
174.0	-.870E-02	-.721E+03	-.142E+04	.207E-03	.836E+03	.763E+10	.457E+02
180.0	-.746E-02	-.859E+04	-.116E+04	.203E-03	.863E+03	.763E+10	.434E+02
186.0	-.626E-02	-.149E+05	-.904E+03	.194E-03	.885E+03	.763E+10	.409E+02
192.0	-.513E-02	-.197E+05	-.667E+03	.180E-03	.902E+03	.763E+10	.383E+02
198.0	-.410E-02	-.232E+05	-.445E+03	.163E-03	.914E+03	.763E+10	.355E+02
204.0	-.317E-02	-.253E+05	-.240E+03	.144E-03	.921E+03	.763E+10	.326E+02
210.0	-.236E-02	-.263E+05	-.537E+02	.124E-03	.924E+03	.763E+10	.296E+02
216.0	-.168E-02	-.261E+05	.114E+03	.104E-03	.924E+03	.763E+10	.264E+02
222.0	-.112E-02	-.250E+05	.263E+03	.834E-04	.920E+03	.763E+10	.231E+02
228.0	-.679E-03	-.231E+05	.391E+03	.645E-04	.914E+03	.763E+10	.195E+02
234.0	-.347E-03	-.204E+05	.496E+03	.474E-04	.904E+03	.763E+10	.156E+02
240.0	-.111E-03	-.172E+05	.575E+03	.326E-04	.893E+03	.763E+10	.107E+02
246.0	.445E-04	-.136E+05	.583E+03	.205E-04	.880E+03	.763E+10	-.788E+01
252.0	.135E-03	-.102E+05	.526E+03	.111E-04	.869E+03	.763E+10	-.114E+02
258.0	.178E-03	-.729E+04	.454E+03	.425E-05	.859E+03	.763E+10	-.125E+02
264.0	.186E-03	-.479E+04	.378E+03	-.499E-06	.850E+03	.763E+10	-.127E+02
270.0	.172E-03	-.275E+04	.303E+03	-.346E-05	.843E+03	.763E+10	-.124E+02
276.0	.145E-03	-.115E+04	.231E+03	-.499E-05	.837E+03	.763E+10	-.117E+02
282.0	.112E-03	.357E+02	.164E+03	-.543E-05	.833E+03	.763E+10	-.107E+02
288.0	.798E-04	.831E+03	.103E+03	-.509E-05	.836E+03	.763E+10	-.957E+01
294.0	.512E-04	.128E+04	.498E+02	-.426E-05	.838E+03	.763E+10	-.825E+01
300.0	.287E-04	.144E+04	.469E+01	-.319E-05	.838E+03	.763E+10	-.681E+01
306.0	.130E-04	.134E+04	-.314E+02	-.210E-05	.838E+03	.763E+10	-.522E+01
312.0	.356E-05	.106E+04	-.571E+02	-.115E-05	.837E+03	.763E+10	-.340E+01
318.0	-.832E-06	.659E+03	-.610E+02	-.474E-06	.836E+03	.763E+10	.208E+01

324.0	-.212E-05	.331E+03	-.461E+02	-.845E-07	.834E+03	.763E+10	.285E+01
330.0	-.185E-05	.106E+03	-.293E+02	.873E-07	.834E+03	.763E+10	.272E+01
336.0	-.107E-05	-.209E+02	-.143E+02	.121E-06	.833E+03	.763E+10	.227E+01
342.0	-.398E-06	-.657E+02	-.254E+01	.866E-07	.834E+03	.763E+10	.163E+01
348.0	-.336E-07	-.516E+02	.448E+01	.405E-07	.834E+03	.763E+10	.723E+00
354.0	.876E-07	-.120E+02	.357E+01	.155E-07	.833E+03	.763E+10	-.977E+00
360.0	.152E-06	-.872E+01	.517E+00	.731E-08	.833E+03	.763E+10	-.119E-01
366.0	.175E-06	-.584E+01	.436E+00	.158E-08	.833E+03	.763E+10	-.146E-01
372.0	.171E-06	-.350E+01	.345E+00	-.209E-08	.833E+03	.763E+10	-.151E-01
378.0	.150E-06	-.170E+01	.256E+00	-.413E-08	.833E+03	.763E+10	-.140E-01
384.0	.121E-06	-.420E+00	.177E+00	-.497E-08	.833E+03	.763E+10	-.119E-01
390.0	.907E-07	.427E+00	.112E+00	-.496E-08	.833E+03	.763E+10	-.930E-02
396.0	.619E-07	.934E+00	.636E-01	-.443E-08	.833E+03	.763E+10	-.665E-02
402.0	.376E-07	.120E+01	.305E-01	-.359E-08	.833E+03	.763E+10	-.421E-02
408.0	.188E-07	.130E+01	.109E-01	-.261E-08	.833E+03	.763E+10	-.220E-02
414.0	.628E-08	.133E+01	.191E-02	-.157E-08	.833E+03	.763E+10	-.764E-03
420.0	.184E-12	.133E+01	-.111E+00	-.523E-09	.833E+03	.763E+10	-.296E-01
426.0	-.268E-12	.153E-03	-.111E+00	-.154E-13	.833E+03	.763E+10	.291E-01
432.0	-.703E-17	-.569E-04	-.127E-04	.224E-13	.833E+03	.763E+10	.586E-05
438.0	.150E-17	-.212E-08	.474E-05	.586E-18	.833E+03	.763E+10	-.125E-05
444.0	.727E-22	.318E-09	.177E-09	-.125E-18	.833E+03	.763E+10	-.606E-10
450.0	-.837E-23	.190E-13	-.265E-10	-.606E-23	.833E+03	.763E+10	.696E-11
456.0	-.594E-27	-.177E-14	-.158E-14	.698E-24	.833E+03	.763E+10	.494E-15
462.0	.468E-28	-.146E-18	.148E-15	.495E-28	.833E+03	.763E+10	-.389E-16
468.0	.436E-32	.991E-20	.121E-19	-.390E-29	.833E+03	.763E+10	-.363E-20
474.0	-.261E-33	.319E-24	-.826E-21	-.645E-33	.833E+03	.763E+10	.217E-21
480.0	-.338E-32	.258E-24	-.994E-26	-.418E-33	.833E+03	.763E+10	.818E-28
486.0	-.528E-32	.201E-24	-.913E-26	-.237E-33	.833E+03	.763E+10	.131E-27
492.0	-.623E-32	.149E-24	-.803E-26	-.100E-33	.833E+03	.763E+10	.158E-27
498.0	-.648E-32	.104E-24	-.679E-26	-.437E-36	.833E+03	.763E+10	.168E-27
504.0	-.623E-32	.674E-25	-.552E-26	.671E-34	.833E+03	.763E+10	.166E-27
510.0	-.567E-32	.380E-25	-.431E-26	.109E-33	.833E+03	.763E+10	.154E-27
516.0	-.493E-32	.156E-25	-.320E-26	.130E-33	.833E+03	.763E+10	.137E-27
522.0	-.412E-32	-.605E-27	-.224E-26	.136E-33	.833E+03	.763E+10	.117E-27
528.0	-.330E-32	-.115E-25	-.143E-26	.131E-33	.833E+03	.763E+10	.957E-28
534.0	-.255E-32	-.180E-25	-.781E-27	.119E-33	.833E+03	.763E+10	.752E-28
540.0	-.187E-32	-.210E-25	-.281E-27	.104E-33	.833E+03	.763E+10	.565E-28
546.0	-.130E-32	-.215E-25	.853E-28	.872E-34	.833E+03	.763E+10	.399E-28
552.0	-.827E-33	-.201E-25	.335E-27	.708E-34	.833E+03	.763E+10	.259E-28
558.0	-.450E-33	-.176E-25	.488E-27	.560E-34	.833E+03	.763E+10	.144E-28
564.0	-.155E-33	-.143E-25	.562E-27	.435E-34	.833E+03	.763E+10	.504E-29
570.0	.719E-34	-.109E-25	.572E-27	.335E-34	.833E+03	.763E+10	-.238E-29
576.0	.248E-33	-.752E-26	.532E-27	.263E-34	.833E+03	.763E+10	-.834E-29
582.0	.388E-33	-.453E-26	.449E-27	.216E-34	.833E+03	.763E+10	-.133E-28
588.0	.506E-33	-.215E-26	.332E-27	.189E-34	.833E+03	.763E+10	-.177E-28
594.0	.615E-33	-.580E-27	.182E-27	.179E-34	.833E+03	.763E+10	-.218E-28
600.0	.721E-33	.000E+00	.000E+00	.176E-34	.833E+03	.763E+10	-.260E-28

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.141E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.322E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .300E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.495E-02
MAXIMUM BENDING MOMENT = .434E+06 LBS-IN
MAXIMUM SHEAR FORCE = .160E+05 LBS
NO. OF ITERATIONS = 30

NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .170E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.347E+00	-.824E-07	.170E+05	-.556E-02	.833E+03	.763E+10	-.284E+03
6.0	.314E+00	.101E+06	.152E+05	-.552E-02	.118E+04	.763E+10	-.302E+03
12.0	.281E+00	.191E+06	.134E+05	-.541E-02	.150E+04	.763E+10	-.319E+03
18.0	.249E+00	.269E+06	.114E+05	-.523E-02	.177E+04	.763E+10	-.334E+03
24.0	.218E+00	.335E+06	.938E+04	-.499E-02	.200E+04	.763E+10	-.346E+03
30.0	.189E+00	.389E+06	.727E+04	-.471E-02	.218E+04	.763E+10	-.357E+03
36.0	.162E+00	.430E+06	.511E+04	-.438E-02	.232E+04	.763E+10	-.365E+03
42.0	.137E+00	.457E+06	.290E+04	-.404E-02	.242E+04	.763E+10	-.371E+03
48.0	.113E+00	.470E+06	.670E+03	-.367E-02	.247E+04	.763E+10	-.374E+03
54.0	.925E-01	.470E+06	-.157E+04	-.330E-02	.247E+04	.763E+10	-.374E+03
60.0	.738E-01	.456E+06	-.301E+04	-.294E-02	.242E+04	.763E+10	-.106E+03
66.0	.572E-01	.438E+06	-.359E+04	-.259E-02	.235E+04	.763E+10	-.856E+02
72.0	.428E-01	.417E+06	-.408E+04	-.225E-02	.228E+04	.763E+10	-.777E+02
78.0	.302E-01	.392E+06	-.452E+04	-.193E-02	.220E+04	.763E+10	-.692E+02
84.0	.196E-01	.365E+06	-.491E+04	-.163E-02	.210E+04	.763E+10	-.599E+02
90.0	.106E-01	.336E+06	-.523E+04	-.136E-02	.200E+04	.763E+10	-.489E+02
96.0	.328E-02	.304E+06	-.548E+04	-.111E-02	.189E+04	.763E+10	-.330E+02
102.0	-.264E-02	.272E+06	-.549E+04	-.880E-03	.178E+04	.763E+10	.307E+02
108.0	-.728E-02	.240E+06	-.527E+04	-.679E-03	.167E+04	.763E+10	.431E+02
114.0	-.108E-01	.209E+06	-.499E+04	-.502E-03	.156E+04	.763E+10	.491E+02
120.0	-.133E-01	.181E+06	-.468E+04	-.349E-03	.146E+04	.763E+10	.526E+02
126.0	-.150E-01	.154E+06	-.436E+04	-.217E-03	.137E+04	.763E+10	.548E+02
132.0	-.159E-01	.129E+06	-.403E+04	-.106E-03	.128E+04	.763E+10	.559E+02
138.0	-.162E-01	.106E+06	-.369E+04	-.141E-04	.120E+04	.763E+10	.563E+02
144.0	-.161E-01	.843E+05	-.336E+04	.605E-04	.113E+04	.763E+10	.561E+02
150.0	-.155E-01	.651E+05	-.302E+04	.119E-03	.106E+04	.763E+10	.554E+02
156.0	-.146E-01	.479E+05	-.269E+04	.164E-03	.100E+04	.763E+10	.544E+02
162.0	-.136E-01	.326E+05	-.237E+04	.195E-03	.947E+03	.763E+10	.530E+02
168.0	-.123E-01	.192E+05	-.206E+04	.216E-03	.900E+03	.763E+10	.513E+02
174.0	-.110E-01	.759E+04	-.176E+04	.226E-03	.860E+03	.763E+10	.494E+02
180.0	-.959E-02	-.223E+04	-.147E+04	.228E-03	.841E+03	.763E+10	.472E+02
186.0	-.822E-02	-.103E+05	-.119E+04	.223E-03	.869E+03	.763E+10	.448E+02
192.0	-.691E-02	-.168E+05	-.929E+03	.213E-03	.892E+03	.763E+10	.423E+02
198.0	-.567E-02	-.218E+05	-.683E+03	.198E-03	.909E+03	.763E+10	.396E+02
204.0	-.453E-02	-.253E+05	-.454E+03	.179E-03	.921E+03	.763E+10	.368E+02
210.0	-.352E-02	-.275E+05	-.242E+03	.158E-03	.929E+03	.763E+10	.338E+02
216.0	-.264E-02	-.284E+05	-.488E+02	.136E-03	.932E+03	.763E+10	.307E+02
222.0	-.188E-02	-.283E+05	.126E+03	.114E-03	.932E+03	.763E+10	.274E+02
228.0	-.127E-02	-.271E+05	.280E+03	.922E-04	.927E+03	.763E+10	.240E+02
234.0	-.778E-03	-.251E+05	.413E+03	.717E-04	.920E+03	.763E+10	.204E+02
240.0	-.407E-03	-.222E+05	.524E+03	.531E-04	.911E+03	.763E+10	.165E+02
246.0	-.141E-03	-.188E+05	.608E+03	.369E-04	.899E+03	.763E+10	.116E+02
252.0	.363E-04	-.150E+05	.621E+03	.236E-04	.885E+03	.763E+10	-.737E+01
258.0	.143E-03	-.114E+05	.564E+03	.133E-04	.873E+03	.763E+10	-.116E+02

264.0	.195E-03	-.825E+04	.491E+03	.552E-05	.862E+03	.763E+10	-.129E+02
270.0	.209E-03	-.554E+04	.412E+03	.101E-06	.853E+03	.763E+10	-.132E+02
276.0	.197E-03	-.330E+04	.334E+03	-.338E-05	.845E+03	.763E+10	-.129E+02
282.0	.169E-03	-.153E+04	.259E+03	-.527E-05	.839E+03	.763E+10	-.123E+02
288.0	.133E-03	-.191E+03	.188E+03	-.595E-05	.834E+03	.763E+10	-.114E+02
294.0	.972E-04	.735E+03	.123E+03	-.573E-05	.836E+03	.763E+10	-.102E+02
300.0	.646E-04	.129E+04	.656E+02	-.494E-05	.838E+03	.763E+10	-.891E+01
306.0	.380E-04	.153E+04	.165E+02	-.383E-05	.839E+03	.763E+10	-.747E+01
312.0	.187E-04	.150E+04	-.236E+02	-.264E-05	.839E+03	.763E+10	-.589E+01
318.0	.637E-05	.125E+04	-.536E+02	-.155E-05	.838E+03	.763E+10	-.412E+01
324.0	-.261E-08	.856E+03	-.650E+02	-.726E-06	.836E+03	.763E+10	.298E+00
330.0	-.234E-05	.473E+03	-.552E+02	-.203E-06	.835E+03	.763E+10	.295E+01
336.0	-.244E-05	.195E+03	-.373E+02	.592E-07	.834E+03	.763E+10	.299E+01
342.0	-.163E-05	.243E+02	-.205E+02	.145E-06	.833E+03	.763E+10	.261E+01
348.0	-.697E-06	-.521E+02	-.681E+01	.134E-06	.834E+03	.763E+10	.197E+01
354.0	-.131E-07	-.576E+02	.699E+00	.913E-07	.834E+03	.763E+10	.519E+00
360.0	.399E-06	-.438E+02	.220E+01	.515E-07	.833E+03	.763E+10	-.321E-01
366.0	.605E-06	-.312E+02	.195E+01	.220E-07	.833E+03	.763E+10	-.516E-01
372.0	.663E-06	-.204E+02	.162E+01	.171E-08	.833E+03	.763E+10	-.597E-01
378.0	.625E-06	-.118E+02	.126E+01	-.109E-07	.833E+03	.763E+10	-.593E-01
384.0	.532E-06	-.523E+01	.927E+00	-.176E-07	.833E+03	.763E+10	-.530E-01
390.0	.414E-06	-.605E+00	.639E+00	-.199E-07	.833E+03	.763E+10	-.432E-01
396.0	.293E-06	.247E+01	.413E+00	-.192E-07	.833E+03	.763E+10	-.320E-01
402.0	.184E-06	.438E+01	.255E+00	-.165E-07	.833E+03	.763E+10	-.209E-01
408.0	.951E-07	.555E+01	.158E+00	-.126E-07	.833E+03	.763E+10	-.113E-01
414.0	.327E-07	.630E+01	.112E+00	-.792E-08	.833E+03	.763E+10	-.405E-02
420.0	.449E-10	.690E+01	-.523E+00	-.273E-08	.833E+03	.763E+10	-.195E+00
426.0	-.516E-10	.314E-01	-.576E+00	-.374E-11	.833E+03	.763E+10	.178E+00
432.0	-.140E-14	-.109E-01	-.262E-02	.430E-11	.833E+03	.763E+10	.139E-02
438.0	.288E-15	-.420E-06	.912E-03	.117E-15	.833E+03	.763E+10	-.286E-03
444.0	.143E-19	.611E-07	.350E-07	-.240E-16	.833E+03	.763E+10	-.142E-07
450.0	-.161E-20	.371E-11	-.509E-08	-.119E-20	.833E+03	.763E+10	.160E-08
456.0	-.116E-24	-.341E-12	-.309E-12	.134E-21	.833E+03	.763E+10	.115E-12
462.0	.900E-26	-.284E-16	.284E-13	.965E-26	.833E+03	.763E+10	-.892E-14
468.0	.848E-30	.191E-17	.236E-17	-.750E-27	.833E+03	.763E+10	-.840E-18
474.0	-.503E-31	.621E-22	-.159E-18	-.125E-30	.833E+03	.763E+10	.498E-19
480.0	-.656E-30	.502E-22	-.193E-23	-.812E-31	.833E+03	.763E+10	.189E-25
486.0	-.103E-29	.390E-22	-.177E-23	-.462E-31	.833E+03	.763E+10	.303E-25
492.0	-.121E-29	.289E-22	-.156E-23	-.195E-31	.833E+03	.763E+10	.366E-25
498.0	-.126E-29	.203E-22	-.132E-23	-.958E-34	.833E+03	.763E+10	.390E-25
504.0	-.121E-29	.131E-22	-.107E-23	.130E-31	.833E+03	.763E+10	.384E-25
510.0	-.110E-29	.739E-23	-.837E-24	.211E-31	.833E+03	.763E+10	.357E-25
516.0	-.958E-30	.303E-23	-.622E-24	.252E-31	.833E+03	.763E+10	.317E-25
522.0	-.800E-30	-.116E-24	-.435E-24	.263E-31	.833E+03	.763E+10	.270E-25
528.0	-.642E-30	-.223E-23	-.278E-24	.254E-31	.833E+03	.763E+10	.221E-25
534.0	-.495E-30	-.349E-23	-.152E-24	.232E-31	.833E+03	.763E+10	.174E-25
540.0	-.364E-30	-.408E-23	-.546E-25	.202E-31	.833E+03	.763E+10	.131E-25
546.0	-.253E-30	-.417E-23	.165E-25	.169E-31	.833E+03	.763E+10	.925E-26
552.0	-.161E-30	-.391E-23	.652E-25	.138E-31	.833E+03	.763E+10	.600E-26
558.0	-.874E-31	-.341E-23	.949E-25	.109E-31	.833E+03	.763E+10	.332E-26
564.0	-.302E-31	-.279E-23	.109E-24	.845E-32	.833E+03	.763E+10	.117E-26
570.0	.140E-31	-.211E-23	.111E-24	.652E-32	.833E+03	.763E+10	-.550E-27
576.0	.481E-31	-.146E-23	.103E-24	.512E-32	.833E+03	.763E+10	-.193E-26
582.0	.753E-31	-.881E-24	.873E-25	.419E-32	.833E+03	.763E+10	-.308E-26
588.0	.984E-31	-.419E-24	.645E-25	.368E-32	.833E+03	.763E+10	-.409E-26
594.0	.120E-30	-.113E-24	.353E-25	.347E-32	.833E+03	.763E+10	-.505E-26
600.0	.140E-30	.000E+00	.000E+00	.343E-32	.833E+03	.763E+10	-.602E-26

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .543E-07 IN-LBS

THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .599E-08 LBS

OUTPUT SUMMARY

```
PILE-HEAD DEFLECTION           =   .347E+00 IN
COMPUTED SLOPE AT PILE HEAD    =  -.556E-02
MAXIMUM BENDING MOMENT         =   .470E+06 LBS-IN
MAXIMUM SHEAR FORCE            =   .170E+05 LBS
NO. OF ITERATIONS              =        31
NO. OF ZERO DEFLECTION POINTS  =        10
```

LOADING NUMBER 6

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BOUNDARY CONDITION CODE              =          1
LATERAL LOAD AT THE PILE HEAD        =   .180E+05 LBS
MOMENT AT THE PILE HEAD              =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD          =   .120E+06 LBS
```

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.400E+00	-.106E-06	.180E+05	-.622E-02	.833E+03	.763E+10	-.294E+03
6.0	.362E+00	.107E+06	.162E+05	-.617E-02	.121E+04	.763E+10	-.313E+03
12.0	.326E+00	.203E+06	.142E+05	-.605E-02	.154E+04	.763E+10	-.331E+03
18.0	.290E+00	.287E+06	.122E+05	-.586E-02	.183E+04	.763E+10	-.347E+03
24.0	.255E+00	.358E+06	.101E+05	-.560E-02	.208E+04	.763E+10	-.360E+03
30.0	.223E+00	.416E+06	.790E+04	-.530E-02	.228E+04	.763E+10	-.372E+03
36.0	.192E+00	.460E+06	.564E+04	-.496E-02	.243E+04	.763E+10	-.381E+03
42.0	.163E+00	.491E+06	.334E+04	-.458E-02	.254E+04	.763E+10	-.387E+03
48.0	.137E+00	.507E+06	.100E+04	-.419E-02	.259E+04	.763E+10	-.392E+03
54.0	.113E+00	.509E+06	-.135E+04	-.379E-02	.260E+04	.763E+10	-.393E+03
60.0	.913E-01	.496E+06	-.287E+04	-.339E-02	.256E+04	.763E+10	-.114E+03
66.0	.721E-01	.479E+06	-.349E+04	-.301E-02	.250E+04	.763E+10	-.924E+02
72.0	.551E-01	.459E+06	-.402E+04	-.264E-02	.243E+04	.763E+10	-.845E+02
78.0	.404E-01	.435E+06	-.450E+04	-.229E-02	.234E+04	.763E+10	-.762E+02
84.0	.276E-01	.408E+06	-.493E+04	-.196E-02	.225E+04	.763E+10	-.672E+02
90.0	.169E-01	.379E+06	-.531E+04	-.165E-02	.215E+04	.763E+10	-.570E+02
96.0	.785E-02	.347E+06	-.561E+04	-.136E-02	.204E+04	.763E+10	-.442E+02
102.0	.487E-03	.313E+06	-.580E+04	-.110E-02	.192E+04	.763E+10	-.174E+02
108.0	-.540E-02	.279E+06	-.573E+04	-.872E-03	.180E+04	.763E+10	.390E+02
114.0	-.997E-02	.246E+06	-.547E+04	-.665E-03	.169E+04	.763E+10	.478E+02
120.0	-.134E-01	.214E+06	-.517E+04	-.485E-03	.158E+04	.763E+10	.528E+02
126.0	-.158E-01	.184E+06	-.484E+04	-.328E-03	.147E+04	.763E+10	.557E+02
132.0	-.173E-01	.157E+06	-.450E+04	-.194E-03	.138E+04	.763E+10	.575E+02
138.0	-.181E-01	.131E+06	-.416E+04	-.809E-04	.129E+04	.763E+10	.583E+02
144.0	-.183E-01	.107E+06	-.381E+04	.125E-04	.120E+04	.763E+10	.585E+02
150.0	-.180E-01	.849E+05	-.346E+04	.878E-04	.113E+04	.763E+10	.582E+02
156.0	-.172E-01	.652E+05	-.311E+04	.147E-03	.106E+04	.763E+10	.574E+02
162.0	-.162E-01	.474E+05	-.277E+04	.191E-03	.998E+03	.763E+10	.562E+02
168.0	-.149E-01	.317E+05	-.244E+04	.222E-03	.943E+03	.763E+10	.547E+02
174.0	-.135E-01	.179E+05	-.211E+04	.242E-03	.895E+03	.763E+10	.529E+02
180.0	-.120E-01	.596E+04	-.180E+04	.251E-03	.854E+03	.763E+10	.509E+02
186.0	-.105E-01	-.411E+04	-.150E+04	.252E-03	.848E+03	.763E+10	.487E+02
192.0	-.902E-02	-.124E+05	-.122E+04	.245E-03	.876E+03	.763E+10	.462E+02
198.0	-.758E-02	-.191E+05	-.948E+03	.233E-03	.900E+03	.763E+10	.436E+02

204.0	-.623E-02	-.241E+05	-.694E+03	.216E-03	.917E+03	.763E+10	.409E+02
210.0	-.499E-02	-.277E+05	-.458E+03	.196E-03	.930E+03	.763E+10	.380E+02
216.0	-.388E-02	-.299E+05	-.239E+03	.173E-03	.937E+03	.763E+10	.349E+02
222.0	-.291E-02	-.308E+05	-.390E+02	.149E-03	.940E+03	.763E+10	.317E+02
228.0	-.209E-02	-.306E+05	.141E+03	.125E-03	.940E+03	.763E+10	.284E+02
234.0	-.142E-02	-.293E+05	.302E+03	.101E-03	.935E+03	.763E+10	.249E+02
240.0	-.877E-03	-.271E+05	.440E+03	.791E-04	.927E+03	.763E+10	.213E+02
246.0	-.466E-03	-.241E+05	.556E+03	.590E-04	.917E+03	.763E+10	.172E+02
252.0	-.169E-03	-.205E+05	.644E+03	.414E-04	.905E+03	.763E+10	.123E+02
258.0	.308E-04	-.165E+05	.660E+03	.269E-04	.891E+03	.763E+10	-.697E+01
264.0	.153E-03	-.126E+05	.604E+03	.154E-04	.877E+03	.763E+10	-.119E+02
270.0	.216E-03	-.924E+04	.528E+03	.681E-05	.865E+03	.763E+10	-.133E+02
276.0	.235E-03	-.631E+04	.447E+03	.694E-06	.855E+03	.763E+10	-.137E+02
282.0	.224E-03	-.388E+04	.366E+03	-.331E-05	.847E+03	.763E+10	-.135E+02
288.0	.195E-03	-.192E+04	.286E+03	-.559E-05	.840E+03	.763E+10	-.129E+02
294.0	.157E-03	-.431E+03	.212E+03	-.652E-05	.835E+03	.763E+10	-.120E+02
300.0	.117E-03	.629E+03	.143E+03	-.644E-05	.836E+03	.763E+10	-.109E+02
306.0	.797E-04	.130E+04	.821E+02	-.568E-05	.838E+03	.763E+10	-.956E+01
312.0	.486E-04	.162E+04	.291E+02	-.454E-05	.839E+03	.763E+10	-.811E+01
318.0	.252E-04	.165E+04	-.148E+02	-.325E-05	.839E+03	.763E+10	-.652E+01
324.0	.965E-05	.145E+04	-.485E+02	-.203E-05	.838E+03	.763E+10	-.473E+01
330.0	.899E-06	.107E+04	-.690E+02	-.104E-05	.837E+03	.763E+10	-.216E+01
336.0	-.278E-05	.623E+03	-.659E+02	-.368E-06	.835E+03	.763E+10	.312E+01
342.0	-.352E-05	.284E+03	-.464E+02	-.118E-07	.834E+03	.763E+10	.337E+01
348.0	-.292E-05	.664E+02	-.266E+02	.126E-06	.834E+03	.763E+10	.317E+01
354.0	-.201E-05	-.362E+02	-.862E+01	.138E-06	.833E+03	.763E+10	.280E+01
360.0	-.127E-05	-.373E+02	.139E+00	.109E-06	.833E+03	.763E+10	.101E+00
366.0	-.703E-06	-.347E+02	.624E+00	.806E-07	.833E+03	.763E+10	.590E-01
372.0	-.301E-06	-.299E+02	.885E+00	.552E-07	.833E+03	.763E+10	.264E-01
378.0	-.408E-07	-.241E+02	.978E+00	.340E-07	.833E+03	.763E+10	.335E-02
384.0	.106E-06	-.182E+02	.958E+00	.173E-07	.833E+03	.763E+10	-.109E-01
390.0	.167E-06	-.126E+02	.874E+00	.521E-08	.833E+03	.763E+10	-.177E-01
396.0	.169E-06	-.771E+01	.766E+00	-.279E-08	.833E+03	.763E+10	-.185E-01
402.0	.134E-06	-.344E+01	.665E+00	-.718E-08	.833E+03	.763E+10	-.153E-01
408.0	.826E-07	.282E+00	.590E+00	-.842E-08	.833E+03	.763E+10	-.982E-02
414.0	.327E-07	.365E+01	.549E+00	-.687E-08	.833E+03	.763E+10	-.405E-02
420.0	.118E-09	.688E+01	-.301E+00	-.273E-08	.833E+03	.763E+10	-.272E+00
426.0	-.579E-10	.495E-01	-.574E+00	-.980E-11	.833E+03	.763E+10	.190E+00
432.0	-.195E-14	-.123E-01	-.412E-02	.483E-11	.833E+03	.763E+10	.205E-02
438.0	.323E-15	-.551E-06	.102E-02	.163E-15	.833E+03	.763E+10	-.344E-03
444.0	.181E-19	.685E-07	.459E-07	-.270E-16	.833E+03	.763E+10	-.192E-07
450.0	-.181E-20	.461E-11	-.571E-08	-.151E-20	.833E+03	.763E+10	.192E-08
456.0	-.142E-24	-.383E-12	-.384E-12	.151E-21	.833E+03	.763E+10	.150E-12
462.0	.101E-25	-.343E-16	.319E-13	.118E-25	.833E+03	.763E+10	-.107E-13
468.0	.102E-29	.214E-17	.286E-17	-.841E-27	.833E+03	.763E+10	-.108E-17
474.0	-.564E-31	.741E-22	-.178E-18	-.150E-30	.833E+03	.763E+10	.600E-19
480.0	-.780E-30	.599E-22	-.230E-23	-.971E-31	.833E+03	.763E+10	.241E-25
486.0	-.122E-29	.466E-22	-.212E-23	-.552E-31	.833E+03	.763E+10	.386E-25
492.0	-.144E-29	.346E-22	-.186E-23	-.233E-31	.833E+03	.763E+10	.467E-25
498.0	-.150E-29	.242E-22	-.158E-23	-.190E-33	.833E+03	.763E+10	.498E-25
504.0	-.145E-29	.157E-22	-.128E-23	.155E-31	.833E+03	.763E+10	.490E-25
510.0	-.132E-29	.884E-23	-.100E-23	.251E-31	.833E+03	.763E+10	.456E-25
516.0	-.114E-29	.363E-23	-.743E-24	.300E-31	.833E+03	.763E+10	.405E-25
522.0	-.955E-30	-.126E-24	-.520E-24	.314E-31	.833E+03	.763E+10	.345E-25
528.0	-.767E-30	-.265E-23	-.332E-24	.303E-31	.833E+03	.763E+10	.283E-25
534.0	-.591E-30	-.416E-23	-.182E-24	.276E-31	.833E+03	.763E+10	.223E-25
540.0	-.435E-30	-.487E-23	-.655E-25	.241E-31	.833E+03	.763E+10	.167E-25
546.0	-.302E-30	-.498E-23	.195E-25	.202E-31	.833E+03	.763E+10	.118E-25
552.0	-.192E-30	-.466E-23	.776E-25	.164E-31	.833E+03	.763E+10	.767E-26
558.0	-.105E-30	-.407E-23	.113E-24	.130E-31	.833E+03	.763E+10	.425E-26
564.0	-.362E-31	-.332E-23	.130E-24	.101E-31	.833E+03	.763E+10	.150E-26
570.0	.165E-31	-.252E-23	.133E-24	.779E-32	.833E+03	.763E+10	-.697E-27
576.0	.573E-31	-.174E-23	.123E-24	.611E-32	.833E+03	.763E+10	-.246E-26

582.0	.899E-31	-.105E-23	.104E-24	.501E-32	.833E+03	.763E+10	-.393E-26
588.0	.117E-30	-.500E-24	.770E-25	.440E-32	.833E+03	.763E+10	-.522E-26
594.0	.143E-30	-.135E-24	.422E-25	.415E-32	.833E+03	.763E+10	-.645E-26
600.0	.167E-30	.000E+00	.000E+00	.410E-32	.833E+03	.763E+10	-.769E-26

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .495E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .525E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .400E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.622E-02
MAXIMUM BENDING MOMENT = .509E+06 LBS-IN
MAXIMUM SHEAR FORCE = .180E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 7

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .190E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.458E+00	.941E-07	.190E+05	-.690E-02	.833E+03	.763E+10	-.304E+03
6.0	.416E+00	.114E+06	.171E+05	-.686E-02	.123E+04	.763E+10	-.324E+03
12.0	.375E+00	.215E+06	.151E+05	-.673E-02	.158E+04	.763E+10	-.343E+03
18.0	.335E+00	.305E+06	.130E+05	-.652E-02	.189E+04	.763E+10	-.359E+03
24.0	.297E+00	.381E+06	.108E+05	-.625E-02	.216E+04	.763E+10	-.374E+03
30.0	.260E+00	.443E+06	.853E+04	-.593E-02	.237E+04	.763E+10	-.386E+03
36.0	.226E+00	.492E+06	.618E+04	-.556E-02	.254E+04	.763E+10	-.397E+03
42.0	.194E+00	.525E+06	.377E+04	-.516E-02	.266E+04	.763E+10	-.404E+03
48.0	.164E+00	.544E+06	.133E+04	-.474E-02	.272E+04	.763E+10	-.410E+03
54.0	.137E+00	.548E+06	-.113E+04	-.431E-02	.274E+04	.763E+10	-.412E+03
60.0	.112E+00	.537E+06	-.274E+04	-.388E-02	.270E+04	.763E+10	-.122E+03
66.0	.902E-01	.521E+06	-.340E+04	-.347E-02	.264E+04	.763E+10	-.996E+02
72.0	.706E-01	.501E+06	-.398E+04	-.307E-02	.257E+04	.763E+10	-.918E+02
78.0	.534E-01	.478E+06	-.450E+04	-.268E-02	.249E+04	.763E+10	-.837E+02
84.0	.385E-01	.451E+06	-.498E+04	-.232E-02	.240E+04	.763E+10	-.750E+02
90.0	.256E-01	.421E+06	-.540E+04	-.197E-02	.230E+04	.763E+10	-.655E+02
96.0	.148E-01	.389E+06	-.576E+04	-.165E-02	.218E+04	.763E+10	-.545E+02
102.0	.577E-02	.354E+06	-.605E+04	-.136E-02	.206E+04	.763E+10	-.398E+02
108.0	-.157E-02	.318E+06	-.609E+04	-.110E-02	.194E+04	.763E+10	.259E+02
114.0	-.741E-02	.283E+06	-.588E+04	-.861E-03	.182E+04	.763E+10	.433E+02
120.0	-.119E-01	.249E+06	-.560E+04	-.652E-03	.170E+04	.763E+10	.507E+02
126.0	-.152E-01	.217E+06	-.528E+04	-.469E-03	.159E+04	.763E+10	.551E+02
132.0	-.175E-01	.186E+06	-.494E+04	-.311E-03	.148E+04	.763E+10	.577E+02
138.0	-.190E-01	.158E+06	-.459E+04	-.175E-03	.138E+04	.763E+10	.592E+02

144.0	-.196E-01	.131E+06	-.423E+04	-.615E-04	.129E+04	.763E+10	.599E+02
150.0	-.197E-01	.107E+06	-.387E+04	.323E-04	.121E+04	.763E+10	.600E+02
156.0	-.193E-01	.849E+05	-.352E+04	.108E-03	.113E+04	.763E+10	.595E+02
162.0	-.184E-01	.648E+05	-.316E+04	.167E-03	.106E+04	.763E+10	.587E+02
168.0	-.173E-01	.468E+05	-.281E+04	.211E-03	.996E+03	.763E+10	.574E+02
174.0	-.159E-01	.308E+05	-.247E+04	.241E-03	.940E+03	.763E+10	.558E+02
180.0	-.144E-01	.167E+05	-.214E+04	.260E-03	.891E+03	.763E+10	.540E+02
186.0	-.128E-01	.467E+04	-.183E+04	.268E-03	.850E+03	.763E+10	.519E+02
192.0	-.111E-01	-.555E+04	-.152E+04	.268E-03	.853E+03	.763E+10	.496E+02
198.0	-.955E-02	-.140E+05	-.123E+04	.260E-03	.882E+03	.763E+10	.471E+02
204.0	-.802E-02	-.207E+05	-.956E+03	.247E-03	.905E+03	.763E+10	.445E+02
210.0	-.659E-02	-.258E+05	-.697E+03	.228E-03	.923E+03	.763E+10	.417E+02
216.0	-.528E-02	-.294E+05	-.456E+03	.207E-03	.935E+03	.763E+10	.387E+02
222.0	-.411E-02	-.316E+05	-.233E+03	.183E-03	.943E+03	.763E+10	.356E+02
228.0	-.309E-02	-.324E+05	-.294E+02	.157E-03	.946E+03	.763E+10	.324E+02
234.0	-.223E-02	-.321E+05	.155E+03	.132E-03	.945E+03	.763E+10	.290E+02
240.0	-.151E-02	-.308E+05	.318E+03	.107E-03	.940E+03	.763E+10	.255E+02
246.0	-.939E-03	-.285E+05	.460E+03	.840E-04	.932E+03	.763E+10	.218E+02
252.0	-.502E-03	-.254E+05	.578E+03	.628E-04	.921E+03	.763E+10	.177E+02
258.0	-.185E-03	-.216E+05	.669E+03	.443E-04	.908E+03	.763E+10	.127E+02
264.0	.294E-04	-.174E+05	.687E+03	.289E-04	.894E+03	.763E+10	-.687E+01
270.0	.162E-03	-.134E+05	.630E+03	.168E-04	.880E+03	.763E+10	-.121E+02
276.0	.231E-03	-.988E+04	.553E+03	.764E-05	.868E+03	.763E+10	-.136E+02
282.0	.254E-03	-.682E+04	.469E+03	.107E-05	.857E+03	.763E+10	-.141E+02
288.0	.244E-03	-.425E+04	.386E+03	-.328E-05	.848E+03	.763E+10	-.139E+02
294.0	.214E-03	-.218E+04	.304E+03	-.581E-05	.841E+03	.763E+10	-.133E+02
300.0	.174E-03	-.594E+03	.227E+03	-.690E-05	.835E+03	.763E+10	-.124E+02
306.0	.132E-03	.549E+03	.156E+03	-.692E-05	.835E+03	.763E+10	-.113E+02
312.0	.913E-04	.129E+04	.920E+02	-.620E-05	.838E+03	.763E+10	-.100E+02
318.0	.571E-04	.166E+04	.363E+02	-.504E-05	.839E+03	.763E+10	-.856E+01
324.0	.308E-04	.173E+04	-.102E+02	-.370E-05	.839E+03	.763E+10	-.697E+01
330.0	.127E-04	.154E+04	-.467E+02	-.242E-05	.839E+03	.763E+10	-.519E+01
336.0	.184E-05	.117E+04	-.703E+02	-.135E-05	.837E+03	.763E+10	-.273E+01
342.0	-.349E-05	.703E+03	-.683E+02	-.611E-06	.836E+03	.763E+10	.336E+01
348.0	-.549E-05	.354E+03	-.464E+02	-.195E-06	.835E+03	.763E+10	.392E+01
354.0	-.583E-05	.147E+03	-.226E+02	.211E-08	.834E+03	.763E+10	.400E+01
360.0	-.547E-05	.833E+02	-.927E+01	.927E-07	.834E+03	.763E+10	.439E+00
366.0	-.472E-05	.355E+02	-.675E+01	.139E-06	.833E+03	.763E+10	.401E+00
372.0	-.380E-05	.212E+01	-.452E+01	.154E-06	.833E+03	.763E+10	.341E+00
378.0	-.287E-05	-.190E+02	-.269E+01	.148E-06	.833E+03	.763E+10	.271E+00
384.0	-.203E-05	-.303E+02	-.127E+01	.128E-06	.833E+03	.763E+10	.202E+00
390.0	-.133E-05	-.344E+02	-.246E+00	.103E-06	.833E+03	.763E+10	.139E+00
396.0	-.793E-06	-.334E+02	.429E+00	.761E-07	.833E+03	.763E+10	.866E-01
402.0	-.415E-06	-.293E+02	.830E+00	.514E-07	.833E+03	.763E+10	.474E-01
408.0	-.176E-06	-.235E+02	.104E+01	.306E-07	.833E+03	.763E+10	.209E-01
414.0	-.481E-07	-.170E+02	.112E+01	.147E-07	.833E+03	.763E+10	.596E-02
420.0	-.471E-11	-.102E+02	.141E+01	.403E-08	.833E+03	.763E+10	.952E-01
426.0	.176E-09	-.757E-01	.850E+00	.392E-12	.833E+03	.763E+10	-.273E+00
432.0	.397E-14	.374E-01	.631E-02	-.147E-10	.833E+03	.763E+10	-.412E-02
438.0	-.985E-15	.126E-05	-.311E-02	-.331E-15	.833E+03	.763E+10	.102E-02
444.0	-.442E-19	-.209E-06	-.105E-06	.821E-16	.833E+03	.763E+10	.459E-07
450.0	.550E-20	-.117E-10	.174E-07	.368E-20	.833E+03	.763E+10	-.571E-08
456.0	.370E-24	.117E-11	.975E-12	-.459E-21	.833E+03	.763E+10	-.384E-12
462.0	-.307E-25	.914E-16	-.972E-13	-.308E-25	.833E+03	.763E+10	.319E-13
468.0	-.275E-29	-.651E-17	-.762E-17	.256E-26	.833E+03	.763E+10	.286E-17
474.0	.172E-30	-.202E-21	.543E-18	.408E-30	.833E+03	.763E+10	-.178E-18
480.0	.214E-29	-.163E-21	.629E-23	.264E-30	.833E+03	.763E+10	-.648E-25
486.0	.334E-29	-.127E-21	.578E-23	.150E-30	.833E+03	.763E+10	-.104E-24
492.0	.394E-29	-.942E-22	.509E-23	.632E-31	.833E+03	.763E+10	-.125E-24
498.0	.410E-29	-.660E-22	.430E-23	.143E-33	.833E+03	.763E+10	-.133E-24
504.0	.395E-29	-.426E-22	.350E-23	-.426E-31	.833E+03	.763E+10	-.131E-24
510.0	.359E-29	-.240E-22	.273E-23	-.688E-31	.833E+03	.763E+10	-.122E-24
516.0	.312E-29	-.984E-23	.203E-23	-.821E-31	.833E+03	.763E+10	-.108E-24

522.0	.260E-29	.404E-24	.142E-23	-.858E-31	.833E+03	.763E+10	-.922E-25
528.0	.209E-29	.728E-23	.905E-24	-.828E-31	.833E+03	.763E+10	-.756E-25
534.0	.161E-29	.114E-22	.494E-24	-.755E-31	.833E+03	.763E+10	-.594E-25
540.0	.119E-29	.133E-22	.177E-24	-.658E-31	.833E+03	.763E+10	-.446E-25
546.0	.822E-30	.136E-22	-.545E-25	-.552E-31	.833E+03	.763E+10	-.315E-25
552.0	.523E-30	.127E-22	-.213E-24	-.448E-31	.833E+03	.763E+10	-.205E-25
558.0	.284E-30	.111E-22	-.309E-24	-.354E-31	.833E+03	.763E+10	-.113E-25
564.0	.978E-31	.908E-23	-.356E-24	-.275E-31	.833E+03	.763E+10	-.397E-26
570.0	-.458E-31	.688E-23	-.362E-24	-.212E-31	.833E+03	.763E+10	.189E-26
576.0	-.157E-30	.476E-23	-.337E-24	-.166E-31	.833E+03	.763E+10	.660E-26
582.0	-.246E-30	.287E-23	-.284E-24	-.136E-31	.833E+03	.763E+10	.105E-25
588.0	-.321E-30	.136E-23	-.210E-24	-.120E-31	.833E+03	.763E+10	.140E-25
594.0	-.389E-30	.367E-24	-.115E-24	-.113E-31	.833E+03	.763E+10	.172E-25
600.0	-.456E-30	.000E+00	.000E+00	-.112E-31	.833E+03	.763E+10	.205E-25

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.178E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.572E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .458E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.690E-02
MAXIMUM BENDING MOMENT = .548E+06 LBS-IN
MAXIMUM SHEAR FORCE = .190E+05 LBS
NO. OF ITERATIONS = 32
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 8

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .200E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.519E+00	-.706E-07	.200E+05	-.763E-02	.833E+03	.763E+10	-.314E+03
6.0	.474E+00	.120E+06	.181E+05	-.758E-02	.125E+04	.763E+10	-.335E+03
12.0	.428E+00	.228E+06	.160E+05	-.745E-02	.162E+04	.763E+10	-.354E+03
18.0	.384E+00	.322E+06	.138E+05	-.723E-02	.195E+04	.763E+10	-.372E+03
24.0	.342E+00	.404E+06	.115E+05	-.694E-02	.224E+04	.763E+10	-.387E+03
30.0	.301E+00	.471E+06	.917E+04	-.660E-02	.247E+04	.763E+10	-.401E+03
36.0	.262E+00	.523E+06	.673E+04	-.621E-02	.265E+04	.763E+10	-.412E+03
42.0	.226E+00	.560E+06	.423E+04	-.578E-02	.278E+04	.763E+10	-.420E+03
48.0	.193E+00	.582E+06	.169E+04	-.533E-02	.286E+04	.763E+10	-.427E+03
54.0	.162E+00	.588E+06	-.880E+03	-.487E-02	.288E+04	.763E+10	-.431E+03
60.0	.135E+00	.579E+06	-.256E+04	-.441E-02	.284E+04	.763E+10	-.130E+03
66.0	.109E+00	.564E+06	-.327E+04	-.396E-02	.279E+04	.763E+10	-.106E+03
72.0	.870E-01	.545E+06	-.388E+04	-.353E-02	.273E+04	.763E+10	-.984E+02
78.0	.671E-01	.523E+06	-.445E+04	-.311E-02	.265E+04	.763E+10	-.903E+02

84.0	.497E-01	.496E+06	-.497E+04	-.271E-02	.256E+04	.763E+10	-.817E+02
90.0	.346E-01	.467E+06	-.543E+04	-.233E-02	.245E+04	.763E+10	-.724E+02
96.0	.217E-01	.435E+06	-.583E+04	-.197E-02	.234E+04	.763E+10	-.620E+02
102.0	.109E-01	.400E+06	-.616E+04	-.165E-02	.222E+04	.763E+10	-.492E+02
108.0	.196E-02	.363E+06	-.640E+04	-.135E-02	.209E+04	.763E+10	-.278E+02
114.0	-.527E-02	.325E+06	-.636E+04	-.108E-02	.196E+04	.763E+10	.387E+02
120.0	-.110E-01	.288E+06	-.610E+04	-.835E-03	.183E+04	.763E+10	.494E+02
126.0	-.153E-01	.253E+06	-.579E+04	-.623E-03	.171E+04	.763E+10	.551E+02
132.0	-.184E-01	.220E+06	-.544E+04	-.437E-03	.160E+04	.763E+10	.587E+02
138.0	-.205E-01	.188E+06	-.509E+04	-.276E-03	.149E+04	.763E+10	.608E+02
144.0	-.217E-01	.159E+06	-.472E+04	-.140E-03	.139E+04	.763E+10	.620E+02
150.0	-.222E-01	.132E+06	-.434E+04	-.254E-04	.129E+04	.763E+10	.625E+02
156.0	-.221E-01	.107E+06	-.397E+04	.684E-04	.120E+04	.763E+10	.623E+02
162.0	-.214E-01	.841E+05	-.360E+04	.144E-03	.113E+04	.763E+10	.617E+02
168.0	-.203E-01	.635E+05	-.323E+04	.202E-03	.105E+04	.763E+10	.606E+02
174.0	-.190E-01	.451E+05	-.287E+04	.244E-03	.990E+03	.763E+10	.593E+02
180.0	-.174E-01	.287E+05	-.252E+04	.273E-03	.933E+03	.763E+10	.576E+02
186.0	-.157E-01	.144E+05	-.218E+04	.290E-03	.883E+03	.763E+10	.556E+02
192.0	-.139E-01	.212E+04	-.185E+04	.297E-03	.841E+03	.763E+10	.534E+02
198.0	-.121E-01	-.826E+04	-.154E+04	.294E-03	.862E+03	.763E+10	.510E+02
204.0	-.104E-01	-.168E+05	-.124E+04	.285E-03	.892E+03	.763E+10	.485E+02
210.0	-.872E-02	-.236E+05	-.960E+03	.269E-03	.915E+03	.763E+10	.457E+02
216.0	-.716E-02	-.287E+05	-.694E+03	.248E-03	.933E+03	.763E+10	.428E+02
222.0	-.574E-02	-.323E+05	-.446E+03	.224E-03	.945E+03	.763E+10	.398E+02
228.0	-.447E-02	-.344E+05	-.217E+03	.198E-03	.953E+03	.763E+10	.366E+02
234.0	-.336E-02	-.351E+05	-.737E+01	.171E-03	.955E+03	.763E+10	.333E+02
240.0	-.242E-02	-.347E+05	.182E+03	.143E-03	.954E+03	.763E+10	.298E+02
246.0	-.165E-02	-.332E+05	.350E+03	.116E-03	.948E+03	.763E+10	.262E+02
252.0	-.103E-02	-.307E+05	.496E+03	.913E-04	.940E+03	.763E+10	.224E+02
258.0	-.550E-03	-.273E+05	.618E+03	.685E-04	.928E+03	.763E+10	.182E+02
264.0	-.203E-03	-.234E+05	.712E+03	.486E-04	.914E+03	.763E+10	.131E+02
270.0	.336E-04	-.189E+05	.729E+03	.320E-04	.899E+03	.763E+10	-.718E+01
276.0	.181E-03	-.146E+05	.670E+03	.188E-04	.884E+03	.763E+10	-.126E+02
282.0	.260E-03	-.109E+05	.590E+03	.880E-05	.871E+03	.763E+10	-.142E+02
288.0	.287E-03	-.758E+04	.504E+03	.155E-05	.860E+03	.763E+10	-.147E+02
294.0	.278E-03	-.482E+04	.416E+03	-.333E-05	.850E+03	.763E+10	-.145E+02
300.0	.247E-03	-.258E+04	.331E+03	-.623E-05	.842E+03	.763E+10	-.139E+02
306.0	.203E-03	-.836E+03	.250E+03	-.757E-05	.836E+03	.763E+10	-.131E+02
312.0	.156E-03	.434E+03	.175E+03	-.773E-05	.835E+03	.763E+10	-.120E+02
318.0	.111E-03	.127E+04	.107E+03	-.706E-05	.838E+03	.763E+10	-.107E+02
324.0	.711E-04	.173E+04	.475E+02	-.588E-05	.839E+03	.763E+10	-.921E+01
330.0	.399E-04	.185E+04	-.290E+01	-.447E-05	.840E+03	.763E+10	-.760E+01
336.0	.175E-04	.170E+04	-.429E+02	-.308E-05	.839E+03	.763E+10	-.577E+01
342.0	.302E-05	.134E+04	-.698E+02	-.188E-05	.838E+03	.763E+10	-.322E+01
348.0	-.510E-05	.865E+03	-.679E+02	-.101E-05	.836E+03	.763E+10	.382E+01
354.0	-.914E-05	.527E+03	-.425E+02	-.466E-06	.835E+03	.763E+10	.464E+01
360.0	-.107E-04	.356E+03	-.259E+02	-.118E-06	.835E+03	.763E+10	.857E+00
366.0	-.106E-04	.216E+03	-.207E+02	.107E-06	.834E+03	.763E+10	.898E+00
372.0	-.940E-05	.108E+03	-.155E+02	.234E-06	.834E+03	.763E+10	.845E+00
378.0	-.774E-05	.303E+02	-.107E+02	.289E-06	.833E+03	.763E+10	.733E+00
384.0	-.594E-05	-.211E+02	-.675E+01	.292E-06	.833E+03	.763E+10	.591E+00
390.0	-.423E-05	-.511E+02	-.365E+01	.264E-06	.834E+03	.763E+10	.442E+00
396.0	-.277E-05	-.652E+02	-.142E+01	.218E-06	.834E+03	.763E+10	.302E+00
402.0	-.162E-05	-.684E+02	.428E-01	.166E-06	.834E+03	.763E+10	.184E+00
408.0	-.784E-06	-.649E+02	.874E+00	.113E-06	.834E+03	.763E+10	.931E-01
414.0	-.258E-06	-.581E+02	.125E+01	.648E-07	.834E+03	.763E+10	.319E-01
420.0	-.599E-08	-.501E+02	.440E+01	.223E-07	.834E+03	.763E+10	.102E+01
426.0	.961E-08	-.532E+01	.434E+01	.509E-09	.833E+03	.763E+10	-.104E+01
432.0	.115E-09	.199E+01	.445E+00	-.801E-09	.833E+03	.763E+10	-.228E+00
438.0	-.115E-11	.248E-01	-.166E+00	-.956E-11	.833E+03	.763E+10	.500E-01
444.0	-.667E-15	-.243E-03	-.207E-02	.958E-13	.833E+03	.763E+10	.624E-03
450.0	.641E-17	-.144E-06	.203E-04	.556E-16	.833E+03	.763E+10	-.628E-05
456.0	.387E-20	.136E-08	.120E-07	-.534E-18	.833E+03	.763E+10	-.363E-08

462.0	-.357E-22	.835E-12	-.113E-09	-.322E-21	.833E+03	.763E+10	.350E-10
468.0	-.224E-25	-.756E-14	-.696E-13	.298E-23	.833E+03	.763E+10	.211E-13
474.0	.199E-27	-.155E-17	.630E-15	.316E-26	.833E+03	.763E+10	-.195E-15
480.0	.155E-25	-.125E-17	.478E-19	.206E-26	.833E+03	.763E+10	-.424E-21
486.0	.249E-25	-.977E-18	.440E-19	.118E-26	.833E+03	.763E+10	-.698E-21
492.0	.297E-25	-.727E-18	.388E-19	.511E-27	.833E+03	.763E+10	-.852E-21
498.0	.310E-25	-.511E-18	.329E-19	.245E-28	.833E+03	.763E+10	-.912E-21
504.0	.300E-25	-.332E-18	.268E-19	-.307E-27	.833E+03	.763E+10	-.900E-21
510.0	.273E-25	-.189E-18	.210E-19	-.512E-27	.833E+03	.763E+10	-.840E-21
516.0	.238E-25	-.798E-19	.156E-19	-.618E-27	.833E+03	.763E+10	-.748E-21
522.0	.199E-25	-.680E-21	.110E-19	-.649E-27	.833E+03	.763E+10	-.639E-21
528.0	.160E-25	.526E-19	.704E-20	-.629E-27	.833E+03	.763E+10	-.525E-21
534.0	.124E-25	.848E-19	.389E-20	-.575E-27	.833E+03	.763E+10	-.414E-21
540.0	.914E-26	.100E-18	.145E-20	-.502E-27	.833E+03	.763E+10	-.311E-21
546.0	.636E-26	.103E-18	-.339E-21	-.422E-27	.833E+03	.763E+10	-.221E-21
552.0	.407E-26	.967E-19	-.157E-20	-.344E-27	.833E+03	.763E+10	-.144E-21
558.0	.224E-26	.846E-19	-.232E-20	-.273E-27	.833E+03	.763E+10	-.807E-22
564.0	.802E-27	.692E-19	-.269E-20	-.212E-27	.833E+03	.763E+10	-.294E-22
570.0	-.308E-27	.526E-19	-.275E-20	-.164E-27	.833E+03	.763E+10	.115E-22
576.0	-.117E-26	.364E-19	-.257E-20	-.129E-27	.833E+03	.763E+10	.445E-22
582.0	-.186E-26	.220E-19	-.217E-20	-.106E-27	.833E+03	.763E+10	.720E-22
588.0	-.244E-26	.105E-19	-.161E-20	-.935E-28	.833E+03	.763E+10	.963E-22
594.0	-.298E-26	.282E-20	-.882E-21	-.883E-28	.833E+03	.763E+10	.119E-21
600.0	-.350E-26	.000E+00	.000E+00	-.872E-28	.833E+03	.763E+10	.143E-21

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .568E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .880E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .519E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.763E-02
MAXIMUM BENDING MOMENT = .588E+06 LBS-IN
MAXIMUM SHEAR FORCE = .200E+05 LBS
NO. OF ITERATIONS = 32
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 9

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .210E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.587E+00	-.188E-06	.210E+05	-.839E-02	.833E+03	.763E+10	-.323E+03
6.0	.537E+00	.126E+06	.190E+05	-.834E-02	.127E+04	.763E+10	-.346E+03
12.0	.487E+00	.240E+06	.169E+05	-.820E-02	.167E+04	.763E+10	-.366E+03
18.0	.439E+00	.340E+06	.146E+05	-.797E-02	.202E+04	.763E+10	-.384E+03

24.0	.392E+00	.427E+06	.123E+05	-.767E-02	.231E+04	.763E+10	-.401E+03
30.0	.347E+00	.498E+06	.981E+04	-.730E-02	.256E+04	.763E+10	-.415E+03
36.0	.304E+00	.555E+06	.728E+04	-.689E-02	.276E+04	.763E+10	-.427E+03
42.0	.264E+00	.596E+06	.469E+04	-.644E-02	.290E+04	.763E+10	-.437E+03
48.0	.227E+00	.620E+06	.204E+04	-.596E-02	.299E+04	.763E+10	-.444E+03
54.0	.192E+00	.629E+06	-.637E+03	-.547E-02	.302E+04	.763E+10	-.449E+03
60.0	.161E+00	.621E+06	-.240E+04	-.498E-02	.299E+04	.763E+10	-.138E+03
66.0	.133E+00	.607E+06	-.315E+04	-.449E-02	.294E+04	.763E+10	-.113E+03
72.0	.107E+00	.589E+06	-.381E+04	-.402E-02	.288E+04	.763E+10	-.106E+03
78.0	.844E-01	.567E+06	-.442E+04	-.357E-02	.280E+04	.763E+10	-.974E+02
84.0	.643E-01	.541E+06	-.498E+04	-.313E-02	.271E+04	.763E+10	-.890E+02
90.0	.468E-01	.512E+06	-.548E+04	-.272E-02	.261E+04	.763E+10	-.800E+02
96.0	.317E-01	.480E+06	-.593E+04	-.233E-02	.250E+04	.763E+10	-.703E+02
102.0	.188E-01	.444E+06	-.632E+04	-.197E-02	.238E+04	.763E+10	-.591E+02
108.0	.807E-02	.406E+06	-.663E+04	-.163E-02	.224E+04	.763E+10	-.446E+02
114.0	-.761E-03	.367E+06	-.671E+04	-.133E-02	.211E+04	.763E+10	.203E+02
120.0	-.786E-02	.328E+06	-.651E+04	-.105E-02	.197E+04	.763E+10	.442E+02
126.0	-.134E-01	.290E+06	-.622E+04	-.811E-03	.184E+04	.763E+10	.528E+02
132.0	-.176E-01	.254E+06	-.589E+04	-.597E-03	.172E+04	.763E+10	.578E+02
138.0	-.206E-01	.220E+06	-.554E+04	-.411E-03	.160E+04	.763E+10	.609E+02
144.0	-.225E-01	.189E+06	-.516E+04	-.250E-03	.149E+04	.763E+10	.627E+02
150.0	-.236E-01	.159E+06	-.478E+04	-.113E-03	.138E+04	.763E+10	.637E+02
156.0	-.239E-01	.131E+06	-.440E+04	.966E-06	.129E+04	.763E+10	.640E+02
162.0	-.236E-01	.106E+06	-.402E+04	.943E-04	.120E+04	.763E+10	.637E+02
168.0	-.228E-01	.830E+05	-.364E+04	.169E-03	.112E+04	.763E+10	.630E+02
174.0	-.215E-01	.621E+05	-.326E+04	.226E-03	.105E+04	.763E+10	.618E+02
180.0	-.200E-01	.435E+05	-.290E+04	.267E-03	.984E+03	.763E+10	.604E+02
186.0	-.183E-01	.270E+05	-.254E+04	.295E-03	.927E+03	.763E+10	.586E+02
192.0	-.165E-01	.125E+05	-.220E+04	.310E-03	.877E+03	.763E+10	.566E+02
198.0	-.146E-01	.162E+03	-.186E+04	.315E-03	.834E+03	.763E+10	.543E+02
204.0	-.127E-01	-.103E+05	-.154E+04	.311E-03	.869E+03	.763E+10	.519E+02
210.0	-.109E-01	-.188E+05	-.124E+04	.300E-03	.899E+03	.763E+10	.492E+02
216.0	-.912E-02	-.256E+05	-.954E+03	.283E-03	.922E+03	.763E+10	.464E+02
222.0	-.749E-02	-.307E+05	-.685E+03	.260E-03	.940E+03	.763E+10	.435E+02
228.0	-.600E-02	-.342E+05	-.433E+03	.235E-03	.952E+03	.763E+10	.404E+02
234.0	-.467E-02	-.362E+05	-.201E+03	.207E-03	.959E+03	.763E+10	.371E+02
240.0	-.351E-02	-.369E+05	.120E+02	.178E-03	.961E+03	.763E+10	.338E+02
246.0	-.253E-02	-.363E+05	.204E+03	.150E-03	.959E+03	.763E+10	.303E+02
252.0	-.172E-02	-.347E+05	.375E+03	.122E-03	.954E+03	.763E+10	.266E+02
258.0	-.107E-02	-.320E+05	.523E+03	.955E-04	.944E+03	.763E+10	.227E+02
264.0	-.569E-03	-.285E+05	.646E+03	.717E-04	.932E+03	.763E+10	.184E+02
270.0	-.206E-03	-.244E+05	.740E+03	.509E-04	.918E+03	.763E+10	.131E+02
276.0	.425E-04	-.197E+05	.757E+03	.336E-04	.902E+03	.763E+10	-.776E+01
282.0	.198E-03	-.153E+05	.695E+03	.198E-04	.887E+03	.763E+10	-.129E+02
288.0	.280E-03	-.114E+05	.612E+03	.931E-05	.873E+03	.763E+10	-.145E+02
294.0	.309E-03	-.800E+04	.523E+03	.168E-05	.861E+03	.763E+10	-.150E+02
300.0	.301E-03	-.513E+04	.434E+03	-.348E-05	.851E+03	.763E+10	-.149E+02
306.0	.268E-03	-.279E+04	.346E+03	-.659E-05	.843E+03	.763E+10	-.143E+02
312.0	.221E-03	-.966E+03	.263E+03	-.807E-05	.837E+03	.763E+10	-.134E+02
318.0	.171E-03	.376E+03	.186E+03	-.830E-05	.835E+03	.763E+10	-.123E+02
324.0	.122E-03	.127E+04	.116E+03	-.765E-05	.838E+03	.763E+10	-.110E+02
330.0	.789E-04	.177E+04	.539E+02	-.646E-05	.839E+03	.763E+10	-.953E+01
336.0	.444E-04	.193E+04	.174E+01	-.500E-05	.840E+03	.763E+10	-.787E+01
342.0	.189E-04	.180E+04	-.396E+02	-.353E-05	.840E+03	.763E+10	-.592E+01
348.0	.197E-05	.146E+04	-.657E+02	-.225E-05	.838E+03	.763E+10	-.279E+01
354.0	-.810E-05	.102E+04	-.607E+02	-.128E-05	.837E+03	.763E+10	.446E+01
360.0	-.134E-04	.732E+03	-.441E+02	-.592E-06	.836E+03	.763E+10	.107E+01
366.0	-.152E-04	.487E+03	-.370E+02	-.112E-06	.835E+03	.763E+10	.129E+01
372.0	-.147E-04	.289E+03	-.291E+02	.193E-06	.834E+03	.763E+10	.132E+01
378.0	-.129E-04	.137E+03	-.215E+02	.360E-06	.834E+03	.763E+10	.122E+01
384.0	-.104E-04	.300E+02	-.147E+02	.426E-06	.833E+03	.763E+10	.103E+01
390.0	-.777E-05	-.401E+02	-.921E+01	.422E-06	.833E+03	.763E+10	.811E+00
396.0	-.533E-05	-.811E+02	-.503E+01	.375E-06	.834E+03	.763E+10	.582E+00

402.0	-.328E-05	-.101E+03	-.217E+01	.303E-06	.834E+03	.763E+10	.373E+00
408.0	-.170E-05	-.107E+03	-.443E+00	.221E-06	.834E+03	.763E+10	.201E+00
414.0	-.624E-06	-.107E+03	.393E+00	.137E-06	.834E+03	.763E+10	.771E-01
420.0	-.548E-07	-.103E+03	.701E+01	.544E-07	.834E+03	.763E+10	.213E+01
426.0	.284E-07	-.226E+02	.892E+01	.496E-08	.833E+03	.763E+10	-.149E+01
432.0	.469E-08	.402E+01	.197E+01	-.236E-08	.833E+03	.763E+10	-.816E+00
438.0	-.217E-11	.996E+00	-.335E+00	-.391E-09	.833E+03	.763E+10	.670E-01
444.0	-.136E-12	-.401E-03	-.830E-01	.181E-12	.833E+03	.763E+10	.240E-01
450.0	.906E-17	-.289E-04	.335E-04	.113E-13	.833E+03	.763E+10	-.124E-04
456.0	.761E-18	.160E-08	.241E-05	-.755E-18	.833E+03	.763E+10	-.695E-06
462.0	-.336E-22	.161E-09	-.133E-09	-.634E-19	.833E+03	.763E+10	.535E-10
468.0	-.425E-23	-.532E-14	-.134E-10	.280E-23	.833E+03	.763E+10	.388E-11
474.0	.131E-27	-.291E-15	.424E-15	.595E-24	.833E+03	.763E+10	-.247E-15
480.0	.288E-23	-.236E-15	.897E-17	.388E-24	.833E+03	.763E+10	-.766E-19
486.0	.465E-23	-.184E-15	.827E-17	.223E-24	.833E+03	.763E+10	-.127E-18
492.0	.556E-23	-.137E-15	.729E-17	.970E-25	.833E+03	.763E+10	-.155E-18
498.0	.582E-23	-.962E-16	.618E-17	.538E-26	.833E+03	.763E+10	-.166E-18
504.0	.562E-23	-.625E-16	.504E-17	-.570E-25	.833E+03	.763E+10	-.164E-18
510.0	.513E-23	-.357E-16	.394E-17	-.957E-25	.833E+03	.763E+10	-.153E-18
516.0	.447E-23	-.151E-16	.294E-17	-.116E-24	.833E+03	.763E+10	-.136E-18
522.0	.374E-23	-.254E-18	.206E-17	-.122E-24	.833E+03	.763E+10	-.117E-18
528.0	.301E-23	.978E-17	.133E-17	-.118E-24	.833E+03	.763E+10	-.958E-19
534.0	.233E-23	.158E-16	.734E-18	-.108E-24	.833E+03	.763E+10	-.755E-19
540.0	.172E-23	.187E-16	.276E-18	-.943E-25	.833E+03	.763E+10	-.569E-19
546.0	.120E-23	.193E-16	-.611E-19	-.793E-25	.833E+03	.763E+10	-.404E-19
552.0	.767E-24	.181E-16	-.292E-18	-.646E-25	.833E+03	.763E+10	-.264E-19
558.0	.422E-24	.159E-16	-.435E-18	-.512E-25	.833E+03	.763E+10	-.148E-19
564.0	.152E-24	.130E-16	-.505E-18	-.399E-25	.833E+03	.763E+10	-.544E-20
570.0	-.563E-25	.987E-17	-.516E-18	-.309E-25	.833E+03	.763E+10	.205E-20
576.0	-.218E-24	.683E-17	-.481E-18	-.243E-25	.833E+03	.763E+10	.808E-20
582.0	-.348E-24	.413E-17	-.408E-18	-.200E-25	.833E+03	.763E+10	.131E-19
588.0	-.459E-24	.196E-17	-.302E-18	-.176E-25	.833E+03	.763E+10	.176E-19
594.0	-.560E-24	.529E-18	-.166E-18	-.166E-25	.833E+03	.763E+10	.218E-19
600.0	-.658E-24	.000E+00	.000E+00	-.164E-25	.833E+03	.763E+10	.261E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.322E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.605E-08 LBS

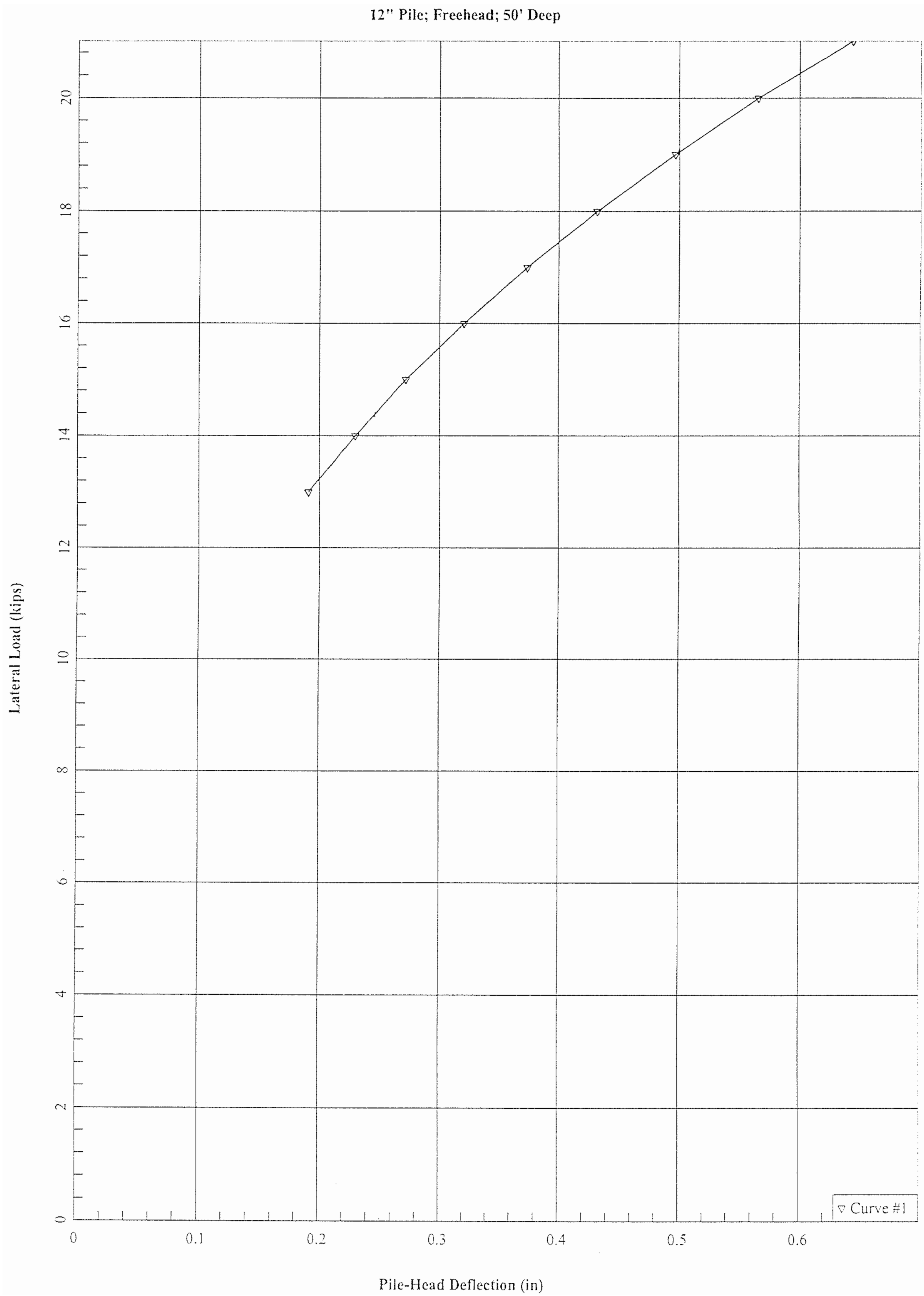
OUTPUT SUMMARY

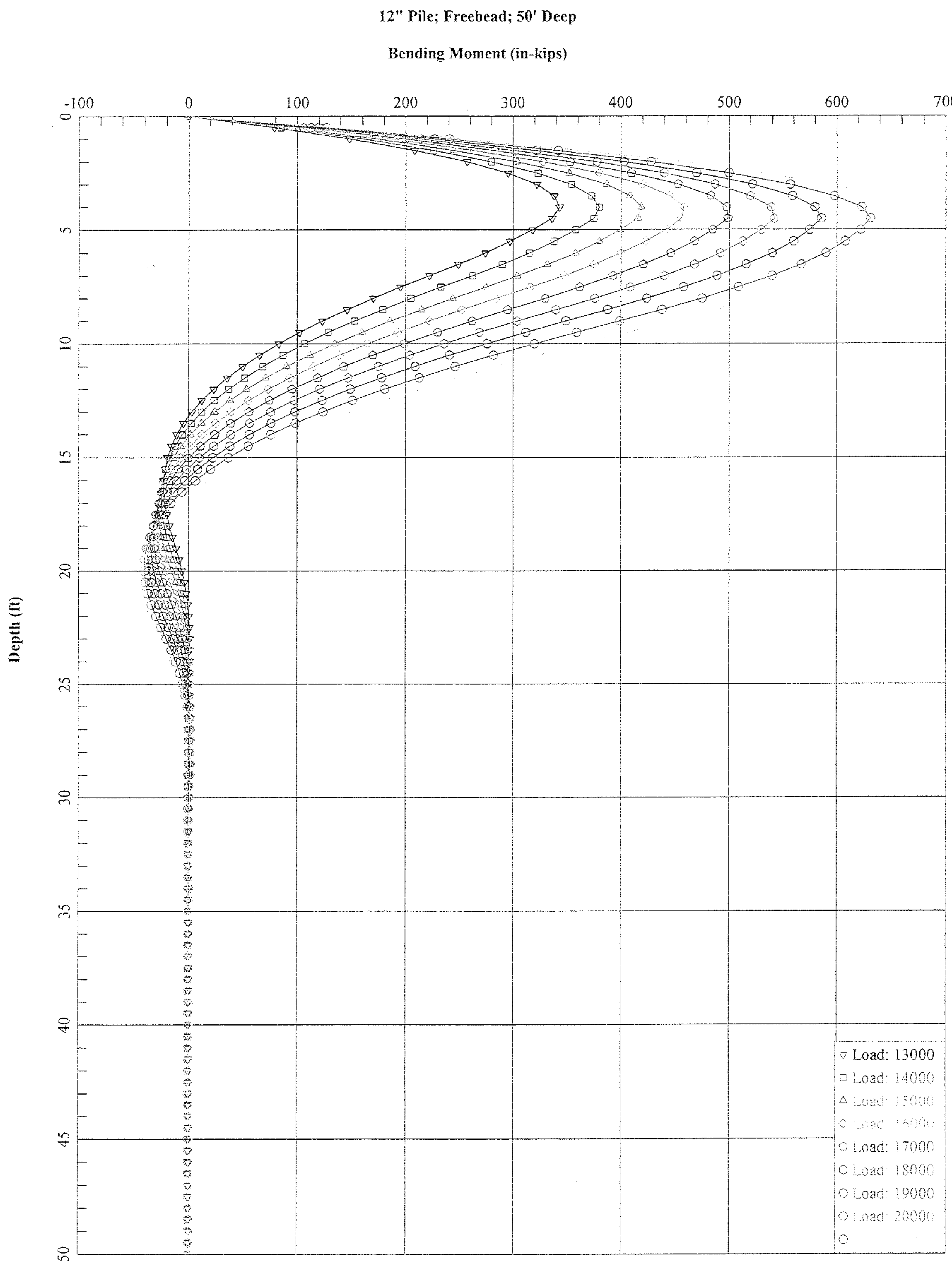
PILE-HEAD DEFLECTION = .587E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.839E-02
MAXIMUM BENDING MOMENT = .629E+06 LBS-IN
MAXIMUM SHEAR FORCE = .210E+05 LBS
NO. OF ITERATIONS = 33
NO. OF ZERO DEFLECTION POINTS = 9

S U M M A R Y   T A B L E
****

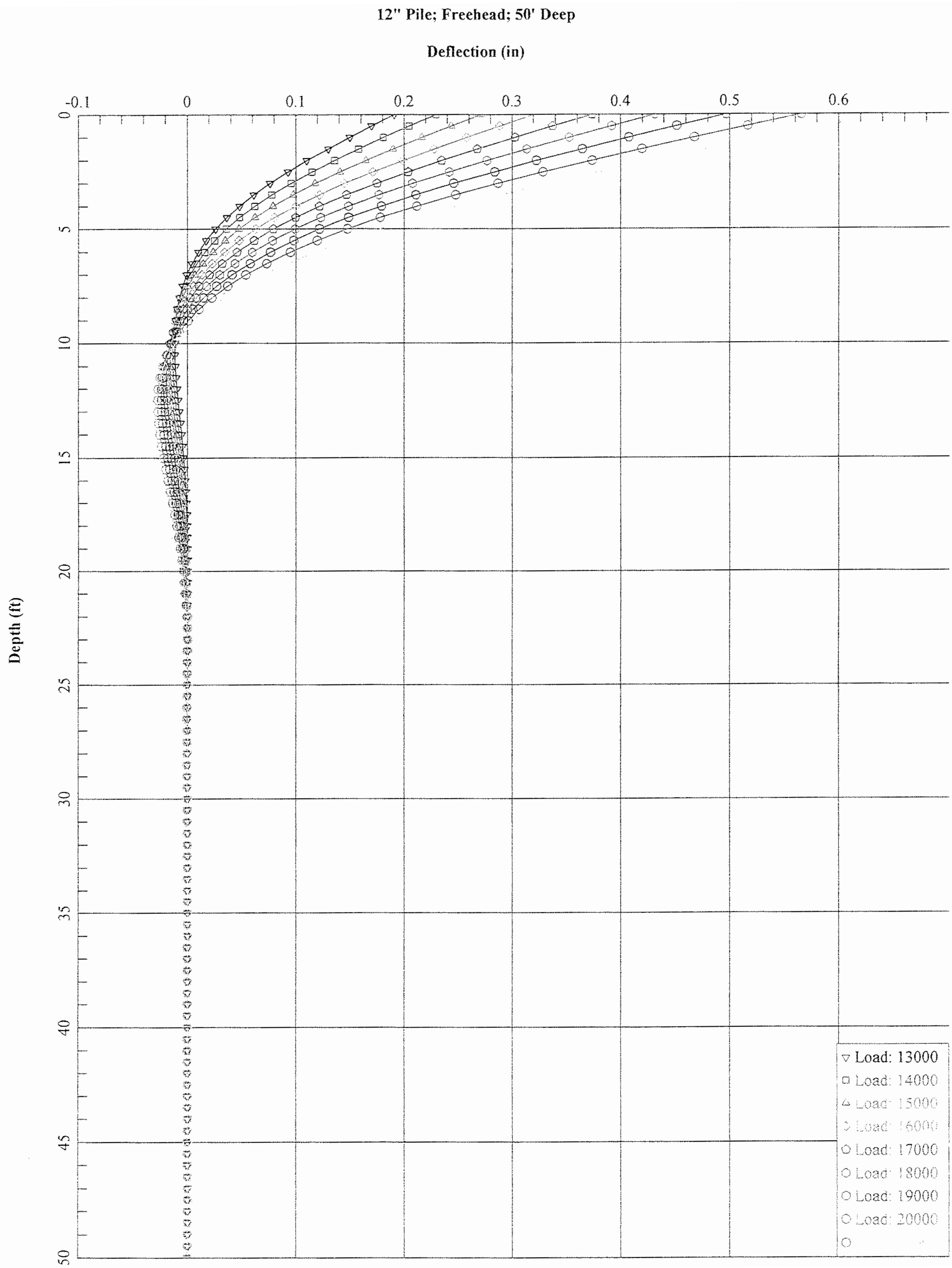
BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS

.1300E+05	.0000E+00	.1200E+06	.1811E+00	.3275E+06	.1300E+05
.1400E+05	.0000E+00	.1200E+06	.2163E+00	.3624E+06	.1400E+05
.1500E+05	.0000E+00	.1200E+06	.2554E+00	.3980E+06	.1500E+05
.1600E+05	.0000E+00	.1200E+06	.2995E+00	.4336E+06	.1600E+05
.1700E+05	.0000E+00	.1200E+06	.3473E+00	.4702E+06	.1700E+05
.1800E+05	.0000E+00	.1200E+06	.3997E+00	.5090E+06	.1800E+05
.1900E+05	.0000E+00	.1200E+06	.4576E+00	.5482E+06	.1900E+05
.2000E+05	.0000E+00	.1200E+06	.5194E+00	.5885E+06	.2000E+05
.2100E+05	.0000E+00	.1200E+06	.5874E+00	.6288E+06	.2100E+05


12" Pile; Freehead; 50' Deep
Lateral Load (kips)
Pile-Head Deflection (in)
Curve #1
0
2
4
6
8
10
12
14
16
18
20
0
0.1
0.2
0.3
0.4
0.5
0.6



12" Pile; Freehead; 50' Deep
Bending Moment (in-kips)
-100
0
100
200
300
400
500
600
700
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 13000
Load: 14000
Load: 15000
Load: 16000
Load: 17000
Load: 18000
Load: 19000
Load: 20000


12" Pile; Freehead; 50' Deep
Deflection (in)
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 13000
Load: 14000
Load: 15000
Load: 16000
Load: 17000
Load: 18000
Load: 19000
Load: 20000

Licensed to: LEROY CHAN

ENGEO, INC.

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 12" sq Concrete Pile; Axial L=50kips; Free Head

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N
****

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	12.000	.173E+04	.144E+03	.442E+07
600.00	12.000	.173E+04	.144E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN

X AT THE BOTTOM OF THE LAYER = 360.00 IN
MODULUS OF SUBGRADE REACTION = .300E+02 LBS/IN**3

LAYER 3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER = 360.00 IN
X AT THE BOTTOM OF THE LAYER = 420.00 IN
MODULUS OF SUBGRADE REACTION = .800E+03 LBS/IN**3

LAYER 4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 420.00 IN
X AT THE BOTTOM OF THE LAYER = 480.00 IN
MODULUS OF SUBGRADE REACTION = .100E+03 LBS/IN**3

LAYER 5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = 480.00 IN
X AT THE BOTTOM OF THE LAYER = 720.00 IN
MODULUS OF SUBGRADE REACTION = .125E+03 LBS/IN**3

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
8 POINTS

X,IN	WEIGHT,LBS/IN**3
.00	.67E-01
60.00	.67E-01
60.00	.22E-01
360.00	.22E-01
360.00	.28E-01
480.00	.28E-01
480.00	.30E-01
720.00	.30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
10 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
.00	.139E+02	.000	.700E-02
60.00	.139E+02	.000	.700E-02
60.00	.347E+01	.000	.200E-01
360.00	.347E+01	.000	.200E-01
360.00	.139E+02	.000	.500E-02
420.00	.139E+02	.000	.500E-02
420.00	.694E+01	.000	.150E-01
480.00	.694E+01	.000	.150E-01
480.00	.000E+00	.260E+02	-----
720.00	.000E+00	.260E+02	-----

BOUNDARY AND LOADING CONDITIONS

LOADING NUMBER 1

BOUNDARY-CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .130E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

LOADING NUMBER 2

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.140E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 3

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.150E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 4

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.160E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 5

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.170E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 6

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.180E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 7

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.190E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 8

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.200E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

LOADING NUMBER 9

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.210E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

FINITE-DIFFERENCE PARAMETERS

NUMBER OF PILE INCREMENTS	=	100
DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE	=	.100E-04 IN
MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS	=	100
MAXIMUM ALLOWABLE DEFLECTION	=	.10E+03 IN

OUTPUT CODES

KOUTPT = 1
KPYOP = 0
INC = 1

O U T P U T   I N F O R M A T I O N
****

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING *
****

LOADING NUMBER 1

BOUNDARY CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.130E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.191E+00	.471E-07	.130E+05	-.352E-02	.174E+04	.763E+10	-.244E+03
6.0	.170E+00	.789E+05	.115E+05	-.349E-02	.201E+04	.763E+10	-.259E+03
12.0	.150E+00	.148E+06	.989E+04	-.340E-02	.225E+04	.763E+10	-.272E+03
18.0	.130E+00	.208E+06	.823E+04	-.326E-02	.246E+04	.763E+10	-.283E+03
24.0	.110E+00	.257E+06	.650E+04	-.308E-02	.263E+04	.763E+10	-.292E+03
30.0	.926E-01	.295E+06	.473E+04	-.286E-02	.276E+04	.763E+10	-.298E+03
36.0	.762E-01	.322E+06	.293E+04	-.262E-02	.285E+04	.763E+10	-.302E+03
42.0	.612E-01	.338E+06	.111E+04	-.236E-02	.291E+04	.763E+10	-.303E+03
48.0	.479E-01	.343E+06	-.703E+03	-.209E-02	.293E+04	.763E+10	-.301E+03
54.0	.362E-01	.336E+06	-.249E+04	-.182E-02	.290E+04	.763E+10	-.296E+03
60.0	.260E-01	.318E+06	-.361E+04	-.157E-02	.284E+04	.763E+10	-.750E+02
66.0	.174E-01	.297E+06	-.400E+04	-.132E-02	.277E+04	.763E+10	-.575E+02
72.0	.101E-01	.274E+06	-.432E+04	-.110E-02	.269E+04	.763E+10	-.481E+02
78.0	.418E-02	.249E+06	-.457E+04	-.893E-03	.260E+04	.763E+10	-.358E+02
84.0	-.592E-03	.222E+06	-.462E+04	-.708E-03	.251E+04	.763E+10	.187E+02
90.0	-.432E-02	.195E+06	-.446E+04	-.544E-03	.241E+04	.763E+10	.362E+02
96.0	-.712E-02	.170E+06	-.422E+04	-.401E-03	.233E+04	.763E+10	.428E+02
102.0	-.913E-02	.146E+06	-.396E+04	-.277E-03	.224E+04	.763E+10	.464E+02
108.0	-.104E-01	.123E+06	-.367E+04	-.171E-03	.216E+04	.763E+10	.486E+02
114.0	-.112E-01	.102E+06	-.338E+04	-.821E-04	.209E+04	.763E+10	.497E+02
120.0	-.114E-01	.830E+05	-.308E+04	-.917E-05	.202E+04	.763E+10	.500E+02

126.0	-.113E-01	.654E+05	-.278E+04	.492E-04	.196E+04	.763E+10	.498E+02
132.0	-.108E-01	.496E+05	-.248E+04	.944E-04	.191E+04	.763E+10	.492E+02
138.0	-.102E-01	.354E+05	-.219E+04	.128E-03	.186E+04	.763E+10	.481E+02
144.0	-.930E-02	.229E+05	-.190E+04	.151E-03	.182E+04	.763E+10	.467E+02
150.0	-.835E-02	.121E+05	-.163E+04	.164E-03	.178E+04	.763E+10	.451E+02
156.0	-.733E-02	.286E+04	-.136E+04	.170E-03	.175E+04	.763E+10	.432E+02
162.0	-.630E-02	-.480E+04	-.111E+04	.170E-03	.175E+04	.763E+10	.410E+02
168.0	-.530E-02	-.110E+05	-.872E+03	.163E-03	.177E+04	.763E+10	.387E+02
174.0	-.434E-02	-.158E+05	-.647E+03	.153E-03	.179E+04	.763E+10	.362E+02
180.0	-.346E-02	-.192E+05	-.438E+03	.139E-03	.180E+04	.763E+10	.336E+02
186.0	-.267E-02	-.214E+05	-.245E+03	.123E-03	.181E+04	.763E+10	.308E+02
192.0	-.198E-02	-.225E+05	-.684E+02	.106E-03	.181E+04	.763E+10	.279E+02
198.0	-.140E-02	-.226E+05	.899E+02	.881E-04	.181E+04	.763E+10	.249E+02
204.0	-.925E-03	-.217E+05	.229E+03	.707E-04	.181E+04	.763E+10	.216E+02
210.0	-.552E-03	-.200E+05	.349E+03	.543E-04	.181E+04	.763E+10	.182E+02
216.0	-.273E-03	-.177E+05	.447E+03	.395E-04	.180E+04	.763E+10	.144E+02
222.0	-.781E-04	-.148E+05	.519E+03	.267E-04	.179E+04	.763E+10	.949E+01
228.0	.473E-04	-.115E+05	.523E+03	.164E-04	.178E+04	.763E+10	-.804E+01
234.0	.118E-03	-.856E+04	.466E+03	.847E-05	.177E+04	.763E+10	-.109E+02
240.0	.149E-03	-.596E+04	.398E+03	.276E-05	.176E+04	.763E+10	-.118E+02
246.0	.152E-03	-.378E+04	.328E+03	-.107E-05	.175E+04	.763E+10	-.118E+02
252.0	.136E-03	-.203E+04	.258E+03	-.335E-05	.174E+04	.763E+10	-.114E+02
258.0	.111E-03	-.680E+03	.191E+03	-.442E-05	.174E+04	.763E+10	-.107E+02
264.0	.832E-04	.283E+03	.130E+03	-.457E-05	.174E+04	.763E+10	-.970E+01
270.0	.564E-04	.898E+03	.757E+02	-.411E-05	.174E+04	.763E+10	-.852E+01
276.0	.339E-04	.120E+04	.286E+02	-.328E-05	.174E+04	.763E+10	-.719E+01
282.0	.170E-04	.125E+04	-.101E+02	-.232E-05	.174E+04	.763E+10	-.571E+01
288.0	.604E-05	.109E+04	-.393E+02	-.140E-05	.174E+04	.763E+10	-.405E+01
294.0	.232E-06	.783E+03	-.555E+02	-.661E-06	.174E+04	.763E+10	-.137E+01
300.0	-.188E-05	.426E+03	-.513E+02	-.185E-06	.174E+04	.763E+10	.274E+01
306.0	-.199E-05	.168E+03	-.347E+02	.482E-07	.174E+04	.763E+10	.279E+01
312.0	-.131E-05	.970E+01	-.190E+02	.118E-06	.174E+04	.763E+10	.243E+01
318.0	-.577E-06	-.608E+02	-.618E+01	.978E-07	.174E+04	.763E+10	.185E+01
324.0	-.133E-06	-.648E+02	.277E+01	.484E-07	.174E+04	.763E+10	.113E+01
330.0	.433E-08	-.277E+02	.509E+01	.120E-07	.174E+04	.763E+10	-.362E+00
336.0	.112E-07	-.373E+01	.249E+01	-.323E-09	.174E+04	.763E+10	-.494E+00
342.0	.453E-09	.218E+01	.319E+00	-.933E-09	.174E+04	.763E+10	-.150E+00
348.0	-.870E-11	.998E-01	-.181E+00	-.378E-10	.174E+04	.763E+10	.417E-01
354.0	-.584E-14	-.734E-03	-.836E-02	.116E-11	.174E+04	.763E+10	.190E-02
360.0	.522E-11	-.559E-03	.283E-04	.652E-12	.174E+04	.763E+10	-.319E-06
366.0	.782E-11	-.397E-03	.250E-04	.276E-12	.174E+04	.763E+10	-.505E-06
372.0	.854E-11	-.260E-03	.207E-04	.176E-13	.174E+04	.763E+10	-.583E-06
378.0	.803E-11	-.149E-03	.161E-04	-.143E-12	.174E+04	.763E+10	-.577E-06
384.0	.682E-11	-.658E-04	.118E-04	-.228E-12	.174E+04	.763E+10	-.515E-06
390.0	.530E-11	-.679E-05	.811E-05	-.256E-12	.174E+04	.763E+10	-.420E-06
396.0	.375E-11	.323E-04	.522E-05	-.246E-12	.174E+04	.763E+10	-.310E-06
402.0	.235E-11	.566E-04	.320E-05	-.211E-12	.174E+04	.763E+10	-.203E-06
408.0	.121E-11	.713E-04	.196E-05	-.161E-12	.174E+04	.763E+10	-.109E-06
414.0	.416E-12	.807E-04	.138E-05	-.101E-12	.174E+04	.763E+10	-.390E-07
420.0	.220E-17	.881E-04	-.673E-05	-.347E-13	.174E+04	.763E+10	-.201E-05
426.0	-.232E-17	.145E-08	-.734E-05	-.183E-18	.174E+04	.763E+10	.186E-05
432.0	-.642E-22	-.492E-09	-.121E-09	.194E-18	.174E+04	.763E+10	.514E-10
438.0	.130E-22	-.191E-13	.410E-10	.535E-23	.174E+04	.763E+10	-.104E-10
444.0	.649E-27	.275E-14	.159E-14	-.108E-23	.174E+04	.763E+10	-.519E-15
450.0	-.725E-28	.168E-18	-.229E-15	-.541E-28	.174E+04	.763E+10	.580E-16
456.0	-.524E-32	-.154E-19	-.140E-19	.604E-29	.174E+04	.763E+10	.420E-20
462.0	.405E-33	-.128E-23	.128E-20	.437E-33	.174E+04	.763E+10	-.324E-21
468.0	.383E-37	.858E-25	.107E-24	-.337E-34	.174E+04	.763E+10	-.307E-25
474.0	-.226E-38	.280E-29	-.715E-26	-.567E-38	.174E+04	.763E+10	.181E-26
480.0	-.297E-37	.227E-29	-.873E-31	-.368E-38	.174E+04	.763E+10	.691E-33
486.0	-.464E-37	.176E-29	-.802E-31	-.209E-38	.174E+04	.763E+10	.111E-32
492.0	-.548E-37	.131E-29	-.706E-31	-.883E-39	.174E+04	.763E+10	.134E-32
498.0	-.570E-37	.919E-30	-.596E-31	-.610E-41	.174E+04	.763E+10	.142E-32

504.0	-.548E-37	.594E-30	-.485E-31	.589E-39	.174E+04	.763E+10	.140E-32
510.0	-.499E-37	.335E-30	-.378E-31	.954E-39	.174E+04	.763E+10	.130E-32
516.0	-.434E-37	.138E-30	-.281E-31	.114E-38	.174E+04	.763E+10	.116E-32
522.0	-.362E-37	-.475E-32	-.196E-31	.119E-38	.174E+04	.763E+10	.987E-33
528.0	-.291E-37	-.101E-30	-.125E-31	.115E-38	.174E+04	.763E+10	.809E-33
534.0	-.224E-37	-.158E-30	-.677E-32	.105E-38	.174E+04	.763E+10	.636E-33
540.0	-.165E-37	-.185E-30	-.238E-32	.915E-39	.174E+04	.763E+10	.477E-33
546.0	-.114E-37	-.189E-30	.840E-33	.768E-39	.174E+04	.763E+10	.337E-33
552.0	-.724E-38	-.177E-30	.303E-32	.624E-39	.174E+04	.763E+10	.218E-33
558.0	-.392E-38	-.155E-30	.437E-32	.493E-39	.174E+04	.763E+10	.120E-33
564.0	-.133E-38	-.126E-30	.501E-32	.383E-39	.174E+04	.763E+10	.414E-34
570.0	.672E-39	-.958E-31	.509E-32	.295E-39	.174E+04	.763E+10	-.214E-34
576.0	.222E-38	-.661E-31	.472E-32	.232E-39	.174E+04	.763E+10	-.719E-34
582.0	.345E-38	-.398E-31	.399E-32	.190E-39	.174E+04	.763E+10	-.114E-33
588.0	.450E-38	-.189E-31	.294E-32	.167E-39	.174E+04	.763E+10	-.151E-33
594.0	.545E-38	-.502E-32	.161E-32	.157E-39	.174E+04	.763E+10	-.186E-33
600.0	.639E-38	.000E+00	.000E+00	.156E-39	.174E+04	.763E+10	-.222E-33

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.244E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.243E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .191E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.352E-02
MAXIMUM BENDING MOMENT = .343E+06 LBS-IN
MAXIMUM SHEAR FORCE = .130E+05 LBS
NO. OF ITERATIONS = 29
NO. OF ZERO DEFLECTION POINTS = 12

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .140E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.230E+00	.235E-07	.140E+05	-.406E-02	.174E+04	.763E+10	-.256E+03
6.0	.205E+00	.855E+05	.124E+05	-.403E-02	.203E+04	.763E+10	-.272E+03
12.0	.181E+00	.161E+06	.107E+05	-.393E-02	.230E+04	.763E+10	-.286E+03
18.0	.158E+00	.226E+06	.899E+04	-.378E-02	.252E+04	.763E+10	-.298E+03
24.0	.136E+00	.280E+06	.718E+04	-.358E-02	.271E+04	.763E+10	-.308E+03
30.0	.115E+00	.323E+06	.531E+04	-.334E-02	.286E+04	.763E+10	-.315E+03
36.0	.957E-01	.354E+06	.341E+04	-.308E-02	.297E+04	.763E+10	-.320E+03
42.0	.781E-01	.373E+06	.148E+04	-.279E-02	.303E+04	.763E+10	-.322E+03
48.0	.622E-01	.380E+06	-.453E+03	-.249E-02	.306E+04	.763E+10	-.322E+03
54.0	.482E-01	.375E+06	-.237E+04	-.220E-02	.304E+04	.763E+10	-.318E+03
60.0	.359E-01	.358E+06	-.357E+04	-.191E-02	.298E+04	.763E+10	-.835E+02

66.0	.253E-01	.338E+06	-.402E+04	-.164E-02	.291E+04	.763E+10	-.652E+02
72.0	.162E-01	.315E+06	-.439E+04	-.138E-02	.283E+04	.763E+10	-.563E+02
78.0	.872E-02	.290E+06	-.469E+04	-.114E-02	.274E+04	.763E+10	-.457E+02
84.0	.256E-02	.262E+06	-.492E+04	-.924E-03	.265E+04	.763E+10	-.304E+02
90.0	-.237E-02	.233E+06	-.492E+04	-.729E-03	.255E+04	.763E+10	.296E+02
96.0	-.619E-02	.205E+06	-.471E+04	-.557E-03	.245E+04	.763E+10	.408E+02
102.0	-.904E-02	.179E+06	-.445E+04	-.406E-03	.236E+04	.763E+10	.463E+02
108.0	-.111E-01	.153E+06	-.416E+04	-.275E-03	.227E+04	.763E+10	.495E+02
114.0	-.123E-01	.129E+06	-.386E+04	-.164E-03	.219E+04	.763E+10	.514E+02
120.0	-.130E-01	.107E+06	-.355E+04	-.710E-04	.211E+04	.763E+10	.523E+02
126.0	-.132E-01	.870E+05	-.323E+04	.538E-05	.204E+04	.763E+10	.525E+02
132.0	-.130E-01	.685E+05	-.292E+04	.665E-04	.197E+04	.763E+10	.522E+02
138.0	-.124E-01	.518E+05	-.261E+04	.114E-03	.192E+04	.763E+10	.514E+02
144.0	-.116E-01	.368E+05	-.230E+04	.149E-03	.186E+04	.763E+10	.503E+02
150.0	-.106E-01	.236E+05	-.201E+04	.172E-03	.182E+04	.763E+10	.488E+02
156.0	-.953E-02	.122E+05	-.172E+04	.186E-03	.178E+04	.763E+10	.471E+02
162.0	-.838E-02	.245E+04	-.144E+04	.192E-03	.174E+04	.763E+10	.451E+02
168.0	-.722E-02	-.568E+04	-.118E+04	.191E-03	.176E+04	.763E+10	.429E+02
174.0	-.609E-02	-.123E+05	-.928E+03	.184E-03	.178E+04	.763E+10	.406E+02
180.0	-.501E-02	-.174E+05	-.693E+03	.172E-03	.180E+04	.763E+10	.380E+02
186.0	-.402E-02	-.211E+05	-.473E+03	.157E-03	.181E+04	.763E+10	.353E+02
192.0	-.313E-02	-.235E+05	-.269E+03	.140E-03	.182E+04	.763E+10	.325E+02
198.0	-.235E-02	-.247E+05	-.831E+02	.121E-03	.182E+04	.763E+10	.295E+02
204.0	-.168E-02	-.249E+05	.846E+02	.101E-03	.182E+04	.763E+10	.264E+02
210.0	-.113E-02	-.240E+05	.233E+03	.819E-04	.182E+04	.763E+10	.232E+02
216.0	-.697E-03	-.223E+05	.362E+03	.637E-04	.181E+04	.763E+10	.197E+02
222.0	-.368E-03	-.199E+05	.469E+03	.471E-04	.181E+04	.763E+10	.159E+02
228.0	-.132E-03	-.168E+05	.551E+03	.326E-04	.179E+04	.763E+10	.113E+02
234.0	.236E-04	-.134E+05	.565E+03	.207E-04	.178E+04	.763E+10	-.639E+01
240.0	.117E-03	-.101E+05	.514E+03	.115E-04	.177E+04	.763E+10	-.109E+02
246.0	.162E-03	-.724E+04	.445E+03	.468E-05	.176E+04	.763E+10	-.121E+02
252.0	.173E-03	-.479E+04	.372E+03	-.499E-07	.175E+04	.763E+10	-.124E+02
258.0	.161E-03	-.278E+04	.298E+03	-.303E-05	.175E+04	.763E+10	-.121E+02
264.0	.136E-03	-.120E+04	.228E+03	-.459E-05	.174E+04	.763E+10	-.114E+02
270.0	.106E-03	-.357E+02	.162E+03	-.508E-05	.174E+04	.763E+10	-.105E+02
276.0	.754E-04	.754E+03	.102E+03	-.480E-05	.174E+04	.763E+10	-.939E+01
282.0	.484E-04	.120E+04	.497E+02	-.403E-05	.174E+04	.763E+10	-.810E+01
288.0	.271E-04	.136E+04	.547E+01	-.302E-05	.174E+04	.763E+10	-.667E+01
294.0	.122E-04	.128E+04	-.298E+02	-.198E-05	.174E+04	.763E+10	-.511E+01
300.0	.329E-05	.101E+04	-.550E+02	-.108E-05	.174E+04	.763E+10	-.331E+01
306.0	-.810E-06	.622E+03	-.587E+02	-.438E-06	.174E+04	.763E+10	.207E+01
312.0	-.197E-05	.308E+03	-.441E+02	-.722E-07	.174E+04	.763E+10	.278E+01
318.0	-.168E-05	.936E+02	-.278E+02	.858E-07	.174E+04	.763E+10	.264E+01
324.0	-.941E-06	-.258E+02	-.133E+02	.112E-06	.174E+04	.763E+10	.218E+01
330.0	-.327E-06	-.668E+02	-.221E+01	.761E-07	.174E+04	.763E+10	.153E+01
336.0	-.283E-07	-.525E+02	.440E+01	.291E-07	.174E+04	.763E+10	.679E+00
342.0	.226E-07	-.140E+02	.451E+01	.299E-08	.174E+04	.763E+10	-.623E+00
348.0	.749E-08	.161E+01	.122E+01	-.188E-08	.174E+04	.763E+10	-.422E+00
354.0	-.349E-11	.633E+00	-.943E-01	-.100E-08	.174E+04	.763E+10	.408E-01
360.0	-.451E-08	.482E+00	-.244E-01	-.562E-09	.174E+04	.763E+10	.333E-03
366.0	-.675E-08	.343E+00	-.216E-01	-.238E-09	.174E+04	.763E+10	.527E-03
372.0	-.736E-08	.224E+00	-.178E-01	-.150E-10	.174E+04	.763E+10	.608E-03
378.0	-.692E-08	.128E+00	-.139E-01	.124E-09	.174E+04	.763E+10	.602E-03
384.0	-.588E-08	.566E-01	-.102E-01	.196E-09	.174E+04	.763E+10	.537E-03
390.0	-.457E-08	.580E-02	-.699E-02	.221E-09	.174E+04	.763E+10	.437E-03
396.0	-.323E-08	-.279E-01	-.450E-02	.212E-09	.174E+04	.763E+10	.323E-03
402.0	-.202E-08	-.489E-01	-.275E-02	.182E-09	.174E+04	.763E+10	.211E-03
408.0	-.105E-08	-.615E-01	-.169E-02	.139E-09	.174E+04	.763E+10	.114E-03
414.0	-.359E-09	-.696E-01	-.119E-02	.871E-10	.174E+04	.763E+10	.406E-04
420.0	-.190E-14	-.760E-01	.580E-02	.299E-10	.174E+04	.763E+10	.210E-02
426.0	.200E-14	-.125E-05	.633E-02	.158E-15	.174E+04	.763E+10	-.194E-02
432.0	.553E-19	.424E-06	.104E-06	-.167E-15	.174E+04	.763E+10	-.535E-07
438.0	-.112E-19	.165E-10	-.354E-07	-.461E-20	.174E+04	.763E+10	.108E-07

444.0	-.559E-24	-.237E-11	-.137E-11	.932E-21	.174E+04	.763E+10	.541E-12
450.0	.625E-25	-.145E-15	.198E-12	.466E-25	.174E+04	.763E+10	-.604E-13
456.0	.452E-29	.132E-16	.121E-16	-.521E-26	.174E+04	.763E+10	-.437E-17
462.0	-.349E-30	.111E-20	-.110E-17	-.377E-30	.174E+04	.763E+10	.338E-18
468.0	-.331E-34	-.740E-22	-.922E-22	.291E-31	.174E+04	.763E+10	.320E-22
474.0	.195E-35	-.241E-26	.616E-23	.489E-35	.174E+04	.763E+10	-.189E-23
480.0	.256E-34	-.195E-26	.753E-28	.317E-35	.174E+04	.763E+10	-.720E-30
486.0	.400E-34	-.152E-26	.692E-28	.180E-35	.174E+04	.763E+10	-.115E-29
492.0	.472E-34	-.113E-26	.608E-28	.761E-36	.174E+04	.763E+10	-.139E-29
498.0	.491E-34	-.792E-27	.514E-28	.526E-38	.174E+04	.763E+10	-.148E-29
504.0	.473E-34	-.512E-27	.418E-28	-.508E-36	.174E+04	.763E+10	-.146E-29
510.0	.430E-34	-.289E-27	.326E-28	-.823E-36	.174E+04	.763E+10	-.136E-29
516.0	.374E-34	-.119E-27	.242E-28	-.983E-36	.174E+04	.763E+10	-.121E-29
522.0	.312E-34	.409E-29	.169E-28	-.103E-35	.174E+04	.763E+10	-.103E-29
528.0	.250E-34	.867E-28	.108E-28	-.993E-36	.174E+04	.763E+10	-.843E-30
534.0	.193E-34	.136E-27	.584E-29	-.905E-36	.174E+04	.763E+10	-.663E-30
540.0	.142E-34	.160E-27	.205E-29	-.789E-36	.174E+04	.763E+10	-.497E-30
546.0	.983E-35	.163E-27	-.724E-30	-.662E-36	.174E+04	.763E+10	-.351E-30
552.0	.624E-35	.153E-27	-.262E-29	-.538E-36	.174E+04	.763E+10	-.227E-30
558.0	.338E-35	.133E-27	-.377E-29	-.425E-36	.174E+04	.763E+10	-.125E-30
564.0	.114E-35	.109E-27	-.432E-29	-.330E-36	.174E+04	.763E+10	-.432E-31
570.0	-.579E-36	.826E-28	-.439E-29	-.255E-36	.174E+04	.763E+10	.223E-31
576.0	-.191E-35	.570E-28	-.407E-29	-.200E-36	.174E+04	.763E+10	.749E-31
582.0	-.298E-35	.343E-28	-.344E-29	-.164E-36	.174E+04	.763E+10	.119E-30
588.0	-.388E-35	.163E-28	-.254E-29	-.144E-36	.174E+04	.763E+10	.157E-30
594.0	-.470E-35	.433E-29	-.139E-29	-.136E-36	.174E+04	.763E+10	.194E-30
600.0	-.551E-35	.000E+00	.000E+00	-.134E-36	.174E+04	.763E+10	.231E-30

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .555E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.506E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .230E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.406E-02
MAXIMUM BENDING MOMENT = .380E+06 LBS-IN
MAXIMUM SHEAR FORCE = .140E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 11

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .150E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.272E+00	.000E+00	.150E+05	-.465E-02	.174E+04	.763E+10	-.267E+03

6.0	.244E+00	.922E+05	.133E+05	-.461E-02	.206E+04	.763E+10	-.284E+03
12.0	.217E+00	.174E+06	.116E+05	-.451E-02	.234E+04	.763E+10	-.299E+03
18.0	.190E+00	.245E+06	.977E+04	-.434E-02	.259E+04	.763E+10	-.312E+03
24.0	.165E+00	.304E+06	.786E+04	-.413E-02	.279E+04	.763E+10	-.323E+03
30.0	.141E+00	.352E+06	.590E+04	-.387E-02	.296E+04	.763E+10	-.331E+03
36.0	.118E+00	.387E+06	.389E+04	-.358E-02	.308E+04	.763E+10	-.337E+03
42.0	.978E-01	.409E+06	.186E+04	-.327E-02	.316E+04	.763E+10	-.341E+03
48.0	.792E-01	.419E+06	-.189E+03	-.294E-02	.319E+04	.763E+10	-.342E+03
54.0	.625E-01	.416E+06	-.223E+04	-.261E-02	.318E+04	.763E+10	-.339E+03
60.0	.478E-01	.400E+06	-.352E+04	-.229E-02	.312E+04	.763E+10	-.919E+02
66.0	.350E-01	.380E+06	-.402E+04	-.199E-02	.306E+04	.763E+10	-.727E+02
72.0	.240E-01	.358E+06	-.443E+04	-.170E-02	.298E+04	.763E+10	-.641E+02
78.0	.146E-01	.332E+06	-.478E+04	-.143E-02	.289E+04	.763E+10	-.544E+02
84.0	.688E-02	.304E+06	-.507E+04	-.118E-02	.279E+04	.763E+10	-.422E+02
90.0	.546E-03	.275E+06	-.526E+04	-.947E-03	.269E+04	.763E+10	-.181E+02
96.0	-.449E-02	.244E+06	-.520E+04	-.743E-03	.258E+04	.763E+10	.367E+02
102.0	-.837E-02	.215E+06	-.495E+04	-.563E-03	.248E+04	.763E+10	.451E+02
108.0	-.112E-01	.186E+06	-.467E+04	-.405E-03	.238E+04	.763E+10	.498E+02
114.0	-.132E-01	.160E+06	-.436E+04	-.269E-03	.229E+04	.763E+10	.525E+02
120.0	-.145E-01	.135E+06	-.404E+04	-.153E-03	.220E+04	.763E+10	.541E+02
126.0	-.151E-01	.112E+06	-.372E+04	-.559E-04	.212E+04	.763E+10	.549E+02
132.0	-.151E-01	.905E+05	-.339E+04	.237E-04	.205E+04	.763E+10	.550E+02
138.0	-.148E-01	.711E+05	-.306E+04	.872E-04	.198E+04	.763E+10	.545E+02
144.0	-.141E-01	.535E+05	-.273E+04	.136E-03	.192E+04	.763E+10	.537E+02
150.0	-.131E-01	.379E+05	-.242E+04	.172E-03	.187E+04	.763E+10	.524E+02
156.0	-.120E-01	.240E+05	-.211E+04	.197E-03	.182E+04	.763E+10	.509E+02
162.0	-.108E-01	.120E+05	-.181E+04	.211E-03	.178E+04	.763E+10	.491E+02
168.0	-.950E-02	.175E+04	-.152E+04	.216E-03	.174E+04	.763E+10	.470E+02
174.0	-.820E-02	-.683E+04	-.124E+04	.214E-03	.176E+04	.763E+10	.448E+02
180.0	-.693E-02	-.138E+05	-.980E+03	.206E-03	.178E+04	.763E+10	.424E+02
186.0	-.572E-02	-.192E+05	-.734E+03	.193E-03	.180E+04	.763E+10	.397E+02
192.0	-.461E-02	-.232E+05	-.503E+03	.176E-03	.182E+04	.763E+10	.370E+02
198.0	-.361E-02	-.258E+05	-.290E+03	.157E-03	.183E+04	.763E+10	.341E+02
204.0	-.273E-02	-.271E+05	-.950E+02	.136E-03	.183E+04	.763E+10	.310E+02
210.0	-.197E-02	-.273E+05	.817E+02	.115E-03	.183E+04	.763E+10	.279E+02
216.0	-.135E-02	-.265E+05	.239E+03	.937E-04	.183E+04	.763E+10	.245E+02
222.0	-.847E-03	-.247E+05	.376E+03	.736E-04	.182E+04	.763E+10	.210E+02
228.0	-.464E-03	-.222E+05	.490E+03	.551E-04	.181E+04	.763E+10	.172E+02
234.0	-.185E-03	-.190E+05	.580E+03	.389E-04	.180E+04	.763E+10	.127E+02
240.0	.323E-05	-.154E+05	.608E+03	.254E-04	.179E+04	.763E+10	-.331E+01
246.0	.119E-03	-.118E+05	.566E+03	.147E-04	.178E+04	.763E+10	-.109E+02
252.0	.180E-03	-.862E+04	.495E+03	.670E-05	.177E+04	.763E+10	-.125E+02
258.0	.200E-03	-.588E+04	.419E+03	.994E-06	.176E+04	.763E+10	-.130E+02
264.0	.192E-03	-.360E+04	.341E+03	-.273E-05	.175E+04	.763E+10	-.128E+02
270.0	.167E-03	-.178E+04	.266E+03	-.485E-05	.174E+04	.763E+10	-.122E+02
276.0	.134E-03	-.391E+03	.195E+03	-.570E-05	.174E+04	.763E+10	-.114E+02
282.0	.986E-04	.585E+03	.130E+03	-.562E-05	.174E+04	.763E+10	-.103E+02
288.0	.662E-04	.119E+04	.727E+02	-.492E-05	.174E+04	.763E+10	-.899E+01
294.0	.395E-04	.147E+04	.231E+02	-.388E-05	.174E+04	.763E+10	-.757E+01
300.0	.197E-04	.148E+04	-.176E+02	-.272E-05	.174E+04	.763E+10	-.600E+01
306.0	.691E-05	.127E+04	-.483E+02	-.163E-05	.174E+04	.763E+10	-.423E+01
312.0	.105E-06	.905E+03	-.641E+02	-.779E-06	.174E+04	.763E+10	-.106E+01
318.0	-.243E-05	.503E+03	-.582E+02	-.225E-06	.174E+04	.763E+10	.299E+01
324.0	-.260E-05	.208E+03	-.400E+02	.544E-07	.174E+04	.763E+10	.305E+01
330.0	-.178E-05	.225E+02	-.228E+02	.145E-06	.174E+04	.763E+10	.269E+01
336.0	-.856E-06	-.659E+02	-.834E+01	.128E-06	.174E+04	.763E+10	.211E+01
342.0	-.244E-06	-.780E+02	.220E+01	.714E-07	.174E+04	.763E+10	.138E+01
348.0	.666E-10	-.397E+02	.601E+01	.251E-07	.174E+04	.763E+10	-.759E-01
354.0	.568E-07	-.595E+01	.296E+01	.712E-08	.174E+04	.763E+10	-.836E+00
360.0	.855E-07	-.425E+01	.264E+00	.311E-08	.174E+04	.763E+10	-.644E-02
366.0	.941E-07	-.279E+01	.219E+00	.337E-09	.174E+04	.763E+10	-.751E-02
372.0	.895E-07	-.162E+01	.171E+00	-.140E-08	.174E+04	.763E+10	-.755E-02
378.0	.773E-07	-.732E+00	.125E+00	-.232E-08	.174E+04	.763E+10	-.687E-02

384.0	.617E-07	-.108E+00	.848E-01	-.265E-08	.174E+04	.763E+10	-.576E-02
390.0	.455E-07	.294E+00	.521E-01	-.258E-08	.174E+04	.763E+10	-.446E-02
396.0	.308E-07	.525E+00	.278E-01	-.226E-08	.174E+04	.763E+10	-.315E-02
402.0	.185E-07	.635E+00	.115E-01	-.180E-08	.174E+04	.763E+10	-.197E-02
408.0	.917E-08	.668E+00	.189E-02	-.129E-08	.174E+04	.763E+10	-.102E-02
414.0	.302E-08	.661E+00	-.249E-02	-.764E-09	.174E+04	.763E+10	-.350E-03
420.0	.186E-13	.641E+00	-.552E-01	-.252E-09	.174E+04	.763E+10	-.138E-01
426.0	-.273E-13	.155E-04	-.534E-01	-.155E-14	.174E+04	.763E+10	.134E-01
432.0	-.713E-18	-.578E-05	-.129E-05	.227E-14	.174E+04	.763E+10	.571E-06
438.0	.152E-18	-.216E-09	.481E-06	.594E-19	.174E+04	.763E+10	-.121E-06
444.0	.738E-23	.323E-10	.180E-10	-.127E-19	.174E+04	.763E+10	-.588E-11
450.0	-.851E-24	.193E-14	-.269E-11	-.615E-24	.174E+04	.763E+10	.674E-12
456.0	-.603E-28	-.180E-15	-.160E-15	.709E-25	.174E+04	.763E+10	.479E-16
462.0	.475E-29	-.148E-19	.150E-16	.502E-29	.174E+04	.763E+10	-.377E-17
468.0	.443E-33	.101E-20	.123E-20	-.396E-30	.174E+04	.763E+10	-.352E-21
474.0	-.265E-34	.324E-25	-.839E-22	-.655E-34	.174E+04	.763E+10	.210E-22
480.0	-.343E-33	.262E-25	-.101E-26	-.425E-34	.174E+04	.763E+10	.794E-29
486.0	-.536E-33	.204E-25	-.927E-27	-.242E-34	.174E+04	.763E+10	.127E-28
492.0	-.633E-33	.151E-25	-.816E-27	-.102E-34	.174E+04	.763E+10	.154E-28
498.0	-.659E-33	.106E-25	-.690E-27	-.624E-37	.174E+04	.763E+10	.164E-28
504.0	-.634E-33	.687E-26	-.560E-27	.681E-35	.174E+04	.763E+10	.161E-28
510.0	-.577E-33	.388E-26	-.437E-27	.110E-34	.174E+04	.763E+10	.150E-28
516.0	-.501E-33	.159E-26	-.324E-27	.132E-34	.174E+04	.763E+10	.133E-28
522.0	-.418E-33	-.562E-28	-.226E-27	.138E-34	.174E+04	.763E+10	.113E-28
528.0	-.336E-33	-.116E-26	-.144E-27	.133E-34	.174E+04	.763E+10	.929E-29
534.0	-.259E-33	-.183E-26	-.783E-28	.121E-34	.174E+04	.763E+10	.730E-29
540.0	-.190E-33	-.214E-26	-.274E-28	.106E-34	.174E+04	.763E+10	.548E-29
546.0	-.132E-33	-.219E-26	.974E-29	.888E-35	.174E+04	.763E+10	.387E-29
552.0	-.837E-34	-.205E-26	.351E-28	.721E-35	.174E+04	.763E+10	.250E-29
558.0	-.453E-34	-.179E-26	.505E-28	.570E-35	.174E+04	.763E+10	.138E-29
564.0	-.153E-34	-.146E-26	.579E-28	.442E-35	.174E+04	.763E+10	.475E-30
570.0	.778E-35	-.111E-26	.588E-28	.341E-35	.174E+04	.763E+10	-.246E-30
576.0	.256E-34	-.764E-27	.546E-28	.268E-35	.174E+04	.763E+10	-.826E-30
582.0	.399E-34	-.460E-27	.461E-28	.220E-35	.174E+04	.763E+10	-.131E-29
588.0	.520E-34	-.218E-27	.340E-28	.193E-35	.174E+04	.763E+10	-.173E-29
594.0	.631E-34	-.580E-28	.186E-28	.182E-35	.174E+04	.763E+10	-.214E-29
600.0	.738E-34	.000E+00	.000E+00	.180E-35	.174E+04	.763E+10	-.254E-29

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .153E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.126E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .272E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.465E-02
MAXIMUM BENDING MOMENT = .419E+06 LBS-IN
MAXIMUM SHEAR FORCE = .150E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .160E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.321E+00	-.353E-07	.160E+05	-.528E-02	.174E+04	.763E+10	-.278E+03
6.0	.289E+00	.989E+05	.143E+05	-.524E-02	.208E+04	.763E+10	-.296E+03
12.0	.258E+00	.187E+06	.125E+05	-.513E-02	.239E+04	.763E+10	-.312E+03
18.0	.228E+00	.264E+06	.105E+05	-.495E-02	.265E+04	.763E+10	-.326E+03
24.0	.199E+00	.328E+06	.855E+04	-.472E-02	.288E+04	.763E+10	-.338E+03
30.0	.171E+00	.380E+06	.649E+04	-.444E-02	.306E+04	.763E+10	-.348E+03
36.0	.145E+00	.420E+06	.438E+04	-.412E-02	.319E+04	.763E+10	-.355E+03
42.0	.122E+00	.445E+06	.223E+04	-.378E-02	.328E+04	.763E+10	-.360E+03
48.0	.999E-01	.458E+06	.677E+02	-.343E-02	.333E+04	.763E+10	-.362E+03
54.0	.804E-01	.456E+06	-.210E+04	-.307E-02	.332E+04	.763E+10	-.361E+03
60.0	.630E-01	.442E+06	-.349E+04	-.272E-02	.327E+04	.763E+10	-.101E+03
66.0	.478E-01	.423E+06	-.403E+04	-.238E-02	.320E+04	.763E+10	-.806E+02
72.0	.345E-01	.400E+06	-.449E+04	-.205E-02	.313E+04	.763E+10	-.723E+02
78.0	.231E-01	.375E+06	-.490E+04	-.175E-02	.304E+04	.763E+10	-.633E+02
84.0	.135E-01	.347E+06	-.525E+04	-.146E-02	.294E+04	.763E+10	-.530E+02
90.0	.558E-02	.316E+06	-.552E+04	-.120E-02	.283E+04	.763E+10	-.394E+02
96.0	-.888E-03	.284E+06	-.558E+04	-.967E-03	.272E+04	.763E+10	.214E+02
102.0	-.602E-02	.252E+06	-.539E+04	-.756E-03	.261E+04	.763E+10	.404E+02
108.0	-.996E-02	.222E+06	-.513E+04	-.569E-03	.251E+04	.763E+10	.478E+02
114.0	-.128E-01	.193E+06	-.483E+04	-.406E-03	.240E+04	.763E+10	.520E+02
120.0	-.148E-01	.165E+06	-.451E+04	-.266E-03	.231E+04	.763E+10	.546E+02
126.0	-.160E-01	.139E+06	-.418E+04	-.146E-03	.222E+04	.763E+10	.560E+02
132.0	-.166E-01	.115E+06	-.384E+04	-.458E-04	.214E+04	.763E+10	.567E+02
138.0	-.166E-01	.934E+05	-.350E+04	.363E-04	.206E+04	.763E+10	.567E+02
144.0	-.161E-01	.733E+05	-.316E+04	.102E-03	.199E+04	.763E+10	.562E+02
150.0	-.154E-01	.551E+05	-.283E+04	.152E-03	.193E+04	.763E+10	.552E+02
156.0	-.143E-01	.389E+05	-.250E+04	.189E-03	.187E+04	.763E+10	.540E+02
162.0	-.131E-01	.246E+05	-.218E+04	.214E-03	.182E+04	.763E+10	.524E+02
168.0	-.117E-01	.121E+05	-.187E+04	.229E-03	.178E+04	.763E+10	.505E+02
174.0	-.104E-01	.142E+04	-.157E+04	.234E-03	.174E+04	.763E+10	.484E+02
180.0	-.894E-02	-.751E+04	-.129E+04	.231E-03	.176E+04	.763E+10	.461E+02
186.0	-.757E-02	-.148E+05	-.102E+04	.223E-03	.179E+04	.763E+10	.436E+02
192.0	-.627E-02	-.204E+05	-.768E+03	.209E-03	.181E+04	.763E+10	.410E+02
198.0	-.507E-02	-.246E+05	-.531E+03	.191E-03	.182E+04	.763E+10	.382E+02
204.0	-.398E-02	-.274E+05	-.311E+03	.171E-03	.183E+04	.763E+10	.352E+02
210.0	-.302E-02	-.289E+05	-.109E+03	.149E-03	.184E+04	.763E+10	.321E+02
216.0	-.219E-02	-.291E+05	.740E+02	.126E-03	.184E+04	.763E+10	.289E+02
222.0	-.151E-02	-.284E+05	.237E+03	.103E-03	.183E+04	.763E+10	.255E+02
228.0	-.956E-03	-.266E+05	.379E+03	.816E-04	.183E+04	.763E+10	.219E+02
234.0	-.529E-03	-.240E+05	.499E+03	.616E-04	.182E+04	.763E+10	.180E+02
240.0	-.216E-03	-.208E+05	.593E+03	.440E-04	.181E+04	.763E+10	.133E+02
246.0	-.117E-05	-.171E+05	.640E+03	.291E-04	.180E+04	.763E+10	.232E+01
252.0	.133E-03	-.132E+05	.613E+03	.172E-04	.178E+04	.763E+10	-.113E+02
258.0	.205E-03	-.977E+04	.539E+03	.816E-05	.177E+04	.763E+10	-.131E+02
264.0	.231E-03	-.677E+04	.459E+03	.165E-05	.176E+04	.763E+10	-.136E+02
270.0	.225E-03	-.426E+04	.378E+03	-.268E-05	.175E+04	.763E+10	-.135E+02
276.0	.199E-03	-.223E+04	.298E+03	-.524E-05	.174E+04	.763E+10	-.130E+02
282.0	.162E-03	-.663E+03	.223E+03	-.637E-05	.174E+04	.763E+10	-.121E+02
288.0	.122E-03	.467E+03	.154E+03	-.645E-05	.174E+04	.763E+10	-.110E+02
294.0	.848E-04	.120E+04	.914E+02	-.579E-05	.174E+04	.763E+10	-.976E+01
300.0	.529E-04	.158E+04	.371E+02	-.470E-05	.174E+04	.763E+10	-.834E+01
306.0	.284E-04	.166E+04	-.826E+01	-.343E-05	.174E+04	.763E+10	-.678E+01
312.0	.117E-04	.149E+04	-.437E+02	-.219E-05	.174E+04	.763E+10	-.505E+01
318.0	.213E-05	.114E+04	-.674E+02	-.115E-05	.174E+04	.763E+10	-.286E+01

324.0	-.209E-05	.687E+03	-.675E+02	-.433E-06	.174E+04	.763E+10	.284E+01
330.0	-.307E-05	.333E+03	-.492E+02	-.321E-07	.174E+04	.763E+10	.323E+01
336.0	-.247E-05	.958E+02	-.305E+02	.137E-06	.174E+04	.763E+10	.300E+01
342.0	-.143E-05	-.334E+02	-.140E+02	.161E-06	.174E+04	.763E+10	.250E+01
348.0	-.538E-06	-.725E+02	-.104E+01	.120E-06	.174E+04	.763E+10	.181E+01
354.0	.790E-08	-.463E+02	.313E+01	.728E-07	.174E+04	.763E+10	-.454E+00
360.0	.336E-06	-.352E+02	.179E+01	.408E-07	.174E+04	.763E+10	-.269E-01
366.0	.497E-06	-.250E+02	.158E+01	.171E-07	.174E+04	.763E+10	-.423E-01
372.0	.541E-06	-.163E+02	.131E+01	.888E-09	.174E+04	.763E+10	-.486E-01
378.0	.508E-06	-.933E+01	.102E+01	-.919E-08	.174E+04	.763E+10	-.480E-01
384.0	.431E-06	-.408E+01	.742E+00	-.145E-07	.174E+04	.763E+10	-.428E-01
390.0	.334E-06	-.377E+00	.509E+00	-.162E-07	.174E+04	.763E+10	-.348E-01
396.0	.236E-06	.207E+01	.327E+00	-.155E-07	.174E+04	.763E+10	-.257E-01
402.0	.148E-06	.359E+01	.199E+00	-.133E-07	.174E+04	.763E+10	-.168E-01
408.0	.764E-07	.450E+01	.122E+00	-.101E-07	.174E+04	.763E+10	-.905E-02
414.0	.262E-07	.508E+01	.847E-01	-.636E-08	.174E+04	.763E+10	-.323E-02
420.0	.218E-10	.554E+01	-.423E+00	-.219E-08	.174E+04	.763E+10	-.152E+00
426.0	-.257E-10	.155E-01	-.462E+00	-.182E-11	.174E+04	.763E+10	.140E+00
432.0	-.696E-15	-.545E-02	-.129E-02	.214E-11	.174E+04	.763E+10	.673E-03
438.0	.144E-15	-.208E-06	.454E-03	.580E-16	.174E+04	.763E+10	-.139E-03
444.0	.710E-20	.304E-07	.174E-07	-.120E-16	.174E+04	.763E+10	-.686E-08
450.0	-.802E-21	.184E-11	-.253E-08	-.591E-21	.174E+04	.763E+10	.775E-09
456.0	-.576E-25	-.170E-12	-.154E-12	.668E-22	.174E+04	.763E+10	.556E-13
462.0	.448E-26	-.141E-16	.142E-13	.480E-26	.174E+04	.763E+10	-.433E-14
468.0	.422E-30	.949E-18	.117E-17	-.373E-27	.174E+04	.763E+10	-.408E-18
474.0	-.250E-31	.308E-22	-.791E-19	-.623E-31	.174E+04	.763E+10	.242E-19
480.0	-.326E-30	.249E-22	-.961E-24	-.404E-31	.174E+04	.763E+10	.918E-26
486.0	-.510E-30	.194E-22	-.882E-24	-.230E-31	.174E+04	.763E+10	.147E-25
492.0	-.602E-30	.144E-22	-.776E-24	-.971E-32	.174E+04	.763E+10	.178E-25
498.0	-.627E-30	.101E-22	-.656E-24	-.643E-34	.174E+04	.763E+10	.189E-25
504.0	-.603E-30	.654E-23	-.533E-24	.648E-32	.174E+04	.763E+10	.186E-25
510.0	-.549E-30	.369E-23	-.416E-24	.105E-31	.174E+04	.763E+10	.173E-25
516.0	-.477E-30	.152E-23	-.309E-24	.125E-31	.174E+04	.763E+10	.154E-25
522.0	-.398E-30	-.527E-25	-.215E-24	.131E-31	.174E+04	.763E+10	.131E-25
528.0	-.320E-30	-.111E-23	-.137E-24	.127E-31	.174E+04	.763E+10	.108E-25
534.0	-.246E-30	-.174E-23	-.745E-25	.115E-31	.174E+04	.763E+10	.845E-26
540.0	-.181E-30	-.204E-23	-.261E-25	.101E-31	.174E+04	.763E+10	.634E-26
546.0	-.125E-30	-.208E-23	.925E-26	.845E-32	.174E+04	.763E+10	.448E-26
552.0	-.797E-31	-.195E-23	.334E-25	.686E-32	.174E+04	.763E+10	.290E-26
558.0	-.431E-31	-.170E-23	.481E-25	.542E-32	.174E+04	.763E+10	.160E-26
564.0	-.146E-31	-.139E-23	.551E-25	.421E-32	.174E+04	.763E+10	.550E-27
570.0	.740E-32	-.105E-23	.560E-25	.325E-32	.174E+04	.763E+10	-.285E-27
576.0	.244E-31	-.727E-24	.519E-25	.255E-32	.174E+04	.763E+10	-.955E-27
582.0	.380E-31	-.438E-24	.439E-25	.209E-32	.174E+04	.763E+10	-.151E-26
588.0	.495E-31	-.207E-24	.324E-25	.184E-32	.174E+04	.763E+10	-.200E-26
594.0	.600E-31	-.552E-25	.177E-25	.173E-32	.174E+04	.763E+10	-.247E-26
600.0	.703E-31	.000E+00	.000E+00	.171E-32	.174E+04	.763E+10	-.294E-26

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.581E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.584E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .321E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.528E-02
MAXIMUM BENDING MOMENT = .458E+06 LBS-IN
MAXIMUM SHEAR FORCE = .160E+05 LBS
NO. OF ITERATIONS = 31

NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .170E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.374E+00	.106E-06	.170E+05	-.596E-02	.174E+04	.763E+10	-.289E+03
6.0	.338E+00	.106E+06	.152E+05	-.591E-02	.210E+04	.763E+10	-.308E+03
12.0	.303E+00	.200E+06	.133E+05	-.579E-02	.243E+04	.763E+10	-.325E+03
18.0	.268E+00	.283E+06	.113E+05	-.560E-02	.272E+04	.763E+10	-.340E+03
24.0	.235E+00	.353E+06	.924E+04	-.535E-02	.296E+04	.763E+10	-.353E+03
30.0	.204E+00	.410E+06	.709E+04	-.505E-02	.316E+04	.763E+10	-.364E+03
36.0	.175E+00	.453E+06	.489E+04	-.472E-02	.331E+04	.763E+10	-.372E+03
42.0	.147E+00	.483E+06	.264E+04	-.435E-02	.341E+04	.763E+10	-.378E+03
48.0	.122E+00	.498E+06	.360E+03	-.396E-02	.346E+04	.763E+10	-.381E+03
54.0	.999E-01	.499E+06	-.193E+04	-.357E-02	.347E+04	.763E+10	-.381E+03
60.0	.796E-01	.485E+06	-.340E+04	-.318E-02	.342E+04	.763E+10	-.109E+03
66.0	.617E-01	.468E+06	-.399E+04	-.281E-02	.336E+04	.763E+10	-.878E+02
72.0	.459E-01	.446E+06	-.449E+04	-.245E-02	.328E+04	.763E+10	-.796E+02
78.0	.323E-01	.421E+06	-.494E+04	-.211E-02	.320E+04	.763E+10	-.707E+02
84.0	.206E-01	.393E+06	-.534E+04	-.179E-02	.310E+04	.763E+10	-.609E+02
90.0	.108E-01	.362E+06	-.567E+04	-.149E-02	.299E+04	.763E+10	-.492E+02
96.0	.275E-02	.330E+06	-.591E+04	-.122E-02	.288E+04	.763E+10	-.311E+02
102.0	-.379E-02	.295E+06	-.590E+04	-.973E-03	.276E+04	.763E+10	.346E+02
108.0	-.893E-02	.262E+06	-.565E+04	-.754E-03	.264E+04	.763E+10	.461E+02
114.0	-.128E-01	.230E+06	-.536E+04	-.561E-03	.253E+04	.763E+10	.520E+02
120.0	-.157E-01	.199E+06	-.504E+04	-.392E-03	.243E+04	.763E+10	.556E+02
126.0	-.175E-01	.170E+06	-.470E+04	-.247E-03	.233E+04	.763E+10	.577E+02
132.0	-.186E-01	.143E+06	-.435E+04	-.124E-03	.223E+04	.763E+10	.589E+02
138.0	-.190E-01	.119E+06	-.399E+04	-.207E-04	.215E+04	.763E+10	.593E+02
144.0	-.189E-01	.956E+05	-.364E+04	.635E-04	.207E+04	.763E+10	.592E+02
150.0	-.183E-01	.747E+05	-.328E+04	.130E-03	.200E+04	.763E+10	.585E+02
156.0	-.173E-01	.558E+05	-.294E+04	.182E-03	.193E+04	.763E+10	.575E+02
162.0	-.161E-01	.389E+05	-.260E+04	.219E-03	.187E+04	.763E+10	.561E+02
168.0	-.147E-01	.240E+05	-.226E+04	.244E-03	.182E+04	.763E+10	.544E+02
174.0	-.132E-01	.110E+05	-.194E+04	.258E-03	.177E+04	.763E+10	.525E+02
180.0	-.116E-01	-.684E+02	-.164E+04	.262E-03	.174E+04	.763E+10	.503E+02
186.0	-.100E-01	-.937E+04	-.134E+04	.258E-03	.177E+04	.763E+10	.479E+02
192.0	-.849E-02	-.169E+05	-.106E+04	.248E-03	.179E+04	.763E+10	.453E+02
198.0	-.704E-02	-.228E+05	-.797E+03	.232E-03	.182E+04	.763E+10	.426E+02
204.0	-.570E-02	-.272E+05	-.550E+03	.213E-03	.183E+04	.763E+10	.397E+02
210.0	-.449E-02	-.301E+05	-.321E+03	.190E-03	.184E+04	.763E+10	.367E+02
216.0	-.342E-02	-.316E+05	-.111E+03	.166E-03	.185E+04	.763E+10	.335E+02
222.0	-.250E-02	-.319E+05	.801E+02	.141E-03	.185E+04	.763E+10	.302E+02
228.0	-.173E-02	-.311E+05	.251E+03	.116E-03	.184E+04	.763E+10	.267E+02
234.0	-.111E-02	-.293E+05	.400E+03	.923E-04	.184E+04	.763E+10	.230E+02
240.0	-.627E-03	-.266E+05	.526E+03	.704E-04	.183E+04	.763E+10	.190E+02
246.0	-.267E-03	-.232E+05	.626E+03	.508E-04	.182E+04	.763E+10	.143E+02
252.0	-.168E-04	-.192E+05	.686E+03	.342E-04	.180E+04	.763E+10	.568E+01
258.0	.143E-03	-.150E+05	.668E+03	.207E-04	.179E+04	.763E+10	-.116E+02

264.0	.232E-03	-.113E+05	.592E+03	.104E-04	.178E+04	.763E+10	-.136E+02
270.0	.267E-03	-.795E+04	.508E+03	.281E-05	.176E+04	.763E+10	-.143E+02
276.0	.265E-03	-.516E+04	.423E+03	-.234E-05	.175E+04	.763E+10	-.143E+02
282.0	.239E-03	-.287E+04	.339E+03	-.550E-05	.175E+04	.763E+10	-.138E+02
288.0	.199E-03	-.108E+04	.258E+03	-.705E-05	.174E+04	.763E+10	-.130E+02
294.0	.154E-03	.248E+03	.184E+03	-.738E-05	.174E+04	.763E+10	-.119E+02
300.0	.111E-03	.115E+04	.116E+03	-.683E-05	.174E+04	.763E+10	-.107E+02
306.0	.725E-04	.166E+04	.560E+02	-.573E-05	.174E+04	.763E+10	-.926E+01
312.0	.420E-04	.183E+04	.502E+01	-.436E-05	.174E+04	.763E+10	-.773E+01
318.0	.202E-04	.173E+04	-.363E+02	-.295E-05	.174E+04	.763E+10	-.606E+01
324.0	.661E-05	.141E+04	-.670E+02	-.172E-05	.174E+04	.763E+10	-.417E+01
330.0	-.378E-06	.933E+03	-.746E+02	-.798E-06	.174E+04	.763E+10	.160E+01
336.0	-.296E-05	.515E+03	-.601E+02	-.228E-06	.174E+04	.763E+10	.319E+01
342.0	-.312E-05	.212E+03	-.408E+02	.576E-07	.174E+04	.763E+10	.324E+01
348.0	-.227E-05	.258E+02	-.222E+02	.151E-06	.174E+04	.763E+10	.292E+01
354.0	-.131E-05	-.552E+02	-.614E+01	.140E-06	.174E+04	.763E+10	.242E+01
360.0	-.598E-06	-.483E+02	.132E+01	.989E-07	.174E+04	.763E+10	.474E-01
366.0	-.118E-06	-.397E+02	.149E+01	.643E-07	.174E+04	.763E+10	.954E-02
372.0	.174E-06	-.307E+02	.147E+01	.366E-07	.174E+04	.763E+10	-.161E-01
378.0	.322E-06	-.221E+02	.133E+01	.159E-07	.174E+04	.763E+10	-.308E-01
384.0	.365E-06	-.147E+02	.113E+01	.142E-08	.174E+04	.763E+10	-.365E-01
390.0	.339E-06	-.852E+01	.920E+00	-.770E-08	.174E+04	.763E+10	-.355E-01
396.0	.272E-06	-.362E+01	.724E+00	-.125E-07	.174E+04	.763E+10	-.298E-01
402.0	.189E-06	.210E+00	.571E+00	-.138E-07	.174E+04	.763E+10	-.216E-01
408.0	.106E-06	.327E+01	.468E+00	-.125E-07	.174E+04	.763E+10	-.127E-01
414.0	.395E-07	.587E+01	.416E+00	-.886E-08	.174E+04	.763E+10	-.488E-02
420.0	.140E-09	.828E+01	-.484E+00	-.330E-08	.174E+04	.763E+10	-.289E+00
426.0	-.978E-10	.712E-01	-.692E+00	-.117E-10	.174E+04	.763E+10	.225E+00
432.0	-.297E-14	-.207E-01	-.593E-02	.815E-11	.174E+04	.763E+10	.311E-02
438.0	.547E-15	-.861E-06	.173E-02	.248E-15	.174E+04	.763E+10	-.575E-03
444.0	.288E-19	.116E-06	.717E-07	-.455E-16	.174E+04	.763E+10	-.302E-07
450.0	-.305E-20	.740E-11	-.965E-08	-.240E-20	.174E+04	.763E+10	.321E-08
456.0	-.229E-24	-.647E-12	-.616E-12	.254E-21	.174E+04	.763E+10	.241E-12
462.0	.171E-25	-.558E-16	.539E-13	.191E-25	.174E+04	.763E+10	-.179E-13
468.0	.166E-29	.361E-17	.465E-17	-.142E-26	.174E+04	.763E+10	-.174E-17
474.0	-.953E-31	.121E-21	-.301E-18	-.245E-30	.174E+04	.763E+10	.100E-18
480.0	-.128E-29	.980E-22	-.377E-23	-.159E-30	.174E+04	.763E+10	.392E-25
486.0	-.200E-29	.762E-22	-.347E-23	-.905E-31	.174E+04	.763E+10	.628E-25
492.0	-.237E-29	.567E-22	-.305E-23	-.382E-31	.174E+04	.763E+10	.759E-25
498.0	-.246E-29	.398E-22	-.258E-23	-.318E-33	.174E+04	.763E+10	.808E-25
504.0	-.237E-29	.257E-22	-.210E-23	.254E-31	.174E+04	.763E+10	.796E-25
510.0	-.216E-29	.145E-22	-.163E-23	.412E-31	.174E+04	.763E+10	.740E-25
516.0	-.188E-29	.598E-23	-.121E-23	.493E-31	.174E+04	.763E+10	.658E-25
522.0	-.157E-29	-.197E-24	-.847E-24	.516E-31	.174E+04	.763E+10	.561E-25
528.0	-.126E-29	-.434E-23	-.540E-24	.498E-31	.174E+04	.763E+10	.459E-25
534.0	-.968E-30	-.683E-23	-.293E-24	.454E-31	.174E+04	.763E+10	.361E-25
540.0	-.712E-30	-.800E-23	-.103E-24	.396E-31	.174E+04	.763E+10	.271E-25
546.0	-.493E-30	-.818E-23	.361E-25	.332E-31	.174E+04	.763E+10	.191E-25
552.0	-.313E-30	-.766E-23	.131E-24	.270E-31	.174E+04	.763E+10	.124E-25
558.0	-.170E-30	-.669E-23	.189E-24	.213E-31	.174E+04	.763E+10	.684E-26
564.0	-.574E-31	-.546E-23	.217E-24	.165E-31	.174E+04	.763E+10	.236E-26
570.0	.290E-31	-.414E-23	.220E-24	.128E-31	.174E+04	.763E+10	-.121E-26
576.0	.958E-31	-.286E-23	.204E-24	.100E-31	.174E+04	.763E+10	-.408E-26
582.0	.149E-30	-.172E-23	.172E-24	.822E-32	.174E+04	.763E+10	-.646E-26
588.0	.194E-30	-.815E-24	.127E-24	.722E-32	.174E+04	.763E+10	-.856E-26
594.0	.236E-30	-.217E-24	.696E-25	.681E-32	.174E+04	.763E+10	-.106E-25
600.0	.276E-30	.000E+00	.000E+00	.673E-32	.174E+04	.763E+10	-.126E-25

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .125E-07 IN-LBS

THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .282E-08 LBS

OUTPUT SUMMARY

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PILE-HEAD DEFLECTION              =   .374E+00 IN
COMPUTED SLOPE AT PILE HEAD       =  -.596E-02
MAXIMUM BENDING MOMENT            =   .499E+06 LBS-IN
MAXIMUM SHEAR FORCE               =   .170E+05 LBS
NO. OF ITERATIONS                 =        32
NO. OF ZERO DEFLECTION POINTS     =        10
```

LOADING NUMBER 6

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BOUNDARY CONDITION CODE                  =         1
LATERAL LOAD AT THE PILE HEAD            =   .180E+05 LBS
MOMENT AT THE PILE HEAD                  =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD              =   .250E+06 LBS
```

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.432E+00	-.706E-07	.180E+05	-.668E-02	.174E+04	.763E+10	-.299E+03
6.0	.392E+00	.113E+06	.161E+05	-.664E-02	.213E+04	.763E+10	-.319E+03
12.0	.353E+00	.214E+06	.142E+05	-.651E-02	.248E+04	.763E+10	-.337E+03
18.0	.314E+00	.302E+06	.121E+05	-.630E-02	.279E+04	.763E+10	-.354E+03
24.0	.277E+00	.378E+06	.994E+04	-.604E-02	.305E+04	.763E+10	-.367E+03
30.0	.242E+00	.440E+06	.770E+04	-.572E-02	.326E+04	.763E+10	-.379E+03
36.0	.208E+00	.487E+06	.539E+04	-.535E-02	.343E+04	.763E+10	-.389E+03
42.0	.177E+00	.520E+06	.304E+04	-.496E-02	.354E+04	.763E+10	-.396E+03
48.0	.149E+00	.539E+06	.653E+03	-.454E-02	.361E+04	.763E+10	-.400E+03
54.0	.123E+00	.542E+06	-.175E+04	-.411E-02	.362E+04	.763E+10	-.402E+03
60.0	.995E-01	.530E+06	-.331E+04	-.369E-02	.358E+04	.763E+10	-.117E+03
66.0	.786E-01	.513E+06	-.395E+04	-.328E-02	.352E+04	.763E+10	-.952E+02
72.0	.601E-01	.492E+06	-.449E+04	-.289E-02	.345E+04	.763E+10	-.870E+02
78.0	.439E-01	.468E+06	-.499E+04	-.251E-02	.336E+04	.763E+10	-.784E+02
84.0	.300E-01	.440E+06	-.543E+04	-.215E-02	.326E+04	.763E+10	-.690E+02
90.0	.181E-01	.409E+06	-.581E+04	-.182E-02	.316E+04	.763E+10	-.584E+02
96.0	.817E-02	.376E+06	-.612E+04	-.151E-02	.304E+04	.763E+10	-.448E+02
102.0	.180E-05	.340E+06	-.626E+04	-.123E-02	.292E+04	.763E+10	-.264E+01
108.0	-.656E-02	.304E+06	-.615E+04	-.975E-03	.279E+04	.763E+10	.416E+02
114.0	-.117E-01	.269E+06	-.587E+04	-.749E-03	.267E+04	.763E+10	.504E+02
120.0	-.156E-01	.236E+06	-.555E+04	-.550E-03	.256E+04	.763E+10	.555E+02
126.0	-.183E-01	.204E+06	-.521E+04	-.377E-03	.245E+04	.763E+10	.585E+02
132.0	-.201E-01	.175E+06	-.486E+04	-.228E-03	.234E+04	.763E+10	.604E+02
138.0	-.210E-01	.147E+06	-.449E+04	-.102E-03	.225E+04	.763E+10	.613E+02
144.0	-.213E-01	.121E+06	-.412E+04	.360E-05	.216E+04	.763E+10	.616E+02
150.0	-.210E-01	.974E+05	-.375E+04	.895E-04	.207E+04	.763E+10	.613E+02
156.0	-.202E-01	.757E+05	-.339E+04	.158E-03	.200E+04	.763E+10	.605E+02
162.0	-.191E-01	.562E+05	-.303E+04	.209E-03	.193E+04	.763E+10	.594E+02
168.0	-.177E-01	.388E+05	-.268E+04	.247E-03	.187E+04	.763E+10	.579E+02
174.0	-.161E-01	.234E+05	-.233E+04	.271E-03	.182E+04	.763E+10	.561E+02
180.0	-.145E-01	.995E+04	-.200E+04	.284E-03	.177E+04	.763E+10	.541E+02
186.0	-.127E-01	-.152E+04	-.169E+04	.288E-03	.174E+04	.763E+10	.519E+02
192.0	-.110E-01	-.111E+05	-.138E+04	.283E-03	.177E+04	.763E+10	.494E+02
198.0	-.934E-02	-.189E+05	-.109E+04	.271E-03	.180E+04	.763E+10	.468E+02

204.0	-.776E-02	-.251E+05	-.820E+03	.254E-03	.182E+04	.763E+10	.440E+02
210.0	-.630E-02	-.296E+05	-.565E+03	.232E-03	.184E+04	.763E+10	.410E+02
216.0	-.497E-02	-.325E+05	-.329E+03	.208E-03	.185E+04	.763E+10	.379E+02
222.0	-.380E-02	-.341E+05	-.111E+03	.181E-03	.185E+04	.763E+10	.347E+02
228.0	-.280E-02	-.344E+05	.873E+02	.154E-03	.186E+04	.763E+10	.313E+02
234.0	-.195E-02	-.335E+05	.264E+03	.128E-03	.185E+04	.763E+10	.278E+02
240.0	-.126E-02	-.316E+05	.420E+03	.102E-03	.185E+04	.763E+10	.240E+02
246.0	-.724E-03	-.288E+05	.552E+03	.784E-04	.184E+04	.763E+10	.199E+02
252.0	-.322E-03	-.252E+05	.657E+03	.571E-04	.182E+04	.763E+10	.152E+02
258.0	-.387E-04	-.211E+05	.726E+03	.389E-04	.181E+04	.763E+10	.749E+01
264.0	.145E-03	-.166E+05	.714E+03	.241E-04	.179E+04	.763E+10	-.117E+02
270.0	.250E-03	-.126E+05	.637E+03	.126E-04	.178E+04	.763E+10	-.140E+02
276.0	.296E-03	-.904E+04	.550E+03	.409E-05	.177E+04	.763E+10	-.148E+02
282.0	.300E-03	-.601E+04	.461E+03	-.183E-05	.176E+04	.763E+10	-.149E+02
288.0	.274E-03	-.350E+04	.373E+03	-.556E-05	.175E+04	.763E+10	-.144E+02
294.0	.233E-03	-.151E+04	.289E+03	-.754E-05	.174E+04	.763E+10	-.137E+02
300.0	.184E-03	-.105E+02	.210E+03	-.813E-05	.174E+04	.763E+10	-.126E+02
306.0	.135E-03	.103E+04	.138E+03	-.773E-05	.174E+04	.763E+10	-.114E+02
312.0	.912E-04	.167E+04	.738E+02	-.667E-05	.174E+04	.763E+10	-.100E+02
318.0	.551E-04	.194E+04	.184E+02	-.525E-05	.174E+04	.763E+10	-.846E+01
324.0	.282E-04	.191E+04	-.272E+02	-.374E-05	.174E+04	.763E+10	-.677E+01
330.0	.103E-04	.162E+04	-.620E+02	-.235E-05	.174E+04	.763E+10	-.484E+01
336.0	.547E-07	.117E+04	-.789E+02	-.125E-05	.174E+04	.763E+10	-.874E+00
342.0	-.469E-05	.682E+03	-.701E+02	-.522E-06	.174E+04	.763E+10	.372E+01
348.0	-.621E-05	.329E+03	-.466E+02	-.124E-06	.174E+04	.763E+10	.408E+01
354.0	-.618E-05	.123E+03	-.221E+02	.538E-07	.174E+04	.763E+10	.407E+01
360.0	-.556E-05	.635E+02	-.855E+01	.127E-06	.174E+04	.763E+10	.446E+00
366.0	-.465E-05	.200E+02	-.603E+01	.160E-06	.174E+04	.763E+10	.395E+00
372.0	-.364E-05	-.927E+01	-.386E+01	.164E-06	.174E+04	.763E+10	.327E+00
378.0	-.268E-05	-.268E+02	-.211E+01	.150E-06	.174E+04	.763E+10	.253E+00
384.0	-.184E-05	-.351E+02	-.804E+00	.126E-06	.174E+04	.763E+10	.183E+00
390.0	-.117E-05	-.368E+02	.112E+00	.975E-07	.174E+04	.763E+10	.122E+00
396.0	-.672E-06	-.340E+02	.698E+00	.696E-07	.174E+04	.763E+10	.732E-01
402.0	-.334E-06	-.286E+02	.103E+01	.450E-07	.174E+04	.763E+10	.380E-01
408.0	-.132E-06	-.218E+02	.119E+01	.252E-07	.174E+04	.763E+10	.156E-01
414.0	-.320E-07	-.144E+02	.125E+01	.110E-07	.174E+04	.763E+10	.395E-02
420.0	.109E-12	-.678E+01	.120E+01	.267E-08	.174E+04	.763E+10	-.288E-01
426.0	.467E-10	-.198E-01	.566E+00	-.899E-14	.174E+04	.763E+10	-.171E+00
432.0	.104E-14	.989E-02	.165E-02	-.389E-11	.174E+04	.763E+10	-.100E-02
438.0	-.261E-15	.332E-06	-.825E-03	-.869E-16	.174E+04	.763E+10	.251E-03
444.0	-.117E-19	-.553E-07	-.276E-07	.217E-16	.174E+04	.763E+10	.112E-07
450.0	.146E-20	-.309E-11	.461E-08	.971E-21	.174E+04	.763E+10	-.140E-08
456.0	.977E-25	.309E-12	.257E-12	-.121E-21	.174E+04	.763E+10	-.941E-13
462.0	-.814E-26	.241E-16	-.257E-13	-.814E-26	.174E+04	.763E+10	.784E-14
468.0	-.728E-30	-.172E-17	-.201E-17	.678E-27	.174E+04	.763E+10	.701E-18
474.0	.455E-31	-.533E-22	.144E-18	.108E-30	.174E+04	.763E+10	-.438E-19
480.0	.567E-30	-.432E-22	.166E-23	.699E-31	.174E+04	.763E+10	-.159E-25
486.0	.885E-30	-.336E-22	.153E-23	.398E-31	.174E+04	.763E+10	-.254E-25
492.0	.104E-29	-.249E-22	.134E-23	.167E-31	.174E+04	.763E+10	-.307E-25
498.0	.109E-29	-.175E-22	.114E-23	.661E-34	.174E+04	.763E+10	-.327E-25
504.0	.104E-29	-.113E-22	.923E-24	-.113E-31	.174E+04	.763E+10	-.322E-25
510.0	.950E-30	-.638E-23	.720E-24	-.182E-31	.174E+04	.763E+10	-.299E-25
516.0	.826E-30	-.262E-23	.534E-24	-.217E-31	.174E+04	.763E+10	-.266E-25
522.0	.690E-30	.985E-25	.373E-24	-.227E-31	.174E+04	.763E+10	-.226E-25
528.0	.553E-30	.192E-23	.238E-24	-.219E-31	.174E+04	.763E+10	-.185E-25
534.0	.426E-30	.301E-23	.129E-24	-.200E-31	.174E+04	.763E+10	-.146E-25
540.0	.313E-30	.353E-23	.451E-25	-.174E-31	.174E+04	.763E+10	-.109E-25
546.0	.217E-30	.361E-23	-.162E-25	-.146E-31	.174E+04	.763E+10	-.772E-26
552.0	.138E-30	.338E-23	-.579E-25	-.119E-31	.174E+04	.763E+10	-.500E-26
558.0	.745E-31	.295E-23	-.833E-25	-.939E-32	.174E+04	.763E+10	-.275E-26
564.0	.251E-31	.241E-23	-.955E-25	-.728E-32	.174E+04	.763E+10	-.946E-27
570.0	-.129E-31	.182E-23	-.970E-25	-.562E-32	.174E+04	.763E+10	.494E-27
576.0	-.423E-31	.126E-23	-.899E-25	-.441E-32	.174E+04	.763E+10	.165E-26

582.0	-.658E-31	.758E-24	-.759E-25	-.361E-32	.174E+04	.763E+10	.261E-26
588.0	-.857E-31	.359E-24	-.560E-25	-.317E-32	.174E+04	.763E+10	.346E-26
594.0	-.104E-30	.956E-25	-.307E-25	-.300E-32	.174E+04	.763E+10	.427E-26
600.0	-.122E-30	.000E+00	.000E+00	-.296E-32	.174E+04	.763E+10	.508E-26

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .125E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .129E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .432E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.668E-02
MAXIMUM BENDING MOMENT = .542E+06 LBS-IN
MAXIMUM SHEAR FORCE = .180E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 7

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .190E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.497E+00	.118E-06	.190E+05	-.745E-02	.174E+04	.763E+10	-.310E+03
6.0	.452E+00	.120E+06	.171E+05	-.740E-02	.215E+04	.763E+10	-.331E+03
12.0	.408E+00	.227E+06	.150E+05	-.727E-02	.252E+04	.763E+10	-.350E+03
18.0	.365E+00	.322E+06	.129E+05	-.705E-02	.285E+04	.763E+10	-.367E+03
24.0	.323E+00	.403E+06	.106E+05	-.677E-02	.313E+04	.763E+10	-.382E+03
30.0	.284E+00	.470E+06	.831E+04	-.642E-02	.337E+04	.763E+10	-.395E+03
36.0	.246E+00	.522E+06	.591E+04	-.603E-02	.355E+04	.763E+10	-.405E+03
42.0	.211E+00	.559E+06	.345E+04	-.561E-02	.368E+04	.763E+10	-.413E+03
48.0	.179E+00	.580E+06	.955E+03	-.516E-02	.375E+04	.763E+10	-.419E+03
54.0	.149E+00	.586E+06	-.157E+04	-.470E-02	.377E+04	.763E+10	-.422E+03
60.0	.122E+00	.575E+06	-.321E+04	-.424E-02	.373E+04	.763E+10	-.126E+03
66.0	.983E-01	.560E+06	-.389E+04	-.380E-02	.368E+04	.763E+10	-.103E+03
72.0	.768E-01	.540E+06	-.448E+04	-.337E-02	.361E+04	.763E+10	-.944E+02
78.0	.579E-01	.516E+06	-.502E+04	-.295E-02	.353E+04	.763E+10	-.859E+02
84.0	.414E-01	.489E+06	-.551E+04	-.256E-02	.343E+04	.763E+10	-.769E+02
90.0	.272E-01	.458E+06	-.594E+04	-.218E-02	.333E+04	.763E+10	-.668E+02
96.0	.152E-01	.424E+06	-.631E+04	-.184E-02	.321E+04	.763E+10	-.550E+02
102.0	.519E-02	.388E+06	-.659E+04	-.152E-02	.308E+04	.763E+10	-.385E+02
108.0	-.300E-02	.349E+06	-.661E+04	-.123E-02	.295E+04	.763E+10	.320E+02
114.0	-.954E-02	.312E+06	-.637E+04	-.968E-03	.282E+04	.763E+10	.471E+02
120.0	-.146E-01	.276E+06	-.607E+04	-.737E-03	.269E+04	.763E+10	.543E+02
126.0	-.184E-01	.241E+06	-.573E+04	-.534E-03	.257E+04	.763E+10	.586E+02
132.0	-.210E-01	.209E+06	-.537E+04	-.357E-03	.246E+04	.763E+10	.613E+02
138.0	-.227E-01	.178E+06	-.500E+04	-.205E-03	.235E+04	.763E+10	.629E+02

144.0	-.235E-01	.149E+06	-.462E+04	-.762E-04	.225E+04	.763E+10	.636E+02
150.0	-.236E-01	.123E+06	-.424E+04	.308E-04	.216E+04	.763E+10	.637E+02
156.0	-.231E-01	.983E+05	-.385E+04	.118E-03	.208E+04	.763E+10	.633E+02
162.0	-.222E-01	.761E+05	-.348E+04	.186E-03	.200E+04	.763E+10	.624E+02
168.0	-.209E-01	.561E+05	-.311E+04	.238E-03	.193E+04	.763E+10	.612E+02
174.0	-.193E-01	.381E+05	-.274E+04	.275E-03	.187E+04	.763E+10	.596E+02
180.0	-.176E-01	.223E+05	-.239E+04	.299E-03	.181E+04	.763E+10	.578E+02
186.0	-.157E-01	.853E+04	-.205E+04	.311E-03	.177E+04	.763E+10	.557E+02
192.0	-.138E-01	-.325E+04	-.172E+04	.313E-03	.175E+04	.763E+10	.533E+02
198.0	-.120E-01	-.131E+05	-.141E+04	.307E-03	.178E+04	.763E+10	.508E+02
204.0	-.102E-01	-.211E+05	-.112E+04	.293E-03	.181E+04	.763E+10	.481E+02
210.0	-.844E-02	-.274E+05	-.836E+03	.274E-03	.183E+04	.763E+10	.452E+02
216.0	-.686E-02	-.320E+05	-.573E+03	.251E-03	.185E+04	.763E+10	.422E+02
222.0	-.543E-02	-.350E+05	-.330E+03	.225E-03	.186E+04	.763E+10	.391E+02
228.0	-.417E-02	-.366E+05	-.105E+03	.196E-03	.186E+04	.763E+10	.357E+02
234.0	-.307E-02	-.369E+05	.991E+02	.168E-03	.186E+04	.763E+10	.323E+02
240.0	-.216E-02	-.359E+05	.282E+03	.139E-03	.186E+04	.763E+10	.287E+02
246.0	-.141E-02	-.339E+05	.443E+03	.112E-03	.185E+04	.763E+10	.249E+02
252.0	-.818E-03	-.309E+05	.580E+03	.860E-04	.184E+04	.763E+10	.208E+02
258.0	-.375E-03	-.272E+05	.690E+03	.632E-04	.183E+04	.763E+10	.160E+02
264.0	-.597E-04	-.228E+05	.764E+03	.435E-04	.182E+04	.763E+10	.868E+01
270.0	.147E-03	-.182E+05	.755E+03	.274E-04	.180E+04	.763E+10	-.117E+02
276.0	.269E-03	-.139E+05	.677E+03	.148E-04	.178E+04	.763E+10	-.143E+02
282.0	.325E-03	-.101E+05	.588E+03	.536E-05	.177E+04	.763E+10	-.153E+02
288.0	.333E-03	-.682E+04	.496E+03	-.128E-05	.176E+04	.763E+10	-.154E+02
294.0	.309E-03	-.411E+04	.405E+03	-.558E-05	.175E+04	.763E+10	-.150E+02
300.0	.266E-03	-.194E+04	.317E+03	-.795E-05	.174E+04	.763E+10	-.143E+02
306.0	.214E-03	-.280E+03	.235E+03	-.883E-05	.174E+04	.763E+10	-.133E+02
312.0	.160E-03	.902E+03	.158E+03	-.858E-05	.174E+04	.763E+10	-.121E+02
318.0	.111E-03	.165E+04	.903E+02	-.758E-05	.174E+04	.763E+10	-.107E+02
324.0	.691E-04	.201E+04	.310E+02	-.614E-05	.174E+04	.763E+10	-.912E+01
330.0	.370E-04	.204E+04	-.186E+02	-.455E-05	.174E+04	.763E+10	-.741E+01
336.0	.145E-04	.180E+04	-.570E+02	-.304E-05	.174E+04	.763E+10	-.542E+01
342.0	.515E-06	.136E+04	-.786E+02	-.180E-05	.174E+04	.763E+10	-.179E+01
348.0	-.706E-05	.861E+03	-.711E+02	-.924E-06	.174E+04	.763E+10	.426E+01
354.0	-.106E-04	.512E+03	-.437E+02	-.384E-06	.174E+04	.763E+10	.488E+01
360.0	-.117E-04	.338E+03	-.262E+02	-.499E-07	.174E+04	.763E+10	.937E+00
366.0	-.112E-04	.197E+03	-.206E+02	.161E-06	.174E+04	.763E+10	.951E+00
372.0	-.975E-05	.906E+02	-.151E+02	.274E-06	.174E+04	.763E+10	.876E+00
378.0	-.789E-05	.153E+02	-.102E+02	.315E-06	.174E+04	.763E+10	.747E+00
384.0	-.596E-05	-.331E+02	-.621E+01	.308E-06	.174E+04	.763E+10	.593E+00
390.0	-.419E-05	-.602E+02	-.312E+01	.272E-06	.174E+04	.763E+10	.437E+00
396.0	-.270E-05	-.714E+02	-.925E+00	.220E-06	.174E+04	.763E+10	.295E+00
402.0	-.155E-05	-.719E+02	.489E+00	.164E-06	.174E+04	.763E+10	.177E+00
408.0	-.737E-06	-.660E+02	.128E+01	.109E-06	.174E+04	.763E+10	.875E-01
414.0	-.236E-06	-.569E+02	.163E+01	.611E-07	.174E+04	.763E+10	.292E-01
420.0	-.395E-08	-.466E+02	.437E+01	.204E-07	.174E+04	.763E+10	.884E+00
426.0	.854E-08	-.444E+01	.403E+01	.336E-09	.174E+04	.763E+10	-.100E+01
432.0	.813E-10	.177E+01	.371E+00	-.712E-09	.174E+04	.763E+10	-.207E+00
438.0	-.890E-12	.176E-01	-.148E+00	-.678E-11	.174E+04	.763E+10	.464E-01
444.0	-.474E-15	-.188E-03	-.147E-02	.742E-13	.174E+04	.763E+10	.469E-03
450.0	.496E-17	-.103E-06	.157E-04	.395E-16	.174E+04	.763E+10	-.502E-05
456.0	.276E-20	.105E-08	.855E-08	-.413E-18	.174E+04	.763E+10	-.273E-08
462.0	-.277E-22	.597E-12	-.875E-10	-.230E-21	.174E+04	.763E+10	.280E-10
468.0	-.160E-25	-.585E-14	-.497E-13	.230E-23	.174E+04	.763E+10	.159E-13
474.0	.154E-27	-.111E-17	.488E-15	.226E-26	.174E+04	.763E+10	-.156E-15
480.0	.111E-25	-.898E-18	.343E-19	.148E-26	.174E+04	.763E+10	-.321E-21
486.0	.179E-25	-.700E-18	.316E-19	.848E-27	.174E+04	.763E+10	-.528E-21
492.0	.213E-25	-.521E-18	.278E-19	.367E-27	.174E+04	.763E+10	-.644E-21
498.0	.223E-25	-.367E-18	.236E-19	.180E-28	.174E+04	.763E+10	-.689E-21
504.0	.215E-25	-.239E-18	.192E-19	-.220E-27	.174E+04	.763E+10	-.681E-21
510.0	.196E-25	-.136E-18	.150E-19	-.368E-27	.174E+04	.763E+10	-.635E-21
516.0	.171E-25	-.575E-19	.112E-19	-.444E-27	.174E+04	.763E+10	-.565E-21

522.0	.143E-25	-.636E-21	.782E-20	-.466E-27	.174E+04	.763E+10	-.483E-21
528.0	.115E-25	.377E-19	.501E-20	-.452E-27	.174E+04	.763E+10	-.397E-21
534.0	.888E-26	.609E-19	.275E-20	-.413E-27	.174E+04	.763E+10	-.312E-21
540.0	.655E-26	.720E-19	.100E-20	-.361E-27	.174E+04	.763E+10	-.235E-21
546.0	.455E-26	.740E-19	-.280E-21	-.303E-27	.174E+04	.763E+10	-.167E-21
552.0	.291E-26	.695E-19	-.116E-20	-.247E-27	.174E+04	.763E+10	-.108E-21
558.0	.159E-26	.608E-19	-.170E-20	-.196E-27	.174E+04	.763E+10	-.604E-22
564.0	.559E-27	.497E-19	-.196E-20	-.152E-27	.174E+04	.763E+10	-.216E-22
570.0	-.237E-27	.378E-19	-.200E-20	-.118E-27	.174E+04	.763E+10	.935E-23
576.0	-.855E-27	.261E-19	-.186E-20	-.928E-28	.174E+04	.763E+10	.343E-22
582.0	-.135E-26	.157E-19	-.157E-20	-.763E-28	.174E+04	.763E+10	.551E-22
588.0	-.177E-26	.746E-20	-.116E-20	-.672E-28	.174E+04	.763E+10	.735E-22
594.0	-.216E-26	.199E-20	-.638E-21	-.635E-28	.174E+04	.763E+10	.910E-22
600.0	-.253E-26	.000E+00	.000E+00	-.627E-28	.174E+04	.763E+10	.109E-21

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .162E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.143E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .497E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.745E-02
MAXIMUM BENDING MOMENT = .586E+06 LBS-IN
MAXIMUM SHEAR FORCE = .190E+05 LBS
NO. OF ITERATIONS = 33
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 8

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .200E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.566E+00	.941E-07	.200E+05	-.827E-02	.174E+04	.763E+10	-.320E+03
6.0	.517E+00	.127E+06	.180E+05	-.822E-02	.218E+04	.763E+10	-.342E+03
12.0	.468E+00	.241E+06	.159E+05	-.808E-02	.257E+04	.763E+10	-.362E+03
18.0	.420E+00	.342E+06	.137E+05	-.785E-02	.292E+04	.763E+10	-.380E+03
24.0	.374E+00	.428E+06	.113E+05	-.755E-02	.322E+04	.763E+10	-.396E+03
30.0	.329E+00	.500E+06	.893E+04	-.718E-02	.347E+04	.763E+10	-.410E+03
36.0	.287E+00	.557E+06	.643E+04	-.677E-02	.367E+04	.763E+10	-.421E+03
42.0	.248E+00	.598E+06	.388E+04	-.631E-02	.381E+04	.763E+10	-.430E+03
48.0	.212E+00	.623E+06	.128E+04	-.583E-02	.390E+04	.763E+10	-.437E+03
54.0	.178E+00	.631E+06	-.135E+04	-.534E-02	.393E+04	.763E+10	-.441E+03
60.0	.148E+00	.622E+06	-.308E+04	-.485E-02	.390E+04	.763E+10	-.134E+03
66.0	.120E+00	.608E+06	-.381E+04	-.436E-02	.385E+04	.763E+10	-.110E+03
72.0	.952E-01	.590E+06	-.444E+04	-.389E-02	.378E+04	.763E+10	-.101E+03
78.0	.733E-01	.567E+06	-.502E+04	-.344E-02	.370E+04	.763E+10	-.930E+02

84.0	.540E-01	.540E+06	-.556E+04	-.300E-02	.361E+04	.763E+10	-.840E+02
90.0	.373E-01	.509E+06	-.603E+04	-.259E-02	.350E+04	.763E+10	-.742E+02
96.0	.229E-01	.475E+06	-.644E+04	-.220E-02	.339E+04	.763E+10	-.631E+02
102.0	.108E-01	.438E+06	-.678E+04	-.184E-02	.326E+04	.763E+10	-.492E+02
108.0	.826E-03	.399E+06	-.699E+04	-.151E-02	.312E+04	.763E+10	-.208E+02
114.0	-.731E-02	.359E+06	-.692E+04	-.121E-02	.298E+04	.763E+10	.431E+02
120.0	-.138E-01	.320E+06	-.663E+04	-.948E-03	.285E+04	.763E+10	.532E+02
126.0	-.187E-01	.282E+06	-.630E+04	-.711E-03	.272E+04	.763E+10	.590E+02
132.0	-.223E-01	.246E+06	-.593E+04	-.503E-03	.259E+04	.763E+10	.625E+02
138.0	-.247E-01	.213E+06	-.555E+04	-.323E-03	.247E+04	.763E+10	.647E+02
144.0	-.262E-01	.181E+06	-.516E+04	-.168E-03	.236E+04	.763E+10	.660E+02
150.0	-.267E-01	.151E+06	-.476E+04	-.374E-04	.226E+04	.763E+10	.664E+02
156.0	-.266E-01	.124E+06	-.436E+04	.707E-04	.217E+04	.763E+10	.663E+02
162.0	-.259E-01	.986E+05	-.397E+04	.158E-03	.208E+04	.763E+10	.657E+02
168.0	-.247E-01	.757E+05	-.358E+04	.227E-03	.200E+04	.763E+10	.647E+02
174.0	-.232E-01	.551E+05	-.319E+04	.278E-03	.193E+04	.763E+10	.633E+02
180.0	-.214E-01	.366E+05	-.282E+04	.314E-03	.186E+04	.763E+10	.617E+02
186.0	-.194E-01	.203E+05	-.245E+04	.337E-03	.181E+04	.763E+10	.597E+02
192.0	-.173E-01	.615E+04	-.210E+04	.347E-03	.176E+04	.763E+10	.575E+02
198.0	-.152E-01	-.594E+04	-.176E+04	.347E-03	.176E+04	.763E+10	.551E+02
204.0	-.132E-01	-.160E+05	-.144E+04	.338E-03	.179E+04	.763E+10	.525E+02
210.0	-.112E-01	-.242E+05	-.113E+04	.323E-03	.182E+04	.763E+10	.497E+02
216.0	-.930E-02	-.306E+05	-.845E+03	.301E-03	.184E+04	.763E+10	.467E+02
222.0	-.756E-02	-.353E+05	-.574E+03	.275E-03	.186E+04	.763E+10	.436E+02
228.0	-.600E-02	-.383E+05	-.322E+03	.246E-03	.187E+04	.763E+10	.404E+02
234.0	-.461E-02	-.399E+05	-.902E+02	.215E-03	.187E+04	.763E+10	.370E+02
240.0	-.341E-02	-.401E+05	.121E+03	.184E-03	.188E+04	.763E+10	.334E+02
246.0	-.240E-02	-.390E+05	.311E+03	.153E-03	.187E+04	.763E+10	.298E+02
252.0	-.158E-02	-.368E+05	.478E+03	.123E-03	.186E+04	.763E+10	.259E+02
258.0	-.925E-03	-.336E+05	.620E+03	.954E-04	.185E+04	.763E+10	.216E+02
264.0	-.433E-03	-.296E+05	.735E+03	.705E-04	.184E+04	.763E+10	.168E+02
270.0	-.795E-04	-.250E+05	.815E+03	.490E-04	.182E+04	.763E+10	.955E+01
276.0	.155E-03	-.200E+05	.808E+03	.313E-04	.181E+04	.763E+10	-.120E+02
282.0	.296E-03	-.154E+05	.727E+03	.174E-04	.179E+04	.763E+10	-.148E+02
288.0	.364E-03	-.113E+05	.635E+03	.685E-05	.178E+04	.763E+10	-.159E+02
294.0	.378E-03	-.781E+04	.540E+03	-.685E-06	.176E+04	.763E+10	-.161E+02
300.0	.356E-03	-.486E+04	.444E+03	-.567E-05	.175E+04	.763E+10	-.157E+02
306.0	.310E-03	-.247E+04	.352E+03	-.855E-05	.174E+04	.763E+10	-.150E+02
312.0	.253E-03	-.611E+03	.265E+03	-.976E-05	.174E+04	.763E+10	-.141E+02
318.0	.193E-03	.739E+03	.184E+03	-.971E-05	.174E+04	.763E+10	-.128E+02
324.0	.137E-03	.163E+04	.111E+03	-.878E-05	.174E+04	.763E+10	-.114E+02
330.0	.877E-04	.210E+04	.472E+02	-.731E-05	.174E+04	.763E+10	-.987E+01
336.0	.488E-04	.221E+04	-.676E+01	-.562E-05	.174E+04	.763E+10	-.812E+01
342.0	.203E-04	.203E+04	-.493E+02	-.395E-05	.174E+04	.763E+10	-.606E+01
348.0	.139E-05	.163E+04	-.749E+02	-.251E-05	.174E+04	.763E+10	-.248E+01
354.0	-.979E-05	.114E+04	-.681E+02	-.141E-05	.174E+04	.763E+10	.475E+01
360.0	-.156E-04	.822E+03	-.501E+02	-.642E-06	.174E+04	.763E+10	.125E+01
366.0	-.175E-04	.544E+03	-.418E+02	-.105E-06	.174E+04	.763E+10	.149E+01
372.0	-.168E-04	.320E+03	-.328E+02	.235E-06	.174E+04	.763E+10	.151E+01
378.0	-.147E-04	.149E+03	-.241E+02	.419E-06	.174E+04	.763E+10	.139E+01
384.0	-.118E-04	.290E+02	-.164E+02	.490E-06	.174E+04	.763E+10	.117E+01
390.0	-.879E-05	-.493E+02	-.102E+02	.482E-06	.174E+04	.763E+10	.918E+00
396.0	-.602E-05	-.945E+02	-.544E+01	.425E-06	.174E+04	.763E+10	.657E+00
402.0	-.369E-05	-.116E+03	-.221E+01	.342E-06	.174E+04	.763E+10	.421E+00
408.0	-.191E-05	-.122E+03	-.267E+00	.249E-06	.174E+04	.763E+10	.227E+00
414.0	-.707E-06	-.120E+03	.675E+00	.154E-06	.174E+04	.763E+10	.873E-01
420.0	-.670E-07	-.114E+03	.777E+01	.617E-07	.174E+04	.763E+10	.227E+01
426.0	.332E-07	-.268E+02	.988E+01	.615E-08	.174E+04	.763E+10	-.157E+01
432.0	.681E-08	.416E+01	.236E+01	-.277E-08	.174E+04	.763E+10	-.922E+00
438.0	-.826E-12	.144E+01	-.346E+00	-.567E-09	.174E+04	.763E+10	.523E-01
444.0	-.364E-12	-.209E-04	-.120E+00	.688E-13	.174E+04	.763E+10	.326E-01
450.0	-.351E-17	-.771E-04	.175E-05	.303E-13	.174E+04	.763E+10	-.229E-06
456.0	.203E-17	-.161E-08	.642E-05	.293E-18	.174E+04	.763E+10	-.174E-05

462.0	.650E-22	.431E-09	.134E-09	-.169E-18	.174E+04	.763E+10	-.376E-10
468.0	-.114E-22	.186E-13	-.359E-10	-.542E-23	.174E+04	.763E+10	.973E-11
474.0	-.514E-27	-.774E-15	-.160E-14	.159E-23	.174E+04	.763E+10	.340E-15
480.0	.770E-23	-.628E-15	.239E-16	.104E-23	.174E+04	.763E+10	-.192E-18
486.0	.124E-22	-.490E-15	.221E-16	.596E-24	.174E+04	.763E+10	-.318E-18
492.0	.149E-22	-.365E-15	.195E-16	.260E-24	.174E+04	.763E+10	-.389E-18
498.0	.155E-22	-.257E-15	.165E-16	.148E-25	.174E+04	.763E+10	-.416E-18
504.0	.150E-22	-.167E-15	.134E-16	-.152E-24	.174E+04	.763E+10	-.412E-18
510.0	.137E-22	-.956E-16	.105E-16	-.256E-24	.174E+04	.763E+10	-.384E-18
516.0	.120E-22	-.407E-16	.782E-17	-.309E-24	.174E+04	.763E+10	-.342E-18
522.0	.100E-22	-.813E-18	.548E-17	-.326E-24	.174E+04	.763E+10	-.292E-18
528.0	.805E-23	.261E-16	.352E-17	-.316E-24	.174E+04	.763E+10	-.240E-18
534.0	.622E-23	.424E-16	.193E-17	-.289E-24	.174E+04	.763E+10	-.189E-18
540.0	.459E-23	.502E-16	.710E-18	-.252E-24	.174E+04	.763E+10	-.142E-18
546.0	.319E-23	.516E-16	-.188E-18	-.212E-24	.174E+04	.763E+10	-.101E-18
552.0	.204E-23	.486E-16	-.804E-18	-.173E-24	.174E+04	.763E+10	-.659E-19
558.0	.112E-23	.425E-16	-.118E-17	-.137E-24	.174E+04	.763E+10	-.368E-19
564.0	.396E-24	.348E-16	-.137E-17	-.107E-24	.174E+04	.763E+10	-.133E-19
570.0	-.162E-24	.264E-16	-.140E-17	-.826E-25	.174E+04	.763E+10	.552E-20
576.0	-.595E-24	.183E-16	-.130E-17	-.651E-25	.174E+04	.763E+10	.207E-19
582.0	-.943E-24	.110E-16	-.110E-17	-.536E-25	.174E+04	.763E+10	.333E-19
588.0	-.124E-23	.522E-17	-.814E-18	-.472E-25	.174E+04	.763E+10	.445E-19
594.0	-.151E-23	.139E-17	-.446E-18	-.446E-25	.174E+04	.763E+10	.551E-19
600.0	-.177E-23	.000E+00	.000E+00	-.440E-25	.174E+04	.763E+10	.659E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .860E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .749E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .566E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.827E-02
MAXIMUM BENDING MOMENT = .631E+06 LBS-IN
MAXIMUM SHEAR FORCE = .200E+05 LBS
NO. OF ITERATIONS = 32
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 9

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .210E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.644E+00	.471E-06	.210E+05	-.914E-02	.174E+04	.763E+10	-.331E+03
6.0	.589E+00	.134E+06	.189E+05	-.909E-02	.220E+04	.763E+10	-.354E+03
12.0	.535E+00	.255E+06	.168E+05	-.893E-02	.262E+04	.763E+10	-.374E+03
18.0	.482E+00	.362E+06	.145E+05	-.869E-02	.299E+04	.763E+10	-.393E+03

24.0	.430E+00	.454E+06	.120E+05	-.837E-02	.331E+04	.763E+10	-.410E+03
30.0	.381E+00	.531E+06	.954E+04	-.798E-02	.358E+04	.763E+10	-.425E+03
36.0	.334E+00	.593E+06	.695E+04	-.754E-02	.379E+04	.763E+10	-.437E+03
42.0	.291E+00	.637E+06	.430E+04	-.706E-02	.395E+04	.763E+10	-.448E+03
48.0	.250E+00	.665E+06	.159E+04	-.655E-02	.405E+04	.763E+10	-.455E+03
54.0	.212E+00	.676E+06	-.116E+04	-.602E-02	.408E+04	.763E+10	-.460E+03
60.0	.178E+00	.670E+06	-.296E+04	-.549E-02	.406E+04	.763E+10	-.142E+03
66.0	.146E+00	.657E+06	-.374E+04	-.497E-02	.402E+04	.763E+10	-.117E+03
72.0	.118E+00	.640E+06	-.442E+04	-.446E-02	.396E+04	.763E+10	-.109E+03
78.0	.927E-01	.617E+06	-.505E+04	-.396E-02	.388E+04	.763E+10	-.101E+03
84.0	.704E-01	.591E+06	-.563E+04	-.349E-02	.379E+04	.763E+10	-.917E+02
90.0	.509E-01	.560E+06	-.615E+04	-.303E-02	.368E+04	.763E+10	-.823E+02
96.0	.340E-01	.526E+06	-.661E+04	-.261E-02	.356E+04	.763E+10	-.720E+02
102.0	.196E-01	.489E+06	-.701E+04	-.221E-02	.343E+04	.763E+10	-.599E+02
108.0	.749E-02	.449E+06	-.732E+04	-.184E-02	.329E+04	.763E+10	-.435E+02
114.0	-.249E-02	.407E+06	-.736E+04	-.150E-02	.315E+04	.763E+10	.301E+02
120.0	-.105E-01	.365E+06	-.712E+04	-.120E-02	.300E+04	.763E+10	.487E+02
126.0	-.169E-01	.325E+06	-.680E+04	-.929E-03	.286E+04	.763E+10	.570E+02
132.0	-.217E-01	.286E+06	-.645E+04	-.689E-03	.273E+04	.763E+10	.620E+02
138.0	-.252E-01	.249E+06	-.606E+04	-.478E-03	.260E+04	.763E+10	.651E+02
144.0	-.274E-01	.215E+06	-.567E+04	-.295E-03	.248E+04	.763E+10	.670E+02
150.0	-.287E-01	.182E+06	-.526E+04	-.139E-03	.237E+04	.763E+10	.680E+02
156.0	-.291E-01	.152E+06	-.485E+04	-.767E-05	.226E+04	.763E+10	.683E+02
162.0	-.288E-01	.124E+06	-.445E+04	.101E-03	.217E+04	.763E+10	.681E+02
168.0	-.279E-01	.985E+05	-.404E+04	.188E-03	.208E+04	.763E+10	.674E+02
174.0	-.265E-01	.751E+05	-.364E+04	.257E-03	.200E+04	.763E+10	.663E+02
180.0	-.248E-01	.540E+05	-.324E+04	.307E-03	.192E+04	.763E+10	.648E+02
186.0	-.228E-01	.352E+05	-.286E+04	.343E-03	.186E+04	.763E+10	.630E+02
192.0	-.207E-01	.187E+05	-.249E+04	.364E-03	.180E+04	.763E+10	.610E+02
198.0	-.185E-01	.427E+04	-.213E+04	.373E-03	.175E+04	.763E+10	.587E+02
204.0	-.162E-01	-.801E+04	-.179E+04	.371E-03	.176E+04	.763E+10	.562E+02
210.0	-.140E-01	-.183E+05	-.146E+04	.361E-03	.180E+04	.763E+10	.536E+02
216.0	-.119E-01	-.266E+05	-.114E+04	.343E-03	.183E+04	.763E+10	.507E+02
222.0	-.989E-02	-.330E+05	-.848E+03	.320E-03	.185E+04	.763E+10	.477E+02
228.0	-.805E-02	-.377E+05	-.571E+03	.292E-03	.187E+04	.763E+10	.445E+02
234.0	-.639E-02	-.407E+05	-.314E+03	.261E-03	.188E+04	.763E+10	.412E+02
240.0	-.492E-02	-.422E+05	-.768E+02	.229E-03	.188E+04	.763E+10	.378E+02
246.0	-.364E-02	-.423E+05	.139E+03	.195E-03	.188E+04	.763E+10	.342E+02
252.0	-.257E-02	-.412E+05	.333E+03	.163E-03	.188E+04	.763E+10	.304E+02
258.0	-.169E-02	-.388E+05	.504E+03	.131E-03	.187E+04	.763E+10	.265E+02
264.0	-.998E-03	-.355E+05	.650E+03	.102E-03	.186E+04	.763E+10	.222E+02
270.0	-.471E-03	-.313E+05	.768E+03	.756E-04	.184E+04	.763E+10	.173E+02
276.0	-.914E-04	-.265E+05	.850E+03	.528E-04	.183E+04	.763E+10	.100E+02
282.0	.163E-03	-.213E+05	.844E+03	.340E-04	.181E+04	.763E+10	-.121E+02
288.0	.317E-03	-.165E+05	.762E+03	.191E-04	.179E+04	.763E+10	-.151E+02
294.0	.393E-03	-.122E+05	.668E+03	.785E-05	.178E+04	.763E+10	-.163E+02
300.0	.411E-03	-.851E+04	.569E+03	-.303E-06	.177E+04	.763E+10	-.165E+02
306.0	.389E-03	-.539E+04	.471E+03	-.577E-05	.175E+04	.763E+10	-.162E+02
312.0	.342E-03	-.284E+04	.376E+03	-.900E-05	.175E+04	.763E+10	-.155E+02
318.0	.281E-03	-.847E+03	.286E+03	-.105E-04	.174E+04	.763E+10	-.146E+02
324.0	.216E-03	.621E+03	.202E+03	-.105E-04	.174E+04	.763E+10	-.133E+02
330.0	.154E-03	.161E+04	.126E+03	-.966E-05	.174E+04	.763E+10	-.119E+02
336.0	.100E-03	.217E+04	.596E+02	-.818E-05	.174E+04	.763E+10	-.103E+02
342.0	.563E-04	.235E+04	.312E+01	-.640E-05	.174E+04	.763E+10	-.852E+01
348.0	.235E-04	.222E+04	-.415E+02	-.460E-05	.174E+04	.763E+10	-.636E+01
354.0	.108E-05	.187E+04	-.674E+02	-.300E-05	.174E+04	.763E+10	-.228E+01
360.0	-.125E-04	.142E+04	-.712E+02	-.170E-05	.174E+04	.763E+10	.100E+01
366.0	-.194E-04	.102E+04	-.633E+02	-.744E-06	.174E+04	.763E+10	.165E+01
372.0	-.214E-04	.666E+03	-.525E+02	-.829E-07	.174E+04	.763E+10	.193E+01
378.0	-.204E-04	.386E+03	-.410E+02	.331E-06	.174E+04	.763E+10	.193E+01
384.0	-.175E-04	.174E+03	-.300E+02	.551E-06	.174E+04	.763E+10	.174E+01
390.0	-.137E-04	.243E+02	-.205E+02	.629E-06	.174E+04	.763E+10	.143E+01
396.0	-.992E-05	-.736E+02	-.129E+02	.609E-06	.174E+04	.763E+10	.108E+01

402.0	-.644E-05	-.132E+03	-.746E+01	.528E-06	.174E+04	.763E+10	.733E+00
408.0	-.358E-05	-.165E+03	-.399E+01	.411E-06	.174E+04	.763E+10	.425E+00
414.0	-.150E-05	-.182E+03	-.215E+01	.275E-06	.174E+04	.763E+10	.186E+00
420.0	-.282E-06	-.191E+03	.942E+01	.128E-06	.174E+04	.763E+10	.367E+01
426.0	.361E-07	-.690E+02	.156E+02	.259E-07	.174E+04	.763E+10	-.162E+01
432.0	.290E-07	-.451E+01	.623E+01	-.295E-08	.174E+04	.763E+10	-.150E+01
438.0	.703E-09	.585E+01	.389E+00	-.242E-08	.174E+04	.763E+10	-.430E+00
444.0	-.294E-10	.161E+00	-.488E+00	-.586E-10	.174E+04	.763E+10	.150E+00
450.0	-.458E-14	-.623E-02	-.135E-01	.245E-11	.174E+04	.763E+10	.467E-02
456.0	.164E-15	-.104E-05	.519E-03	.382E-15	.174E+04	.763E+10	-.169E-03
462.0	.293E-19	.348E-07	.868E-07	-.137E-16	.174E+04	.763E+10	-.299E-07
468.0	-.917E-21	.659E-11	-.290E-08	-.244E-20	.174E+04	.763E+10	.944E-09
474.0	-.176E-24	-.625E-13	-.554E-12	.128E-21	.174E+04	.763E+10	.179E-12
480.0	.621E-21	-.507E-13	.193E-14	.837E-22	.174E+04	.763E+10	-.186E-16
486.0	.100E-20	-.396E-13	.178E-14	.481E-22	.174E+04	.763E+10	-.308E-16
492.0	.120E-20	-.295E-13	.157E-14	.210E-22	.174E+04	.763E+10	-.377E-16
498.0	.126E-20	-.208E-13	.133E-14	.120E-23	.174E+04	.763E+10	-.404E-16
504.0	.121E-20	-.135E-13	.109E-14	-.123E-22	.174E+04	.763E+10	-.400E-16
510.0	.111E-20	-.772E-14	.848E-15	-.206E-22	.174E+04	.763E+10	-.373E-16
516.0	.966E-21	-.329E-14	.632E-15	-.250E-22	.174E+04	.763E+10	-.332E-16
522.0	.808E-21	-.661E-16	.443E-15	-.263E-22	.174E+04	.763E+10	-.284E-16
528.0	.650E-21	.211E-14	.284E-15	-.255E-22	.174E+04	.763E+10	-.233E-16
534.0	.502E-21	.342E-14	.156E-15	-.233E-22	.174E+04	.763E+10	-.184E-16
540.0	.371E-21	.405E-14	.574E-16	-.204E-22	.174E+04	.763E+10	-.138E-16
546.0	.258E-21	.417E-14	-.152E-16	-.171E-22	.174E+04	.763E+10	-.981E-17
552.0	.165E-21	.392E-14	-.649E-16	-.140E-22	.174E+04	.763E+10	-.639E-17
558.0	.903E-22	.343E-14	-.955E-16	-.111E-22	.174E+04	.763E+10	-.357E-17
564.0	.320E-22	.281E-14	-.110E-15	-.862E-23	.174E+04	.763E+10	-.129E-17
570.0	-.131E-22	.213E-14	-.113E-15	-.667E-23	.174E+04	.763E+10	.535E-18
576.0	-.481E-22	.148E-14	-.105E-15	-.526E-23	.174E+04	.763E+10	.201E-17
582.0	-.761E-22	.889E-15	-.889E-16	-.433E-23	.174E+04	.763E+10	.323E-17
588.0	-.100E-21	.422E-15	-.657E-16	-.381E-23	.174E+04	.763E+10	.432E-17
594.0	-.122E-21	.112E-15	-.360E-16	-.360E-23	.174E+04	.763E+10	.535E-17
600.0	-.143E-21	.000E+00	.000E+00	-.356E-23	.174E+04	.763E+10	.639E-17

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.210E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .195E-07 LBS

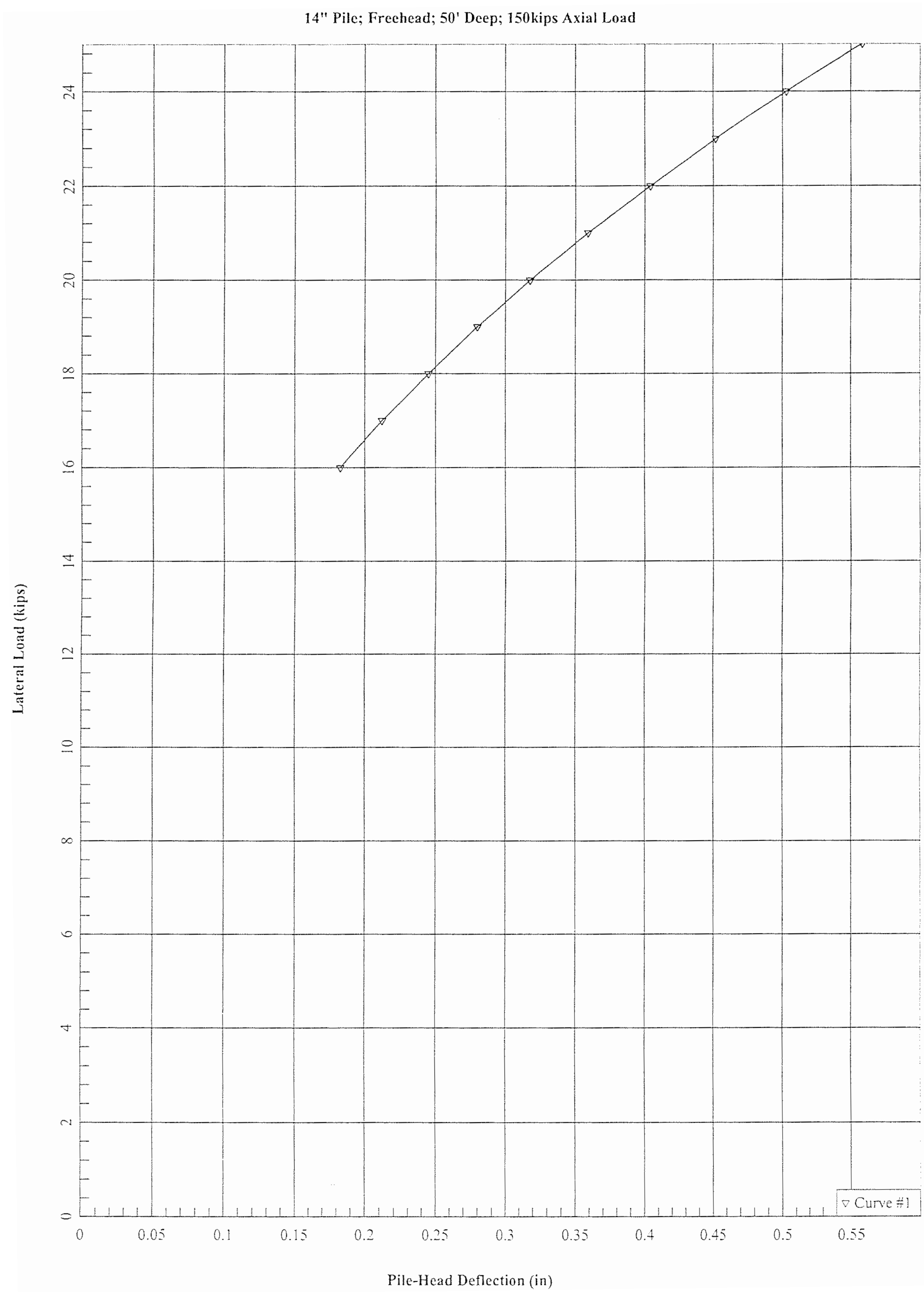
OUTPUT SUMMARY

```
PILE-HEAD DEFLECTION          =   .644E+00 IN
COMPUTED SLOPE AT PILE HEAD   =  -.914E-02
MAXIMUM BENDING MOMENT        =   .676E+06 LBS-IN
MAXIMUM SHEAR FORCE           =   .210E+05 LBS
NO. OF ITERATIONS             =        34
NO. OF ZERO DEFLECTION POINTS =         9
```

S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS

.1300E+05	.0000E+00	.2500E+06	.1915E+00	.3426E+06	.1300E+05
.1400E+05	.0000E+00	.2500E+06	.2296E+00	.3803E+06	.1400E+05
.1500E+05	.0000E+00	.2500E+06	.2724E+00	.4188E+06	.1500E+05
.1600E+05	.0000E+00	.2500E+06	.3208E+00	.4577E+06	.1600E+05
.1700E+05	.0000E+00	.2500E+06	.3735E+00	.4988E+06	.1700E+05
.1800E+05	.0000E+00	.2500E+06	.4322E+00	.5418E+06	.1800E+05
.1900E+05	.0000E+00	.2500E+06	.4966E+00	.5856E+06	.1900E+05
.2000E+05	.0000E+00	.2500E+06	.5664E+00	.6307E+06	.2000E+05
.2100E+05	.0000E+00	.2500E+06	.6436E+00	.6762E+06	.2100E+05


14" Pile; Freehead; 50' Deep; 150kips Axial Load
Lateral Load (kips)
0
2
4
6
8
10
12
14
16
18
20
22
24
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
▽ Curve #1
Pile-Head Deflection (in)

Licensed to: LEROY CHAN

ENGEO, INC.

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 14"sq. Concrete Pile; Axial L=150kips; 50'deep;

UNITS--ENGLISH UNITS

INPUT INFORMATION
****

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	14.000	.320E+04	.196E+03	.442E+07
600.00	14.000	.320E+04	.196E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN

```
X AT THE BOTTOM OF THE LAYER          =     360.00 IN
MODULUS OF SUBGRADE REACTION          =   .300E+02 LBS/IN**3

LAYER  3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER             =     360.00 IN
X AT THE BOTTOM OF THE LAYER          =     420.00 IN
MODULUS OF SUBGRADE REACTION          =   .800E+03 LBS/IN**3

LAYER  4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER             =     420.00 IN
X AT THE BOTTOM OF THE LAYER          =     480.00 IN
MODULUS OF SUBGRADE REACTION          =   .100E+03 LBS/IN**3

LAYER  5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER             =     480.00 IN
X AT THE BOTTOM OF THE LAYER          =     720.00 IN
MODULUS OF SUBGRADE REACTION          =   .125E+03 LBS/IN**3


DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
                  8 POINTS
           X,IN     WEIGHT,LBS/IN**3
            .00         .67E-01
          60.00         .67E-01
          60.00         .22E-01
         360.00         .22E-01
         360.00         .28E-01
         480.00         .28E-01
         480.00         .30E-01
         720.00         .30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
                 10 POINTS
           X,IN       C,LBS/IN**2       PHI,DEGREES      E50
            .00        .139E+02             .000        .700E-02
          60.00        .139E+02             .000        .700E-02
          60.00        .347E+01             .000        .200E-01
         360.00        .347E+01             .000        .200E-01
         360.00        .139E+02             .000        .500E-02
         420.00        .139E+02             .000        .500E-02
         420.00        .694E+01             .000        .150E-01
         480.00        .694E+01             .000        .150E-01
         480.00        .000E+00           .260E+02      -----
         720.00        .000E+00           .260E+02      -----


BOUNDARY AND LOADING CONDITIONS
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    LOADING NUMBER   1

    BOUNDARY-CONDITION CODE                  =          1
    LATERAL LOAD AT THE PILE HEAD            =   .160E+05 LBS
    MOMENT AT THE PILE HEAD                  =   .000E+00 IN-LBS
    AXIAL LOAD AT THE PILE HEAD              =   .150E+06 LBS


    LOADING NUMBER   2
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BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.170E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 3

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.180E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 4

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.190E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 5

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.200E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 6

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.210E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 7

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.220E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 8

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.230E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 9

BOUNDARY-CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.240E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

LOADING NUMBER 10

```
BOUNDARY-CONDITION CODE                       =        1
LATERAL LOAD AT THE PILE HEAD                 =   .250E+05 LBS
MOMENT AT THE PILE HEAD                       =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                   =   .150E+06 LBS
```

```
FINITE-DIFFERENCE PARAMETERS
    NUMBER OF PILE INCREMENTS                                    =       100
    DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE             =   .100E-04 IN
    MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS =       100
    MAXIMUM ALLOWABLE DEFLECTION                                 =    .10E+03 IN
```

```
OUTPUT CODES
    KOUTPT =  1
    KPYOP  =  0
    INC    =  1
```

O U T P U T   I N F O R M A T I O N
****

```
************************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING                    *
************************************************
```

LOADING NUMBER 1

```
BOUNDARY CONDITION CODE                       =        1
LATERAL LOAD AT THE PILE HEAD                 =   .160E+05 LBS
MOMENT AT THE PILE HEAD                       =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD                   =   .150E+06 LBS
```

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.183E+00	.981E-07	.160E+05	-.286E-02	.765E+03	.141E+11	-.271E+03
6.0	.166E+00	.937E+05	.143E+05	-.284E-02	.970E+03	.141E+11	-.286E+03
12.0	.149E+00	.177E+06	.126E+05	-.279E-02	.115E+04	.141E+11	-.299E+03
18.0	.132E+00	.250E+06	.107E+05	-.270E-02	.131E+04	.141E+11	-.311E+03
24.0	.116E+00	.311E+06	.885E+04	-.258E-02	.145E+04	.141E+11	-.321E+03
30.0	.101E+00	.360E+06	.690E+04	-.243E-02	.155E+04	.141E+11	-.329E+03
36.0	.871E-01	.398E+06	.491E+04	-.227E-02	.164E+04	.141E+11	-.335E+03
42.0	.740E-01	.423E+06	.289E+04	-.210E-02	.169E+04	.141E+11	-.339E+03
48.0	.619E-01	.437E+06	.852E+03	-.192E-02	.172E+04	.141E+11	-.341E+03
54.0	.510E-01	.437E+06	-.119E+04	-.173E-02	.172E+04	.141E+11	-.341E+03
60.0	.412E-01	.425E+06	-.251E+04	-.155E-02	.170E+04	.141E+11	-.969E+02
66.0	.324E-01	.410E+06	-.303E+04	-.137E-02	.166E+04	.141E+11	-.785E+02
72.0	.247E-01	.391E+06	-.348E+04	-.120E-02	.162E+04	.141E+11	-.717E+02

78.0	.180E-01	.370E+06	-.389E+04	-.104E-02	.157E+04	.141E+11	-.645E+02
84.0	.123E-01	.347E+06	-.425E+04	-.886E-03	.152E+04	.141E+11	-.568E+02
90.0	.738E-02	.321E+06	-.457E+04	-.745E-03	.147E+04	.141E+11	-.479E+02
96.0	.332E-02	.293E+06	-.482E+04	-.614E-03	.141E+04	.141E+11	-.367E+02
102.0	.650E-05	.264E+06	-.495E+04	-.496E-03	.134E+04	.141E+11	-.448E+01
108.0	-.263E-02	.235E+06	-.486E+04	-.390E-03	.128E+04	.141E+11	.340E+02
114.0	-.468E-02	.206E+06	-.463E+04	-.297E-03	.122E+04	.141E+11	.412E+02
120.0	-.619E-02	.180E+06	-.438E+04	-.215E-03	.116E+04	.141E+11	.452E+02
126.0	-.725E-02	.154E+06	-.410E+04	-.144E-03	.110E+04	.141E+11	.477E+02
132.0	-.792E-02	.131E+06	-.381E+04	-.833E-04	.105E+04	.141E+11	.491E+02
138.0	-.825E-02	.109E+06	-.351E+04	-.325E-04	.100E+04	.141E+11	.498E+02
144.0	-.831E-02	.886E+05	-.321E+04	.935E-05	.959E+03	.141E+11	.499E+02
150.0	-.814E-02	.702E+05	-.291E+04	.431E-04	.919E+03	.141E+11	.495E+02
156.0	-.779E-02	.535E+05	-.262E+04	.693E-04	.882E+03	.141E+11	.488E+02
162.0	-.731E-02	.386E+05	-.233E+04	.889E-04	.850E+03	.141E+11	.478E+02
168.0	-.673E-02	.254E+05	-.205E+04	.102E-03	.821E+03	.141E+11	.465E+02
174.0	-.608E-02	.139E+05	-.177E+04	.111E-03	.796E+03	.141E+11	.449E+02
180.0	-.540E-02	.399E+04	-.151E+04	.115E-03	.774E+03	.141E+11	.432E+02
186.0	-.470E-02	-.438E+04	-.125E+04	.115E-03	.775E+03	.141E+11	.412E+02
192.0	-.402E-02	-.113E+05	-.101E+04	.111E-03	.790E+03	.141E+11	.391E+02
198.0	-.337E-02	-.167E+05	-.784E+03	.105E-03	.802E+03	.141E+11	.369E+02
204.0	-.276E-02	-.209E+05	-.570E+03	.973E-04	.811E+03	.141E+11	.345E+02
210.0	-.220E-02	-.237E+05	-.370E+03	.879E-04	.817E+03	.141E+11	.320E+02
216.0	-.170E-02	-.255E+05	-.186E+03	.774E-04	.821E+03	.141E+11	.294E+02
222.0	-.127E-02	-.261E+05	-.174E+02	.665E-04	.822E+03	.141E+11	.267E+02
228.0	-.905E-03	-.258E+05	.134E+03	.555E-04	.822E+03	.141E+11	.238E+02
234.0	-.605E-03	-.246E+05	.268E+03	.448E-04	.819E+03	.141E+11	.208E+02
240.0	-.368E-03	-.226E+05	.384E+03	.347E-04	.815E+03	.141E+11	.176E+02
246.0	-.188E-03	-.201E+05	.479E+03	.257E-04	.809E+03	.141E+11	.141E+02
252.0	-.598E-04	-.169E+05	.551E+03	.178E-04	.802E+03	.141E+11	.961E+01
258.0	.256E-04	-.135E+05	.558E+03	.114E-04	.795E+03	.141E+11	-.729E+01
264.0	.767E-04	-.103E+05	.505E+03	.634E-05	.788E+03	.141E+11	-.105E+02
270.0	.102E-03	-.743E+04	.439E+03	.258E-05	.782E+03	.141E+11	-.115E+02
276.0	.108E-03	-.500E+04	.370E+03	-.560E-07	.776E+03	.141E+11	-.117E+02
282.0	.101E-03	-.299E+04	.300E+03	-.175E-05	.772E+03	.141E+11	-.115E+02
288.0	.867E-04	-.139E+04	.233E+03	-.268E-05	.768E+03	.141E+11	-.109E+02
294.0	.688E-04	-.185E+03	.170E+03	-.302E-05	.766E+03	.141E+11	-.101E+02
300.0	.505E-04	.659E+03	.113E+03	-.291E-05	.767E+03	.141E+11	-.910E+01
306.0	.338E-04	.117E+04	.617E+02	-.253E-05	.768E+03	.141E+11	-.797E+01
312.0	.202E-04	.140E+04	.177E+02	-.198E-05	.768E+03	.141E+11	-.670E+01
318.0	.101E-04	.139E+04	-.184E+02	-.139E-05	.768E+03	.141E+11	-.532E+01
324.0	.355E-05	.118E+04	-.456E+02	-.839E-06	.768E+03	.141E+11	-.376E+01
330.0	.299E-07	.844E+03	-.592E+02	-.408E-06	.767E+03	.141E+11	-.762E+00
336.0	-.135E-05	.475E+03	-.534E+02	-.128E-06	.766E+03	.141E+11	.272E+01
342.0	-.151E-05	.204E+03	-.367E+02	.156E-07	.766E+03	.141E+11	.282E+01
348.0	-.116E-05	.343E+02	-.204E+02	.661E-07	.765E+03	.141E+11	.258E+01
354.0	-.718E-06	-.415E+02	-.595E+01	.646E-07	.765E+03	.141E+11	.220E+01
360.0	-.384E-06	-.372E+02	.812E+00	.479E-07	.765E+03	.141E+11	.305E-01
366.0	-.144E-06	-.318E+02	.943E+00	.332E-07	.765E+03	.141E+11	.117E-01
372.0	.143E-07	-.260E+02	.977E+00	.209E-07	.765E+03	.141E+11	-.202E-02
378.0	.107E-06	-.202E+02	.942E+00	.111E-07	.765E+03	.141E+11	-.109E-01
384.0	.148E-06	-.147E+02	.867E+00	.371E-08	.765E+03	.141E+11	-.154E-01
390.0	.151E-06	-.977E+01	.774E+00	-.149E-08	.765E+03	.141E+11	-.163E-01
396.0	.130E-06	-.541E+01	.684E+00	-.471E-08	.765E+03	.141E+11	-.146E-01
402.0	.947E-07	-.156E+01	.608E+00	-.618E-08	.765E+03	.141E+11	-.111E-01
408.0	.556E-07	.190E+01	.555E+00	-.611E-08	.765E+03	.141E+11	-.676E-02
414.0	.213E-07	.512E+01	.527E+00	-.462E-08	.765E+03	.141E+11	-.269E-02
420.0	.134E-09	.824E+01	-.418E+00	-.178E-08	.765E+03	.141E+11	-.320E+00
426.0	-.761E-10	.112E+00	-.689E+00	-.111E-10	.765E+03	.141E+11	.234E+00
432.0	-.409E-14	-.299E-01	-.935E-02	.634E-11	.765E+03	.141E+11	.499E-02
438.0	.711E-15	-.216E-05	.249E-02	.341E-15	.765E+03	.141E+11	-.874E-03
444.0	.647E-19	.279E-06	.180E-06	-.592E-16	.765E+03	.141E+11	-.792E-07
450.0	-.663E-20	.306E-10	-.232E-07	-.539E-20	.765E+03	.141E+11	.816E-08

456.0	-.852E-24	-.260E-11	-.255E-11	.553E-21	.765E+03	.141E+11	.104E-11
462.0	.619E-25	-.383E-15	.217E-12	.710E-25	.765E+03	.141E+11	-.762E-13
468.0	.103E-28	.243E-16	.319E-16	-.516E-26	.765E+03	.141E+11	-.126E-16
474.0	-.578E-30	.123E-20	-.202E-17	-.155E-29	.765E+03	.141E+11	.711E-18
480.0	-.828E-29	.103E-20	-.338E-22	-.107E-29	.765E+03	.141E+11	.286E-24
486.0	-.134E-28	.831E-21	-.316E-22	-.671E-30	.765E+03	.141E+11	.472E-24
492.0	-.163E-28	.650E-21	-.286E-22	-.357E-30	.765E+03	.141E+11	.589E-24
498.0	-.177E-28	.489E-21	-.251E-22	-.115E-30	.765E+03	.141E+11	.651E-24
504.0	-.177E-28	.349E-21	-.213E-22	.628E-31	.765E+03	.141E+11	.667E-24
510.0	-.169E-28	.233E-21	-.175E-22	.186E-30	.765E+03	.141E+11	.650E-24
516.0	-.155E-28	.139E-21	-.140E-22	.265E-30	.765E+03	.141E+11	.607E-24
522.0	-.137E-28	.650E-22	-.107E-22	.308E-30	.765E+03	.141E+11	.549E-24
528.0	-.118E-28	.102E-22	-.771E-23	.324E-30	.765E+03	.141E+11	.481E-24
534.0	-.982E-29	-.281E-22	-.517E-23	.321E-30	.765E+03	.141E+11	.409E-24
540.0	-.793E-29	-.524E-22	-.305E-23	.304E-30	.765E+03	.141E+11	.336E-24
546.0	-.618E-29	-.652E-22	-.132E-23	.279E-30	.765E+03	.141E+11	.267E-24
552.0	-.459E-29	-.688E-22	.133E-25	.250E-30	.765E+03	.141E+11	.202E-24
558.0	-.318E-29	-.655E-22	.995E-24	.222E-30	.765E+03	.141E+11	.142E-24
564.0	-.193E-29	-.573E-22	.165E-23	.195E-30	.765E+03	.141E+11	.880E-25
570.0	-.832E-30	-.460E-22	.201E-23	.174E-30	.765E+03	.141E+11	.385E-25
576.0	.151E-30	-.334E-22	.210E-23	.157E-30	.765E+03	.141E+11	-.710E-26
582.0	.105E-29	-.211E-22	.194E-23	.145E-30	.765E+03	.141E+11	-.502E-25
588.0	.189E-29	-.104E-22	.153E-23	.138E-30	.765E+03	.141E+11	-.921E-25
594.0	.271E-29	-.291E-23	.888E-24	.136E-30	.765E+03	.141E+11	-.134E-24
600.0	.352E-29	.000E+00	.000E+00	.135E-30	.765E+03	.141E+11	-.177E-24

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.880E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .785E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .183E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.286E-02
MAXIMUM BENDING MOMENT = .437E+06 LBS-IN
MAXIMUM SHEAR FORCE = .160E+05 LBS
NO. OF ITERATIONS = 26
NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .170E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.212E+00	-.218E-07	.170E+05	-.322E-02	.765E+03	.141E+11	-.281E+03
6.0	.193E+00	.998E+05	.153E+05	-.320E-02	.984E+03	.141E+11	-.297E+03
12.0	.174E+00	.189E+06	.134E+05	-.313E-02	.118E+04	.141E+11	-.311E+03

18.0	.156E+00	.267E+06	.115E+05	-.304E-02	.135E+04	.141E+11	-.324E+03
24.0	.138E+00	.333E+06	.956E+04	-.291E-02	.149E+04	.141E+11	-.334E+03
30.0	.121E+00	.387E+06	.753E+04	-.276E-02	.161E+04	.141E+11	-.343E+03
36.0	.105E+00	.428E+06	.545E+04	-.259E-02	.170E+04	.141E+11	-.350E+03
42.0	.896E-01	.457E+06	.333E+04	-.240E-02	.176E+04	.141E+11	-.355E+03
48.0	.758E-01	.472E+06	.119E+04	-.220E-02	.180E+04	.141E+11	-.359E+03
54.0	.632E-01	.475E+06	-.967E+03	-.200E-02	.180E+04	.141E+11	-.359E+03
60.0	.518E-01	.464E+06	-.236E+04	-.180E-02	.178E+04	.141E+11	-.105E+03
66.0	.416E-01	.450E+06	-.293E+04	-.161E-02	.175E+04	.141E+11	-.853E+02
72.0	.325E-01	.432E+06	-.342E+04	-.142E-02	.171E+04	.141E+11	-.786E+02
78.0	.246E-01	.411E+06	-.387E+04	-.124E-02	.166E+04	.141E+11	-.716E+02
84.0	.177E-01	.388E+06	-.428E+04	-.107E-02	.161E+04	.141E+11	-.641E+02
90.0	.117E-01	.362E+06	-.464E+04	-.911E-03	.156E+04	.141E+11	-.559E+02
96.0	.672E-02	.334E+06	-.495E+04	-.763E-03	.150E+04	.141E+11	-.465E+02
102.0	.257E-02	.304E+06	-.519E+04	-.628E-03	.143E+04	.141E+11	-.337E+02
108.0	-.809E-03	.273E+06	-.522E+04	-.505E-03	.136E+04	.141E+11	.230E+02
114.0	-.349E-02	.242E+06	-.504E+04	-.396E-03	.129E+04	.141E+11	.374E+02
120.0	-.556E-02	.213E+06	-.480E+04	-.299E-03	.123E+04	.141E+11	.436E+02
126.0	-.708E-02	.185E+06	-.452E+04	-.215E-03	.117E+04	.141E+11	.473E+02
132.0	-.814E-02	.159E+06	-.423E+04	-.142E-03	.111E+04	.141E+11	.495E+02
138.0	-.879E-02	.135E+06	-.393E+04	-.794E-04	.106E+04	.141E+11	.508E+02
144.0	-.909E-02	.112E+06	-.363E+04	-.270E-04	.101E+04	.141E+11	.514E+02
150.0	-.911E-02	.912E+05	-.332E+04	.161E-04	.965E+03	.141E+11	.514E+02
156.0	-.890E-02	.722E+05	-.301E+04	.508E-04	.923E+03	.141E+11	.510E+02
162.0	-.850E-02	.550E+05	-.271E+04	.778E-04	.886E+03	.141E+11	.502E+02
168.0	-.796E-02	.396E+05	-.241E+04	.979E-04	.852E+03	.141E+11	.492E+02
174.0	-.733E-02	.259E+05	-.212E+04	.112E-03	.822E+03	.141E+11	.478E+02
180.0	-.662E-02	.140E+05	-.183E+04	.120E-03	.796E+03	.141E+11	.462E+02
186.0	-.588E-02	.370E+04	-.156E+04	.124E-03	.773E+03	.141E+11	.444E+02
192.0	-.513E-02	-.499E+04	-.130E+04	.124E-03	.776E+03	.141E+11	.425E+02
198.0	-.440E-02	-.121E+05	-.105E+04	.120E-03	.792E+03	.141E+11	.403E+02
204.0	-.369E-02	-.178E+05	-.818E+03	.114E-03	.804E+03	.141E+11	.381E+02
210.0	-.303E-02	-.222E+05	-.597E+03	.105E-03	.814E+03	.141E+11	.356E+02
216.0	-.243E-02	-.252E+05	-.391E+03	.952E-04	.820E+03	.141E+11	.331E+02
222.0	-.189E-02	-.270E+05	-.200E+03	.841E-04	.824E+03	.141E+11	.304E+02
228.0	-.142E-02	-.278E+05	-.258E+02	.725E-04	.826E+03	.141E+11	.277E+02
234.0	-.102E-02	-.275E+05	.132E+03	.607E-04	.825E+03	.141E+11	.248E+02
240.0	-.693E-03	-.263E+05	.271E+03	.493E-04	.823E+03	.141E+11	.218E+02
246.0	-.430E-03	-.243E+05	.393E+03	.386E-04	.818E+03	.141E+11	.186E+02
252.0	-.230E-03	-.216E+05	.494E+03	.288E-04	.813E+03	.141E+11	.151E+02
258.0	-.844E-04	-.184E+05	.571E+03	.203E-04	.806E+03	.141E+11	.108E+02
264.0	.140E-04	-.148E+05	.586E+03	.133E-04	.798E+03	.141E+11	-.595E+01
270.0	.747E-04	-.114E+05	.537E+03	.769E-05	.790E+03	.141E+11	-.104E+02
276.0	.106E-03	-.840E+04	.471E+03	.348E-05	.784E+03	.141E+11	-.117E+02
282.0	.116E-03	-.578E+04	.400E+03	.468E-06	.778E+03	.141E+11	-.120E+02
288.0	.112E-03	-.360E+04	.328E+03	-.152E-05	.773E+03	.141E+11	-.119E+02
294.0	.982E-04	-.184E+04	.259E+03	-.268E-05	.769E+03	.141E+11	-.114E+02
300.0	.797E-04	-.490E+03	.193E+03	-.317E-05	.766E+03	.141E+11	-.106E+02
306.0	.601E-04	.479E+03	.132E+03	-.318E-05	.766E+03	.141E+11	-.964E+01
312.0	.416E-04	.110E+04	.776E+02	-.284E-05	.768E+03	.141E+11	-.854E+01
318.0	.260E-04	.142E+04	.302E+02	-.231E-05	.768E+03	.141E+11	-.730E+01
324.0	.140E-04	.147E+04	-.950E+01	-.169E-05	.769E+03	.141E+11	-.593E+01
330.0	.568E-05	.130E+04	-.404E+02	-.110E-05	.768E+03	.141E+11	-.440E+01
336.0	.716E-06	.984E+03	-.602E+02	-.619E-06	.767E+03	.141E+11	-.221E+01
342.0	-.175E-05	.584E+03	-.578E+02	-.286E-06	.767E+03	.141E+11	.296E+01
348.0	-.272E-05	.290E+03	-.386E+02	-.101E-06	.766E+03	.141E+11	.344E+01
354.0	-.295E-05	.121E+03	-.177E+02	-.134E-07	.766E+03	.141E+11	.353E+01
360.0	-.288E-05	.779E+02	-.641E+01	.287E-07	.765E+03	.141E+11	.235E+00
366.0	-.261E-05	.436E+02	-.503E+01	.545E-07	.765E+03	.141E+11	.225E+00
372.0	-.223E-05	.174E+02	-.375E+01	.675E-07	.765E+03	.141E+11	.203E+00
378.0	-.180E-05	-.147E+01	-.262E+01	.709E-07	.765E+03	.141E+11	.173E+00
384.0	-.138E-05	-.142E+02	-.169E+01	.676E-07	.765E+03	.141E+11	.139E+00
390.0	-.988E-06	-.218E+02	-.960E+00	.599E-07	.765E+03	.141E+11	.104E+00

396.0	-.657E-06	-.258E+02	-.429E+00	.498E-07	.765E+03	.141E+11	.726E-01
402.0	-.390E-06	-.271E+02	-.773E-01	.386E-07	.765E+03	.141E+11	.450E-01
408.0	-.193E-06	-.268E+02	.127E+00	.272E-07	.765E+03	.141E+11	.232E-01
414.0	-.645E-07	-.256E+02	.221E+00	.160E-07	.765E+03	.141E+11	.806E-02
420.0	-.876E-09	-.241E+02	.202E+01	.548E-08	.765E+03	.141E+11	.594E+00
426.0	.126E-08	-.133E+01	.205E+01	.731E-10	.765E+03	.141E+11	-.585E+00
432.0	.145E-11	.492E+00	.111E+00	-.105E-09	.765E+03	.141E+11	-.599E-01
438.0	-.154E-13	.581E-03	-.410E-01	-.121E-12	.765E+03	.141E+11	.134E-01
444.0	-.141E-16	-.605E-05	-.484E-04	.129E-14	.765E+03	.141E+11	.154E-04
450.0	.144E-18	-.565E-08	.504E-06	.117E-17	.765E+03	.141E+11	-.165E-06
456.0	.137E-21	.563E-10	.471E-09	-.120E-19	.765E+03	.141E+11	-.150E-09
462.0	-.134E-23	.548E-13	-.469E-11	-.114E-22	.765E+03	.141E+11	.154E-11
468.0	-.133E-26	-.524E-15	-.457E-14	.111E-24	.765E+03	.141E+11	.146E-14
474.0	.124E-28	-.152E-18	.436E-16	.191E-27	.765E+03	.141E+11	-.143E-16
480.0	.968E-27	-.126E-18	.412E-20	.132E-27	.765E+03	.141E+11	-.299E-22
486.0	.160E-26	-.102E-18	.387E-20	.839E-28	.765E+03	.141E+11	-.506E-22
492.0	.198E-26	-.802E-19	.350E-20	.451E-28	.765E+03	.141E+11	-.637E-22
498.0	.214E-26	-.604E-19	.307E-20	.153E-28	.765E+03	.141E+11	-.707E-22
504.0	.216E-26	-.433E-19	.262E-20	-.671E-29	.765E+03	.141E+11	-.727E-22
510.0	.206E-26	-.290E-19	.216E-20	-.221E-28	.765E+03	.141E+11	-.709E-22
516.0	.189E-26	-.174E-19	.172E-20	-.319E-28	.765E+03	.141E+11	-.664E-22
522.0	.168E-26	-.831E-20	.131E-20	-.374E-28	.765E+03	.141E+11	-.601E-22
528.0	.145E-26	-.154E-20	.955E-21	-.395E-28	.765E+03	.141E+11	-.527E-22
534.0	.121E-26	.321E-20	.643E-21	-.391E-28	.765E+03	.141E+11	-.449E-22
540.0	.976E-27	.624E-20	.381E-21	-.371E-28	.765E+03	.141E+11	-.370E-22
546.0	.762E-27	.785E-20	.169E-21	-.341E-28	.765E+03	.141E+11	-.294E-22
552.0	.567E-27	.833E-20	.411E-23	-.307E-28	.765E+03	.141E+11	-.223E-22
558.0	.394E-27	.796E-20	-.117E-21	-.272E-28	.765E+03	.141E+11	-.158E-22
564.0	.241E-27	.697E-20	-.199E-21	-.240E-28	.765E+03	.141E+11	-.980E-23
570.0	.105E-27	.561E-20	-.244E-21	-.214E-28	.765E+03	.141E+11	-.436E-23
576.0	-.156E-28	.408E-20	-.256E-21	-.193E-28	.765E+03	.141E+11	.659E-24
582.0	-.126E-27	.257E-20	-.237E-21	-.179E-28	.765E+03	.141E+11	.541E-23
588.0	-.230E-27	.127E-20	-.187E-21	-.171E-28	.765E+03	.141E+11	.100E-22
594.0	-.331E-27	.356E-21	-.109E-21	-.167E-28	.765E+03	.141E+11	.146E-22
600.0	-.431E-27	.000E+00	.000E+00	-.167E-28	.765E+03	.141E+11	.194E-22

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .773E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .825E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .212E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.322E-02
MAXIMUM BENDING MOMENT = .475E+06 LBS-IN
MAXIMUM SHEAR FORCE = .170E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .180E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.245E+00	.436E-07	.180E+05	-.360E-02	.765E+03	.141E+11	-.292E+03
6.0	.223E+00	.106E+06	.162E+05	-.357E-02	.997E+03	.141E+11	-.308E+03
12.0	.202E+00	.201E+06	.143E+05	-.351E-02	.120E+04	.141E+11	-.323E+03
18.0	.181E+00	.284E+06	.123E+05	-.340E-02	.139E+04	.141E+11	-.336E+03
24.0	.161E+00	.355E+06	.103E+05	-.327E-02	.154E+04	.141E+11	-.348E+03
30.0	.142E+00	.413E+06	.816E+04	-.311E-02	.167E+04	.141E+11	-.357E+03
36.0	.124E+00	.459E+06	.600E+04	-.292E-02	.177E+04	.141E+11	-.365E+03
42.0	.107E+00	.490E+06	.379E+04	-.272E-02	.184E+04	.141E+11	-.371E+03
48.0	.910E-01	.509E+06	.155E+04	-.251E-02	.188E+04	.141E+11	-.375E+03
54.0	.766E-01	.514E+06	-.711E+03	-.229E-02	.189E+04	.141E+11	-.377E+03
60.0	.635E-01	.504E+06	-.218E+04	-.207E-02	.187E+04	.141E+11	-.112E+03
66.0	.517E-01	.491E+06	-.279E+04	-.186E-02	.184E+04	.141E+11	-.917E+02
72.0	.411E-01	.474E+06	-.332E+04	-.166E-02	.180E+04	.141E+11	-.850E+02
78.0	.318E-01	.454E+06	-.381E+04	-.146E-02	.176E+04	.141E+11	-.780E+02
84.0	.236E-01	.431E+06	-.426E+04	-.127E-02	.171E+04	.141E+11	-.706E+02
90.0	.165E-01	.405E+06	-.466E+04	-.110E-02	.165E+04	.141E+11	-.627E+02
96.0	.105E-01	.377E+06	-.501E+04	-.929E-03	.159E+04	.141E+11	-.539E+02
102.0	.537E-02	.347E+06	-.530E+04	-.776E-03	.152E+04	.141E+11	-.431E+02
108.0	.116E-02	.315E+06	-.550E+04	-.635E-03	.145E+04	.141E+11	-.259E+02
114.0	-.225E-02	.282E+06	-.548E+04	-.508E-03	.138E+04	.141E+11	.323E+02
120.0	-.494E-02	.250E+06	-.526E+04	-.395E-03	.131E+04	.141E+11	.419E+02
126.0	-.699E-02	.220E+06	-.499E+04	-.295E-03	.125E+04	.141E+11	.471E+02
132.0	-.848E-02	.191E+06	-.470E+04	-.208E-03	.118E+04	.141E+11	.502E+02
138.0	-.949E-02	.164E+06	-.440E+04	-.133E-03	.112E+04	.141E+11	.521E+02
144.0	-.101E-01	.138E+06	-.408E+04	-.689E-04	.107E+04	.141E+11	.532E+02
150.0	-.103E-01	.115E+06	-.376E+04	-.151E-04	.102E+04	.141E+11	.536E+02
156.0	-.103E-01	.933E+05	-.344E+04	.291E-04	.969E+03	.141E+11	.535E+02
162.0	-.997E-02	.736E+05	-.312E+04	.645E-04	.926E+03	.141E+11	.530E+02
168.0	-.949E-02	.557E+05	-.280E+04	.919E-04	.887E+03	.141E+11	.521E+02
174.0	-.886E-02	.397E+05	-.249E+04	.112E-03	.852E+03	.141E+11	.510E+02
180.0	-.814E-02	.256E+05	-.219E+04	.126E-03	.821E+03	.141E+11	.495E+02
186.0	-.735E-02	.132E+05	-.190E+04	.134E-03	.794E+03	.141E+11	.479E+02
192.0	-.653E-02	.253E+04	-.162E+04	.138E-03	.771E+03	.141E+11	.460E+02
198.0	-.570E-02	-.649E+04	-.135E+04	.137E-03	.779E+03	.141E+11	.440E+02
204.0	-.489E-02	-.139E+05	-.109E+04	.132E-03	.796E+03	.141E+11	.418E+02
210.0	-.411E-02	-.198E+05	-.849E+03	.125E-03	.809E+03	.141E+11	.394E+02
216.0	-.338E-02	-.243E+05	-.619E+03	.116E-03	.818E+03	.141E+11	.370E+02
222.0	-.272E-02	-.275E+05	-.405E+03	.105E-03	.825E+03	.141E+11	.344E+02
228.0	-.213E-02	-.294E+05	-.207E+03	.928E-04	.830E+03	.141E+11	.317E+02
234.0	-.161E-02	-.301E+05	-.258E+02	.802E-04	.831E+03	.141E+11	.288E+02
240.0	-.116E-02	-.298E+05	.138E+03	.675E-04	.831E+03	.141E+11	.259E+02
246.0	-.796E-03	-.286E+05	.284E+03	.551E-04	.828E+03	.141E+11	.228E+02
252.0	-.502E-03	-.265E+05	.412E+03	.434E-04	.823E+03	.141E+11	.196E+02
258.0	-.275E-03	-.237E+05	.518E+03	.327E-04	.817E+03	.141E+11	.160E+02
264.0	-.109E-03	-.204E+05	.602E+03	.234E-04	.810E+03	.141E+11	.118E+02
270.0	.538E-05	-.166E+05	.624E+03	.155E-04	.801E+03	.141E+11	-.433E+01
276.0	.775E-04	-.129E+05	.580E+03	.928E-05	.794E+03	.141E+11	-.105E+02
282.0	.117E-03	-.961E+04	.512E+03	.450E-05	.786E+03	.141E+11	-.120E+02
288.0	.132E-03	-.676E+04	.439E+03	.103E-05	.780E+03	.141E+11	-.125E+02
294.0	.129E-03	-.435E+04	.364E+03	-.133E-05	.775E+03	.141E+11	-.124E+02
300.0	.116E-03	-.239E+04	.290E+03	-.276E-05	.771E+03	.141E+11	-.120E+02
306.0	.960E-04	-.860E+03	.221E+03	-.345E-05	.767E+03	.141E+11	-.113E+02
312.0	.742E-04	.264E+03	.156E+03	-.357E-05	.766E+03	.141E+11	-.103E+02
318.0	.531E-04	.102E+04	.969E+02	-.330E-05	.768E+03	.141E+11	-.926E+01
324.0	.346E-04	.143E+04	.451E+02	-.278E-05	.768E+03	.141E+11	-.803E+01
330.0	.197E-04	.156E+04	.111E+01	-.215E-05	.769E+03	.141E+11	-.666E+01

336.0	.885E-05	.145E+04	-.341E+02	-.151E-05	.768E+03	.141E+11	-.509E+01
342.0	.166E-05	.116E+04	-.581E+02	-.954E-06	.768E+03	.141E+11	-.292E+01
348.0	-.260E-05	.755E+03	-.567E+02	-.549E-06	.767E+03	.141E+11	.338E+01
354.0	-.493E-05	.476E+03	-.340E+02	-.287E-06	.766E+03	.141E+11	.419E+01
360.0	-.604E-05	.348E+03	-.199E+02	-.112E-06	.766E+03	.141E+11	.493E+00
366.0	-.627E-05	.237E+03	-.168E+02	.120E-07	.766E+03	.141E+11	.542E+00
372.0	-.590E-05	.146E+03	-.136E+02	.935E-07	.766E+03	.141E+11	.538E+00
378.0	-.515E-05	.745E+02	-.105E+02	.140E-06	.765E+03	.141E+11	.494E+00
384.0	-.421E-05	.204E+02	-.772E+01	.160E-06	.765E+03	.141E+11	.425E+00
390.0	-.322E-05	-.184E+02	-.542E+01	.161E-06	.765E+03	.141E+11	.340E+00
396.0	-.228E-05	-.450E+02	-.365E+01	.147E-06	.765E+03	.141E+11	.252E+00
402.0	-.146E-05	-.625E+02	-.239E+01	.125E-06	.765E+03	.141E+11	.168E+00
408.0	-.787E-06	-.739E+02	-.160E+01	.957E-07	.765E+03	.141E+11	.945E-01
414.0	-.307E-06	-.819E+02	-.120E+01	.626E-07	.765E+03	.141E+11	.383E-01
420.0	-.356E-07	-.884E+02	.503E+01	.265E-07	.765E+03	.141E+11	.204E+01
426.0	.107E-07	-.215E+02	.758E+01	.315E-08	.765E+03	.141E+11	-.120E+01
432.0	.222E-08	.246E+01	.187E+01	-.893E-09	.765E+03	.141E+11	-.705E+00
438.0	-.106E-12	.870E+00	-.205E+00	-.185E-09	.765E+03	.141E+11	.289E-01
444.0	-.692E-13	.128E-04	-.725E-01	.881E-14	.765E+03	.141E+11	.214E-01
450.0	-.160E-17	-.272E-04	-.107E-05	.577E-14	.765E+03	.141E+11	.101E-05
456.0	.646E-18	-.113E-08	.226E-05	.133E-18	.765E+03	.141E+11	-.667E-06
462.0	.391E-22	.254E-09	.945E-10	-.539E-19	.765E+03	.141E+11	-.343E-10
468.0	-.603E-23	.201E-13	-.211E-10	-.326E-23	.765E+03	.141E+11	.622E-11
474.0	-.496E-27	-.681E-15	-.172E-14	.861E-24	.765E+03	.141E+11	.456E-15
480.0	.430E-23	-.568E-15	.185E-16	.596E-24	.765E+03	.141E+11	-.125E-18
486.0	.715E-23	-.460E-15	.173E-16	.378E-24	.765E+03	.141E+11	-.212E-18
492.0	.884E-23	-.360E-15	.157E-16	.204E-24	.765E+03	.141E+11	-.268E-18
498.0	.960E-23	-.272E-15	.138E-16	.698E-25	.765E+03	.141E+11	-.298E-18
504.0	.967E-23	-.195E-15	.117E-16	-.292E-25	.765E+03	.141E+11	-.306E-18
510.0	.925E-23	-.131E-15	.969E-17	-.982E-25	.765E+03	.141E+11	-.299E-18
516.0	.850E-23	-.784E-16	.772E-17	-.143E-24	.765E+03	.141E+11	-.280E-18
522.0	.754E-23	-.376E-16	.591E-17	-.167E-24	.765E+03	.141E+11	-.254E-18
528.0	.649E-23	-.719E-17	.429E-17	-.177E-24	.765E+03	.141E+11	-.223E-18
534.0	.542E-23	.142E-16	.289E-17	-.175E-24	.765E+03	.141E+11	-.189E-18
540.0	.439E-23	.278E-16	.172E-17	-.166E-24	.765E+03	.141E+11	-.156E-18
546.0	.342E-23	.351E-16	.766E-18	-.153E-24	.765E+03	.141E+11	-.124E-18
552.0	.255E-23	.373E-16	.240E-19	-.138E-24	.765E+03	.141E+11	-.942E-19
558.0	.177E-23	.356E-16	-.522E-18	-.122E-24	.765E+03	.141E+11	-.666E-19
564.0	.108E-23	.313E-16	-.890E-18	-.108E-24	.765E+03	.141E+11	-.415E-19
570.0	.476E-24	.252E-16	-.109E-17	-.960E-25	.765E+03	.141E+11	-.186E-19
576.0	-.673E-25	.183E-16	-.115E-17	-.867E-25	.765E+03	.141E+11	.267E-20
582.0	-.564E-24	.115E-16	-.106E-17	-.804E-25	.765E+03	.141E+11	.227E-19
588.0	-.103E-23	.571E-17	-.841E-18	-.767E-25	.765E+03	.141E+11	.422E-19
594.0	-.149E-23	.160E-17	-.487E-18	-.752E-25	.765E+03	.141E+11	.618E-19
600.0	-.193E-23	.000E+00	.000E+00	-.748E-25	.765E+03	.141E+11	.817E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .118E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .124E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .245E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.360E-02
MAXIMUM BENDING MOMENT = .514E+06 LBS-IN
MAXIMUM SHEAR FORCE = .180E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 4

BOUNDARY CONDITION CODE	=	1
LATERAL LOAD AT THE PILE HEAD	=	.190E+05 LBS
MOMENT AT THE PILE HEAD	=	.000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD	=	.150E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.280E+00	.174E-06	.190E+05	-.399E-02	.765E+03	.141E+11	-.302E+03
6.0	.256E+00	.112E+06	.171E+05	-.397E-02	.101E+04	.141E+11	-.319E+03
12.0	.232E+00	.213E+06	.152E+05	-.390E-02	.123E+04	.141E+11	-.335E+03
18.0	.209E+00	.301E+06	.131E+05	-.379E-02	.142E+04	.141E+11	-.349E+03
24.0	.187E+00	.377E+06	.110E+05	-.365E-02	.159E+04	.141E+11	-.361E+03
30.0	.166E+00	.440E+06	.880E+04	-.347E-02	.173E+04	.141E+11	-.372E+03
36.0	.145E+00	.489E+06	.655E+04	-.328E-02	.183E+04	.141E+11	-.380E+03
42.0	.126E+00	.524E+06	.424E+04	-.306E-02	.191E+04	.141E+11	-.387E+03
48.0	.108E+00	.546E+06	.191E+04	-.283E-02	.196E+04	.141E+11	-.392E+03
54.0	.922E-01	.552E+06	-.455E+03	-.260E-02	.197E+04	.141E+11	-.395E+03
60.0	.773E-01	.545E+06	-.200E+04	-.237E-02	.196E+04	.141E+11	-.120E+03
66.0	.637E-01	.533E+06	-.265E+04	-.214E-02	.193E+04	.141E+11	-.984E+02
72.0	.516E-01	.517E+06	-.322E+04	-.192E-02	.190E+04	.141E+11	-.916E+02
78.0	.407E-01	.497E+06	-.375E+04	-.170E-02	.185E+04	.141E+11	-.847E+02
84.0	.312E-01	.475E+06	-.424E+04	-.150E-02	.180E+04	.141E+11	-.775E+02
90.0	.228E-01	.449E+06	-.468E+04	-.130E-02	.175E+04	.141E+11	-.698E+02
96.0	.156E-01	.421E+06	-.507E+04	-.112E-02	.169E+04	.141E+11	-.615E+02
102.0	.940E-02	.390E+06	-.541E+04	-.943E-03	.162E+04	.141E+11	-.520E+02
108.0	.424E-02	.358E+06	-.569E+04	-.784E-03	.155E+04	.141E+11	-.399E+02
114.0	-.515E-05	.323E+06	-.580E+04	-.639E-03	.147E+04	.141E+11	.440E+01
120.0	-.343E-02	.289E+06	-.567E+04	-.509E-03	.140E+04	.141E+11	.371E+02
126.0	-.612E-02	.256E+06	-.543E+04	-.394E-03	.133E+04	.141E+11	.450E+02
132.0	-.815E-02	.225E+06	-.514E+04	-.291E-03	.126E+04	.141E+11	.496E+02
138.0	-.962E-02	.195E+06	-.484E+04	-.202E-03	.119E+04	.141E+11	.524E+02
144.0	-.106E-01	.167E+06	-.452E+04	-.125E-03	.113E+04	.141E+11	.541E+02
150.0	-.111E-01	.141E+06	-.419E+04	-.600E-04	.107E+04	.141E+11	.550E+02
156.0	-.113E-01	.117E+06	-.386E+04	-.524E-05	.102E+04	.141E+11	.553E+02
162.0	-.112E-01	.947E+05	-.353E+04	.397E-04	.973E+03	.141E+11	.551E+02
168.0	-.108E-01	.745E+05	-.320E+04	.756E-04	.928E+03	.141E+11	.545E+02
174.0	-.103E-01	.562E+05	-.288E+04	.103E-03	.888E+03	.141E+11	.535E+02
180.0	-.958E-02	.398E+05	-.256E+04	.124E-03	.852E+03	.141E+11	.523E+02
186.0	-.879E-02	.252E+05	-.225E+04	.138E-03	.820E+03	.141E+11	.508E+02
192.0	-.793E-02	.125E+05	-.195E+04	.146E-03	.793E+03	.141E+11	.491E+02
198.0	-.704E-02	.156E+04	-.166E+04	.149E-03	.769E+03	.141E+11	.472E+02
204.0	-.615E-02	-.770E+04	-.139E+04	.147E-03	.782E+03	.141E+11	.451E+02
210.0	-.528E-02	-.153E+05	-.112E+04	.142E-03	.799E+03	.141E+11	.429E+02
216.0	-.444E-02	-.214E+05	-.872E+03	.135E-03	.812E+03	.141E+11	.405E+02
222.0	-.366E-02	-.260E+05	-.636E+03	.124E-03	.822E+03	.141E+11	.380E+02
228.0	-.295E-02	-.293E+05	-.416E+03	.113E-03	.829E+03	.141E+11	.353E+02
234.0	-.231E-02	-.312E+05	-.213E+03	.999E-04	.834E+03	.141E+11	.325E+02
240.0	-.175E-02	-.320E+05	-.261E+02	.865E-04	.835E+03	.141E+11	.297E+02
246.0	-.127E-02	-.317E+05	.143E+03	.729E-04	.835E+03	.141E+11	.267E+02
252.0	-.877E-03	-.304E+05	.294E+03	.597E-04	.832E+03	.141E+11	.236E+02
258.0	-.557E-03	-.283E+05	.425E+03	.473E-04	.827E+03	.141E+11	.203E+02
264.0	-.309E-03	-.254E+05	.536E+03	.359E-04	.821E+03	.141E+11	.166E+02
270.0	-.126E-03	-.219E+05	.623E+03	.258E-04	.813E+03	.141E+11	.124E+02

276.0	.737E-06	-.180E+05	.654E+03	.174E-04	.805E+03	.141E+11	-.229E+01
282.0	.820E-04	-.141E+05	.616E+03	.106E-04	.796E+03	.141E+11	-.107E+02
288.0	.127E-03	-.106E+05	.546E+03	.531E-05	.789E+03	.141E+11	-.124E+02
294.0	.146E-03	-.756E+04	.470E+03	.145E-05	.782E+03	.141E+11	-.130E+02
300.0	.145E-03	-.497E+04	.393E+03	-.121E-05	.776E+03	.141E+11	-.129E+02
306.0	.131E-03	-.284E+04	.316E+03	-.287E-05	.772E+03	.141E+11	-.125E+02
312.0	.110E-03	-.117E+04	.243E+03	-.372E-05	.768E+03	.141E+11	-.118E+02
318.0	.866E-04	.829E+02	.175E+03	-.395E-05	.765E+03	.141E+11	-.109E+02
324.0	.630E-04	.941E+03	.113E+03	-.373E-05	.767E+03	.141E+11	-.980E+01
330.0	.418E-04	.145E+04	.581E+02	-.322E-05	.768E+03	.141E+11	-.854E+01
336.0	.243E-04	.164E+04	.110E+02	-.257E-05	.769E+03	.141E+11	-.713E+01
342.0	.110E-04	.158E+04	-.269E+02	-.188E-05	.769E+03	.141E+11	-.547E+01
348.0	.173E-05	.133E+04	-.522E+02	-.127E-05	.768E+03	.141E+11	-.295E+01
354.0	-.418E-05	.959E+03	-.493E+02	-.780E-06	.767E+03	.141E+11	.397E+01
360.0	-.764E-05	.735E+03	-.355E+02	-.421E-06	.767E+03	.141E+11	.623E+00
366.0	-.922E-05	.534E+03	-.313E+02	-.151E-06	.766E+03	.141E+11	.797E+00
372.0	-.945E-05	.361E+03	-.263E+02	.387E-07	.766E+03	.141E+11	.861E+00
378.0	-.876E-05	.218E+03	-.212E+02	.162E-06	.766E+03	.141E+11	.840E+00
384.0	-.751E-05	.106E+03	-.164E+02	.231E-06	.766E+03	.141E+11	.756E+00
390.0	-.599E-05	.213E+02	-.122E+02	.258E-06	.765E+03	.141E+11	.632E+00
396.0	-.442E-05	-.408E+02	-.886E+01	.254E-06	.765E+03	.141E+11	.487E+00
402.0	-.295E-05	-.855E+02	-.638E+01	.227E-06	.765E+03	.141E+11	.339E+00
408.0	-.170E-05	-.118E+03	-.475E+01	.184E-06	.766E+03	.141E+11	.203E+00
414.0	-.746E-06	-.143E+03	-.386E+01	.128E-06	.766E+03	.141E+11	.930E-01
420.0	-.159E-06	-.164E+03	.651E+01	.630E-07	.766E+03	.141E+11	.336E+01
426.0	.983E-08	-.648E+02	.132E+02	.144E-07	.765E+03	.141E+11	-.117E+01
432.0	.135E-07	-.660E+01	.581E+01	-.784E-09	.765E+03	.141E+11	-.129E+01
438.0	.428E-09	.497E+01	.565E+00	-.113E-08	.765E+03	.141E+11	-.387E+00
444.0	-.106E-10	.176E+00	-.415E+00	-.357E-10	.765E+03	.141E+11	.114E+00
450.0	-.439E-14	-.414E-02	-.147E-01	.879E-12	.765E+03	.141E+11	.438E-02
456.0	.984E-16	-.180E-05	.345E-03	.366E-15	.765E+03	.141E+11	-.103E-03
462.0	.447E-19	.386E-07	.150E-06	-.820E-17	.765E+03	.141E+11	-.448E-07
468.0	-.917E-21	.183E-10	-.322E-08	-.372E-20	.765E+03	.141E+11	.956E-09
474.0	-.437E-24	-.103E-12	-.153E-11	.131E-21	.765E+03	.141E+11	.439E-12
480.0	.653E-21	-.863E-13	.281E-14	.906E-22	.765E+03	.141E+11	-.191E-16
486.0	.109E-20	-.699E-13	.264E-14	.574E-22	.765E+03	.141E+11	-.326E-16
492.0	.134E-20	-.547E-13	.239E-14	.310E-22	.765E+03	.141E+11	-.411E-16
498.0	.146E-20	-.413E-13	.210E-14	.106E-22	.765E+03	.141E+11	-.457E-16
504.0	.147E-20	-.296E-13	.178E-14	-.442E-23	.765E+03	.141E+11	-.470E-16
510.0	.141E-20	-.198E-13	.147E-14	-.149E-22	.765E+03	.141E+11	-.459E-16
516.0	.129E-20	-.119E-13	.117E-14	-.217E-22	.765E+03	.141E+11	-.430E-16
522.0	.115E-20	-.572E-14	.898E-15	-.254E-22	.765E+03	.141E+11	-.389E-16
528.0	.986E-21	-.109E-14	.652E-15	-.268E-22	.765E+03	.141E+11	-.342E-16
534.0	.823E-21	.215E-14	.440E-15	-.266E-22	.765E+03	.141E+11	-.291E-16
540.0	.666E-21	.423E-14	.261E-15	-.253E-22	.765E+03	.141E+11	-.240E-16
546.0	.520E-21	.533E-14	.116E-15	-.232E-22	.765E+03	.141E+11	-.191E-16
552.0	.387E-21	.567E-14	.368E-17	-.209E-22	.765E+03	.141E+11	-.145E-16
558.0	.269E-21	.541E-14	-.793E-16	-.186E-22	.765E+03	.141E+11	-.102E-16
564.0	.165E-21	.475E-14	-.135E-15	-.164E-22	.765E+03	.141E+11	-.637E-17
570.0	.724E-22	.382E-14	-.166E-15	-.146E-22	.765E+03	.141E+11	-.285E-17
576.0	-.102E-22	.278E-14	-.174E-15	-.132E-22	.765E+03	.141E+11	.409E-18
582.0	-.857E-22	.175E-14	-.161E-15	-.122E-22	.765E+03	.141E+11	.349E-17
588.0	-.157E-21	.868E-15	-.128E-15	-.117E-22	.765E+03	.141E+11	.648E-17
594.0	-.226E-21	.243E-15	-.740E-16	-.114E-22	.765E+03	.141E+11	.948E-17
600.0	-.294E-21	.000E+00	.000E+00	-.114E-22	.765E+03	.141E+11	.125E-16

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.259E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .203E-07 LBS

OUTPUT SUMMARY

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PILE-HEAD DEFLECTION             =    .280E+00 IN
COMPUTED SLOPE AT PILE HEAD      =   -.399E-02
MAXIMUM BENDING MOMENT           =    .552E+06 LBS-IN
MAXIMUM SHEAR FORCE              =    .190E+05 LBS
NO. OF ITERATIONS                =          28
NO. OF ZERO DEFLECTION POINTS    =           9
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LOADING NUMBER 5

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BOUNDARY CONDITION CODE                  =          1
LATERAL LOAD AT THE PILE HEAD            =    .200E+05 LBS
MOMENT AT THE PILE HEAD                  =    .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD              =    .150E+06 LBS
```

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.318E+00	.153E-06	.200E+05	-.441E-02	.765E+03	.141E+11	-.311E+03
6.0	.292E+00	.118E+06	.181E+05	-.439E-02	.102E+04	.141E+11	-.329E+03
12.0	.266E+00	.225E+06	.161E+05	-.432E-02	.126E+04	.141E+11	-.346E+03
18.0	.240E+00	.319E+06	.139E+05	-.420E-02	.146E+04	.141E+11	-.361E+03
24.0	.215E+00	.400E+06	.117E+05	-.405E-02	.164E+04	.141E+11	-.374E+03
30.0	.191E+00	.467E+06	.945E+04	-.386E-02	.179E+04	.141E+11	-.385E+03
36.0	.169E+00	.520E+06	.711E+04	-.366E-02	.190E+04	.141E+11	-.395E+03
42.0	.148E+00	.559E+06	.472E+04	-.343E-02	.199E+04	.141E+11	-.403E+03
48.0	.128E+00	.583E+06	.228E+04	-.318E-02	.204E+04	.141E+11	-.408E+03
54.0	.109E+00	.592E+06	-.179E+03	-.293E-02	.206E+04	.141E+11	-.412E+03
60.0	.925E-01	.586E+06	-.180E+04	-.269E-02	.205E+04	.141E+11	-.127E+03
66.0	.771E-01	.575E+06	-.249E+04	-.244E-02	.202E+04	.141E+11	-.105E+03
72.0	.632E-01	.560E+06	-.310E+04	-.220E-02	.199E+04	.141E+11	-.981E+02
78.0	.508E-01	.542E+06	-.367E+04	-.196E-02	.195E+04	.141E+11	-.912E+02
84.0	.397E-01	.520E+06	-.419E+04	-.174E-02	.190E+04	.141E+11	-.840E+02
90.0	.299E-01	.495E+06	-.468E+04	-.152E-02	.185E+04	.141E+11	-.764E+02
96.0	.214E-01	.466E+06	-.511E+04	-.132E-02	.179E+04	.141E+11	-.683E+02
102.0	.141E-01	.436E+06	-.549E+04	-.113E-02	.172E+04	.141E+11	-.594E+02
108.0	.786E-02	.403E+06	-.582E+04	-.950E-03	.165E+04	.141E+11	-.489E+02
114.0	.267E-02	.368E+06	-.607E+04	-.786E-03	.157E+04	.141E+11	-.342E+02
120.0	-.158E-02	.331E+06	-.608E+04	-.638E-03	.149E+04	.141E+11	.287E+02
126.0	-.498E-02	.296E+06	-.587E+04	-.505E-03	.141E+04	.141E+11	.421E+02
132.0	-.763E-02	.262E+06	-.560E+04	-.386E-03	.134E+04	.141E+11	.485E+02
138.0	-.962E-02	.229E+06	-.530E+04	-.282E-03	.127E+04	.141E+11	.524E+02
144.0	-.110E-01	.199E+06	-.498E+04	-.191E-03	.120E+04	.141E+11	.548E+02
150.0	-.119E-01	.170E+06	-.464E+04	-.113E-03	.114E+04	.141E+11	.562E+02
156.0	-.124E-01	.143E+06	-.430E+04	-.467E-04	.108E+04	.141E+11	.570E+02
162.0	-.125E-01	.118E+06	-.396E+04	.874E-05	.102E+04	.141E+11	.571E+02
168.0	-.123E-01	.955E+05	-.362E+04	.541E-04	.974E+03	.141E+11	.568E+02
174.0	-.118E-01	.747E+05	-.328E+04	.902E-04	.929E+03	.141E+11	.561E+02
180.0	-.112E-01	.559E+05	-.295E+04	.118E-03	.888E+03	.141E+11	.551E+02
186.0	-.104E-01	.391E+05	-.262E+04	.138E-03	.851E+03	.141E+11	.538E+02
192.0	-.953E-02	.242E+05	-.230E+04	.152E-03	.818E+03	.141E+11	.522E+02
198.0	-.859E-02	.112E+05	-.200E+04	.159E-03	.790E+03	.141E+11	.504E+02
204.0	-.762E-02	-.181E+02	-.170E+04	.161E-03	.765E+03	.141E+11	.485E+02
210.0	-.665E-02	-.949E+04	-.142E+04	.159E-03	.786E+03	.141E+11	.463E+02

216.0	-.571E-02	-.173E+05	-.114E+04	.154E-03	.803E+03	.141E+11	.440E+02
222.0	-.481E-02	-.235E+05	-.888E+03	.145E-03	.817E+03	.141E+11	.416E+02
228.0	-.397E-02	-.282E+05	-.646E+03	.134E-03	.827E+03	.141E+11	.390E+02
234.0	-.320E-02	-.315E+05	-.421E+03	.121E-03	.834E+03	.141E+11	.363E+02
240.0	-.251E-02	-.335E+05	-.211E+03	.108E-03	.839E+03	.141E+11	.335E+02
246.0	-.190E-02	-.342E+05	-.195E+02	.933E-04	.840E+03	.141E+11	.305E+02
252.0	-.139E-02	-.339E+05	.154E+03	.789E-04	.839E+03	.141E+11	.275E+02
258.0	-.958E-03	-.325E+05	.310E+03	.648E-04	.836E+03	.141E+11	.243E+02
264.0	-.611E-03	-.303E+05	.445E+03	.514E-04	.832E+03	.141E+11	.209E+02
270.0	-.341E-03	-.273E+05	.559E+03	.392E-04	.825E+03	.141E+11	.172E+02
276.0	-.140E-03	-.236E+05	.649E+03	.284E-04	.817E+03	.141E+11	.128E+02
282.0	-.362E-09	-.195E+05	.688E+03	.192E-04	.808E+03	.141E+11	.167E+00
288.0	.906E-04	-.154E+05	.656E+03	.118E-04	.799E+03	.141E+11	-.111E+02
294.0	.142E-03	-.117E+05	.584E+03	.608E-05	.791E+03	.141E+11	-.128E+02
300.0	.164E-03	-.841E+04	.505E+03	.182E-05	.784E+03	.141E+11	-.135E+02
306.0	.164E-03	-.562E+04	.424E+03	-.116E-05	.778E+03	.141E+11	-.135E+02
312.0	.150E-03	-.332E+04	.345E+03	-.306E-05	.773E+03	.141E+11	-.131E+02
318.0	.127E-03	-.148E+04	.268E+03	-.408E-05	.769E+03	.141E+11	-.124E+02
324.0	.101E-03	-.914E+02	.197E+03	-.441E-05	.766E+03	.141E+11	-.115E+02
330.0	.742E-04	.887E+03	.131E+03	-.424E-05	.767E+03	.141E+11	-.103E+02
336.0	.498E-04	.149E+04	.732E+02	-.374E-05	.769E+03	.141E+11	-.906E+01
342.0	.293E-04	.177E+04	.232E+02	-.304E-05	.769E+03	.141E+11	-.759E+01
348.0	.133E-04	.178E+04	-.171E+02	-.229E-05	.769E+03	.141E+11	-.583E+01
354.0	.182E-05	.157E+04	-.436E+02	-.158E-05	.769E+03	.141E+11	-.301E+01
360.0	-.567E-05	.126E+04	-.512E+02	-.981E-06	.768E+03	.141E+11	.462E+00
366.0	-.996E-05	.958E+03	-.473E+02	-.511E-06	.767E+03	.141E+11	.860E+00
372.0	-.118E-04	.690E+03	-.414E+02	-.162E-06	.767E+03	.141E+11	.108E+01
378.0	-.119E-04	.461E+03	-.348E+02	.825E-07	.766E+03	.141E+11	.114E+01
384.0	-.108E-04	.272E+03	-.281E+02	.238E-06	.766E+03	.141E+11	.109E+01
390.0	-.904E-05	.123E+03	-.220E+02	.322E-06	.766E+03	.141E+11	.954E+00
396.0	-.695E-05	.796E+01	-.168E+02	.350E-06	.765E+03	.141E+11	.767E+00
402.0	-.484E-05	-.794E+02	-.128E+02	.335E-06	.765E+03	.141E+11	.558E+00
408.0	-.294E-05	-.147E+03	-.101E+02	.287E-06	.766E+03	.141E+11	.352E+00
414.0	-.141E-05	-.201E+03	-.852E+01	.213E-06	.766E+03	.141E+11	.175E+00
420.0	-.385E-06	-.249E+03	.555E+01	.117E-06	.766E+03	.141E+11	.451E+01
426.0	.865E-10	-.135E+03	.184E+02	.356E-07	.766E+03	.141E+11	-.237E+00
432.0	.421E-07	-.291E+02	.120E+02	.829E-09	.765E+03	.141E+11	-.188E+01
438.0	.100E-07	.865E+01	.275E+01	-.351E-08	.765E+03	.141E+11	-.116E+01
444.0	-.299E-12	.394E+01	-.720E+00	-.837E-09	.765E+03	.141E+11	.470E-01
450.0	-.516E-11	.393E-02	-.328E+00	.249E-13	.765E+03	.141E+11	.867E-01
456.0	-.190E-15	-.202E-02	-.328E-03	.430E-12	.765E+03	.141E+11	.172E-03
462.0	.482E-16	-.112E-06	.169E-03	.158E-16	.765E+03	.141E+11	-.447E-04
468.0	.357E-20	.189E-07	.936E-08	-.401E-17	.765E+03	.141E+11	-.327E-08
474.0	-.450E-21	.462E-12	-.158E-08	-.572E-21	.765E+03	.141E+11	.417E-09
480.0	-.329E-20	.384E-12	-.127E-13	-.393E-21	.765E+03	.141E+11	.851E-16
486.0	-.516E-20	.310E-12	-.119E-13	-.245E-21	.765E+03	.141E+11	.136E-15
492.0	-.624E-20	.242E-12	-.107E-13	-.128E-21	.765E+03	.141E+11	.168E-15
498.0	-.670E-20	.181E-12	-.939E-14	-.384E-22	.765E+03	.141E+11	.185E-15
504.0	-.670E-20	.129E-12	-.797E-14	.275E-22	.765E+03	.141E+11	.189E-15
510.0	-.637E-20	.856E-13	-.655E-14	.730E-22	.765E+03	.141E+11	.183E-15
516.0	-.582E-20	.504E-13	-.520E-14	.102E-21	.765E+03	.141E+11	.171E-15
522.0	-.515E-20	.230E-13	-.396E-14	.117E-21	.765E+03	.141E+11	.154E-15
528.0	-.441E-20	.268E-14	-.286E-14	.123E-21	.765E+03	.141E+11	.135E-15
534.0	-.367E-20	-.115E-13	-.191E-14	.121E-21	.765E+03	.141E+11	.114E-15
540.0	-.296E-20	-.204E-13	-.111E-14	.114E-21	.765E+03	.141E+11	.938E-16
546.0	-.230E-20	-.250E-13	-.469E-15	.105E-21	.765E+03	.141E+11	.742E-16
552.0	-.170E-20	-.262E-13	.279E-16	.938E-22	.765E+03	.141E+11	.560E-16
558.0	-.117E-20	-.249E-13	.392E-15	.829E-22	.765E+03	.141E+11	.393E-16
564.0	-.709E-21	-.217E-13	.634E-15	.730E-22	.765E+03	.141E+11	.241E-16
570.0	-.298E-21	-.174E-13	.766E-15	.647E-22	.765E+03	.141E+11	.103E-16
576.0	.679E-22	-.126E-13	.796E-15	.584E-22	.765E+03	.141E+11	-.240E-17
582.0	.402E-21	-.793E-14	.732E-15	.540E-22	.765E+03	.141E+11	-.144E-16
588.0	.716E-21	-.391E-14	.577E-15	.515E-22	.765E+03	.141E+11	-.261E-16

594.0	.102E-20	-.109E-14	.334E-15	.504E-22	.765E+03	.141E+11	-.378E-16
600.0	.132E-20	.000E+00	.000E+00	.502E-22	.765E+03	.141E+11	-.497E-16

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.207E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .196E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .318E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.441E-02
MAXIMUM BENDING MOMENT = .592E+06 LBS-IN
MAXIMUM SHEAR FORCE = .200E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .210E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.359E+00	-.349E-06	.210E+05	-.486E-02	.765E+03	.141E+11	-.321E+03
6.0	.330E+00	.125E+06	.190E+05	-.483E-02	.104E+04	.141E+11	-.340E+03
12.0	.301E+00	.237E+06	.169E+05	-.476E-02	.128E+04	.141E+11	-.357E+03
18.0	.273E+00	.336E+06	.147E+05	-.463E-02	.150E+04	.141E+11	-.373E+03
24.0	.246E+00	.422E+06	.125E+05	-.447E-02	.169E+04	.141E+11	-.387E+03
30.0	.219E+00	.494E+06	.101E+05	-.428E-02	.185E+04	.141E+11	-.399E+03
36.0	.194E+00	.551E+06	.768E+04	-.406E-02	.197E+04	.141E+11	-.409E+03
42.0	.171E+00	.593E+06	.520E+04	-.381E-02	.206E+04	.141E+11	-.418E+03
48.0	.149E+00	.620E+06	.268E+04	-.356E-02	.212E+04	.141E+11	-.424E+03
54.0	.128E+00	.632E+06	.116E+03	-.329E-02	.215E+04	.141E+11	-.429E+03
60.0	.109E+00	.628E+06	-.157E+04	-.302E-02	.214E+04	.141E+11	-.134E+03
66.0	.918E-01	.618E+06	-.231E+04	-.276E-02	.212E+04	.141E+11	-.111E+03
72.0	.761E-01	.605E+06	-.296E+04	-.250E-02	.209E+04	.141E+11	-.104E+03
78.0	.618E-01	.587E+06	-.356E+04	-.225E-02	.205E+04	.141E+11	-.974E+02
84.0	.491E-01	.566E+06	-.412E+04	-.200E-02	.200E+04	.141E+11	-.902E+02
90.0	.378E-01	.542E+06	-.464E+04	-.177E-02	.195E+04	.141E+11	-.826E+02
96.0	.279E-01	.514E+06	-.511E+04	-.154E-02	.189E+04	.141E+11	-.747E+02
102.0	.193E-01	.483E+06	-.554E+04	-.133E-02	.182E+04	.141E+11	-.661E+02
108.0	.119E-01	.450E+06	-.590E+04	-.113E-02	.175E+04	.141E+11	-.563E+02
114.0	.571E-02	.414E+06	-.620E+04	-.950E-03	.167E+04	.141E+11	-.440E+02
120.0	.545E-03	.377E+06	-.640E+04	-.782E-03	.159E+04	.141E+11	-.201E+02
126.0	-.366E-02	.339E+06	-.634E+04	-.630E-03	.151E+04	.141E+11	.380E+02
132.0	-.701E-02	.302E+06	-.609E+04	-.494E-03	.143E+04	.141E+11	.471E+02
138.0	-.959E-02	.267E+06	-.579E+04	-.373E-03	.135E+04	.141E+11	.523E+02
144.0	-.115E-01	.233E+06	-.547E+04	-.267E-03	.128E+04	.141E+11	.556E+02
150.0	-.128E-01	.202E+06	-.513E+04	-.175E-03	.121E+04	.141E+11	.576E+02

156.0	-.136E-01	.172E+06	-.478E+04	-.953E-04	.114E+04	.141E+11	.587E+02
162.0	-.139E-01	.144E+06	-.442E+04	-.281E-04	.108E+04	.141E+11	.592E+02
168.0	-.139E-01	.119E+06	-.407E+04	.278E-04	.103E+04	.141E+11	.592E+02
174.0	-.136E-01	.955E+05	-.371E+04	.733E-04	.974E+03	.141E+11	.588E+02
180.0	-.130E-01	.742E+05	-.336E+04	.109E-03	.928E+03	.141E+11	.580E+02
186.0	-.123E-01	.550E+05	-.302E+04	.137E-03	.886E+03	.141E+11	.568E+02
192.0	-.114E-01	.377E+05	-.268E+04	.156E-03	.848E+03	.141E+11	.554E+02
198.0	-.104E-01	.225E+05	-.236E+04	.169E-03	.814E+03	.141E+11	.538E+02
204.0	-.937E-02	.916E+04	-.204E+04	.176E-03	.785E+03	.141E+11	.519E+02
210.0	-.830E-02	-.230E+04	-.173E+04	.177E-03	.770E+03	.141E+11	.499E+02
216.0	-.724E-02	-.120E+05	-.144E+04	.174E-03	.791E+03	.141E+11	.476E+02
222.0	-.621E-02	-.199E+05	-.116E+04	.168E-03	.809E+03	.141E+11	.453E+02
228.0	-.523E-02	-.262E+05	-.899E+03	.158E-03	.823E+03	.141E+11	.427E+02
234.0	-.432E-02	-.310E+05	-.650E+03	.146E-03	.833E+03	.141E+11	.401E+02
240.0	-.348E-02	-.343E+05	-.418E+03	.132E-03	.840E+03	.141E+11	.373E+02
246.0	-.273E-02	-.362E+05	-.203E+03	.117E-03	.845E+03	.141E+11	.344E+02
252.0	-.208E-02	-.369E+05	-.504E+01	.101E-03	.846E+03	.141E+11	.314E+02
258.0	-.152E-02	-.365E+05	.174E+03	.857E-04	.845E+03	.141E+11	.283E+02
264.0	-.105E-02	-.350E+05	.334E+03	.705E-04	.842E+03	.141E+11	.250E+02
270.0	-.673E-03	-.326E+05	.474E+03	.562E-04	.837E+03	.141E+11	.216E+02
276.0	-.377E-03	-.294E+05	.592E+03	.430E-04	.830E+03	.141E+11	.178E+02
282.0	-.156E-03	-.256E+05	.685E+03	.314E-04	.821E+03	.141E+11	.133E+02
288.0	-.285E-06	-.212E+05	.730E+03	.214E-04	.812E+03	.141E+11	.160E+01
294.0	.101E-03	-.168E+05	.700E+03	.134E-04	.802E+03	.141E+11	-.115E+02
300.0	.160E-03	-.129E+05	.626E+03	.707E-05	.793E+03	.141E+11	-.134E+02
306.0	.186E-03	-.934E+04	.544E+03	.235E-05	.786E+03	.141E+11	-.141E+02
312.0	.188E-03	-.633E+04	.459E+03	-.973E-06	.779E+03	.141E+11	-.141E+02
318.0	.174E-03	-.383E+04	.375E+03	-.313E-05	.774E+03	.141E+11	-.138E+02
324.0	.151E-03	-.182E+04	.295E+03	-.433E-05	.769E+03	.141E+11	-.131E+02
330.0	.123E-03	-.284E+03	.219E+03	-.478E-05	.766E+03	.141E+11	-.122E+02
336.0	.935E-04	.813E+03	.149E+03	-.467E-05	.767E+03	.141E+11	-.112E+02
342.0	.665E-04	.151E+04	.852E+02	-.417E-05	.769E+03	.141E+11	-.998E+01
348.0	.434E-04	.184E+04	.293E+02	-.346E-05	.769E+03	.141E+11	-.865E+01
354.0	.250E-04	.187E+04	-.182E+02	-.267E-05	.769E+03	.141E+11	-.720E+01
360.0	.113E-04	.163E+04	-.426E+02	-.193E-05	.769E+03	.141E+11	-.923E+00
366.0	.182E-05	.136E+04	-.458E+02	-.130E-05	.768E+03	.141E+11	-.157E+00
372.0	-.423E-05	.108E+04	-.451E+02	-.778E-06	.768E+03	.141E+11	.386E+00
378.0	-.752E-05	.819E+03	-.418E+02	-.374E-06	.767E+03	.141E+11	.721E+00
384.0	-.872E-05	.582E+03	-.370E+02	-.767E-07	.767E+03	.141E+11	.878E+00
390.0	-.844E-05	.375E+03	-.317E+02	.126E-06	.766E+03	.141E+11	.891E+00
396.0	-.720E-05	.201E+03	-.266E+02	.249E-06	.766E+03	.141E+11	.795E+00
402.0	-.545E-05	.551E+02	-.224E+02	.303E-06	.765E+03	.141E+11	.628E+00
408.0	-.356E-05	-.682E+02	-.192E+02	.300E-06	.765E+03	.141E+11	.428E+00
414.0	-.185E-05	-.176E+03	-.172E+02	.249E-06	.766E+03	.141E+11	.231E+00
420.0	-.583E-06	-.276E+03	-.101E+01	.153E-06	.766E+03	.141E+11	.518E+01
426.0	-.175E-07	-.188E+03	.188E+02	.542E-07	.766E+03	.141E+11	.141E+01
432.0	.678E-07	-.506E+02	.163E+02	.348E-08	.765E+03	.141E+11	-.221E+01
438.0	.242E-07	.765E+01	.499E+01	-.563E-08	.765E+03	.141E+11	-.157E+01
444.0	.144E-09	.936E+01	-.628E+00	-.202E-08	.765E+03	.141E+11	-.275E+00
450.0	-.852E-10	.123E+00	-.783E+00	-.120E-10	.765E+03	.141E+11	.232E+00
456.0	-.453E-14	-.334E-01	-.103E-01	.710E-11	.765E+03	.141E+11	.484E-02
462.0	.795E-15	-.240E-05	.279E-02	.377E-15	.765E+03	.141E+11	-.854E-03
468.0	.720E-19	.312E-06	.200E-06	-.663E-16	.765E+03	.141E+11	-.771E-07
474.0	-.742E-20	.909E-11	-.260E-07	-.113E-19	.765E+03	.141E+11	.797E-08
480.0	-.636E-19	.756E-11	-.250E-12	-.776E-20	.765E+03	.141E+11	.192E-14
486.0	-.101E-18	.611E-11	-.234E-12	-.486E-20	.765E+03	.141E+11	.310E-14
492.0	-.122E-18	.477E-11	-.211E-12	-.256E-20	.765E+03	.141E+11	.384E-14
498.0	-.131E-18	.358E-11	-.185E-12	-.784E-21	.765E+03	.141E+11	.422E-14
504.0	-.131E-18	.255E-11	-.157E-12	.516E-21	.765E+03	.141E+11	.432E-14
510.0	-.125E-18	.169E-11	-.129E-12	.142E-20	.765E+03	.141E+11	.420E-14
516.0	-.114E-18	.100E-11	-.102E-12	.199E-20	.765E+03	.141E+11	.392E-14
522.0	-.101E-18	.461E-12	-.781E-13	.230E-20	.765E+03	.141E+11	.354E-14
528.0	-.868E-19	.597E-13	-.564E-13	.241E-20	.765E+03	.141E+11	.309E-14

534.0	-.723E-19	-.220E-12	-.377E-13	.238E-20	.765E+03	.141E+11	.262E-14
540.0	-.583E-19	-.397E-12	-.220E-13	.224E-20	.765E+03	.141E+11	.216E-14
546.0	-.453E-19	-.489E-12	-.940E-14	.206E-20	.765E+03	.141E+11	.171E-14
552.0	-.336E-19	-.513E-12	.409E-15	.184E-20	.765E+03	.141E+11	.129E-14
558.0	-.232E-19	-.487E-12	.759E-14	.163E-20	.765E+03	.141E+11	.907E-15
564.0	-.140E-19	-.425E-12	.124E-13	.144E-20	.765E+03	.141E+11	.558E-15
570.0	-.595E-20	-.341E-12	.150E-13	.128E-20	.765E+03	.141E+11	.241E-15
576.0	.127E-20	-.247E-12	.156E-13	.115E-20	.765E+03	.141E+11	-.521E-16
582.0	.785E-20	-.156E-12	.144E-13	.106E-20	.765E+03	.141E+11	-.328E-15
588.0	.140E-19	-.769E-13	.113E-13	.102E-20	.765E+03	.141E+11	-.597E-15
594.0	.200E-19	-.215E-13	.656E-14	.995E-21	.765E+03	.141E+11	-.866E-15
600.0	.260E-19	.000E+00	.000E+00	.990E-21	.765E+03	.141E+11	-.114E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .148E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .152E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .359E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.486E-02
MAXIMUM BENDING MOMENT = .632E+06 LBS-IN
MAXIMUM SHEAR FORCE = .210E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 7

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .220E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.404E+00	.872E-07	.220E+05	-.532E-02	.765E+03	.141E+11	-.331E+03
6.0	.372E+00	.131E+06	.200E+05	-.530E-02	.105E+04	.141E+11	-.350E+03
12.0	.341E+00	.249E+06	.178E+05	-.522E-02	.131E+04	.141E+11	-.368E+03
18.0	.310E+00	.354E+06	.155E+05	-.509E-02	.154E+04	.141E+11	-.384E+03
24.0	.280E+00	.445E+06	.132E+05	-.492E-02	.174E+04	.141E+11	-.399E+03
30.0	.251E+00	.521E+06	.108E+05	-.471E-02	.190E+04	.141E+11	-.412E+03
36.0	.223E+00	.582E+06	.825E+04	-.448E-02	.204E+04	.141E+11	-.423E+03
42.0	.197E+00	.628E+06	.568E+04	-.422E-02	.214E+04	.141E+11	-.433E+03
48.0	.173E+00	.658E+06	.306E+04	-.395E-02	.220E+04	.141E+11	-.440E+03
54.0	.150E+00	.672E+06	.405E+03	-.367E-02	.223E+04	.141E+11	-.446E+03
60.0	.129E+00	.670E+06	-.136E+04	-.338E-02	.223E+04	.141E+11	-.142E+03
66.0	.109E+00	.662E+06	-.214E+04	-.310E-02	.221E+04	.141E+11	-.118E+03
72.0	.913E-01	.650E+06	-.282E+04	-.282E-02	.219E+04	.141E+11	-.111E+03
78.0	.752E-01	.633E+06	-.347E+04	-.255E-02	.215E+04	.141E+11	-.104E+03
84.0	.607E-01	.613E+06	-.407E+04	-.228E-02	.210E+04	.141E+11	-.968E+02
90.0	.478E-01	.588E+06	-.463E+04	-.203E-02	.205E+04	.141E+11	-.894E+02

96.0	.364E-01	.561E+06	-.514E+04	-.179E-02	.199E+04	.141E+11	-.816E+02
102.0	.264E-01	.530E+06	-.560E+04	-.155E-02	.192E+04	.141E+11	-.733E+02
108.0	.177E-01	.496E+06	-.602E+04	-.134E-02	.185E+04	.141E+11	-.642E+02
114.0	.104E-01	.460E+06	-.637E+04	-.113E-02	.177E+04	.141E+11	-.537E+02
120.0	.416E-02	.422E+06	-.665E+04	-.946E-03	.169E+04	.141E+11	-.396E+02
126.0	-.980E-03	.382E+06	-.670E+04	-.775E-03	.160E+04	.141E+11	.245E+02
132.0	-.514E-02	.343E+06	-.649E+04	-.621E-03	.152E+04	.141E+11	.425E+02
138.0	-.843E-02	.305E+06	-.622E+04	-.483E-03	.143E+04	.141E+11	.501E+02
144.0	-.109E-01	.269E+06	-.590E+04	-.362E-03	.135E+04	.141E+11	.547E+02
150.0	-.128E-01	.235E+06	-.557E+04	-.255E-03	.128E+04	.141E+11	.576E+02
156.0	-.140E-01	.203E+06	-.522E+04	-.162E-03	.121E+04	.141E+11	.593E+02
162.0	-.147E-01	.173E+06	-.486E+04	-.819E-04	.114E+04	.141E+11	.603E+02
168.0	-.150E-01	.145E+06	-.449E+04	-.145E-04	.108E+04	.141E+11	.607E+02
174.0	-.149E-01	.119E+06	-.413E+04	.415E-04	.103E+04	.141E+11	.606E+02
180.0	-.145E-01	.951E+05	-.377E+04	.869E-04	.973E+03	.141E+11	.600E+02
186.0	-.138E-01	.735E+05	-.341E+04	.123E-03	.926E+03	.141E+11	.591E+02
192.0	-.130E-01	.539E+05	-.306E+04	.150E-03	.883E+03	.141E+11	.579E+02
198.0	-.120E-01	.365E+05	-.272E+04	.169E-03	.845E+03	.141E+11	.564E+02
204.0	-.110E-01	.210E+05	-.238E+04	.181E-03	.811E+03	.141E+11	.547E+02
210.0	-.987E-02	.756E+04	-.206E+04	.187E-03	.782E+03	.141E+11	.528E+02
216.0	-.874E-02	-.402E+04	-.175E+04	.188E-03	.774E+03	.141E+11	.507E+02
222.0	-.762E-02	-.138E+05	-.145E+04	.184E-03	.795E+03	.141E+11	.484E+02
228.0	-.653E-02	-.218E+05	-.117E+04	.177E-03	.813E+03	.141E+11	.460E+02
234.0	-.550E-02	-.281E+05	-.900E+03	.166E-03	.827E+03	.141E+11	.435E+02
240.0	-.454E-02	-.329E+05	-.647E+03	.153E-03	.837E+03	.141E+11	.408E+02
246.0	-.366E-02	-.362E+05	-.411E+03	.138E-03	.844E+03	.141E+11	.380E+02
252.0	-.288E-02	-.381E+05	-.192E+03	.123E-03	.849E+03	.141E+11	.350E+02
258.0	-.219E-02	-.387E+05	.858E+01	.106E-03	.850E+03	.141E+11	.320E+02
264.0	-.160E-02	-.381E+05	.191E+03	.900E-04	.849E+03	.141E+11	.288E+02
270.0	-.111E-02	-.366E+05	.354E+03	.742E-04	.845E+03	.141E+11	.255E+02
276.0	-.711E-03	-.340E+05	.496E+03	.592E-04	.840E+03	.141E+11	.220E+02
282.0	-.400E-03	-.307E+05	.617E+03	.455E-04	.832E+03	.141E+11	.181E+02
288.0	-.166E-03	-.267E+05	.712E+03	.333E-04	.824E+03	.141E+11	.135E+02
294.0	-.227E-06	-.222E+05	.757E+03	.229E-04	.814E+03	.141E+11	.149E+01
300.0	.109E-03	-.177E+05	.726E+03	.144E-04	.804E+03	.141E+11	-.118E+02
306.0	.173E-03	-.135E+05	.650E+03	.779E-05	.795E+03	.141E+11	-.137E+02
312.0	.202E-03	-.990E+04	.565E+03	.281E-05	.787E+03	.141E+11	-.145E+02
318.0	.206E-03	-.677E+04	.478E+03	-.726E-06	.780E+03	.141E+11	-.146E+02
324.0	.193E-03	-.416E+04	.392E+03	-.304E-05	.774E+03	.141E+11	-.142E+02
330.0	.170E-03	-.206E+04	.308E+03	-.436E-05	.770E+03	.141E+11	-.136E+02
336.0	.141E-03	-.450E+03	.229E+03	-.490E-05	.766E+03	.141E+11	-.128E+02
342.0	.111E-03	.697E+03	.155E+03	-.484E-05	.767E+03	.141E+11	-.118E+02
348.0	.830E-04	.142E+04	.871E+02	-.439E-05	.768E+03	.141E+11	-.107E+02
354.0	.585E-04	.175E+04	.262E+02	-.372E-05	.769E+03	.141E+11	-.956E+01
360.0	.384E-04	.174E+04	-.118E+02	-.298E-05	.769E+03	.141E+11	-.313E+01
366.0	.227E-04	.161E+04	-.271E+02	-.227E-05	.769E+03	.141E+11	-.196E+01
372.0	.111E-04	.142E+04	-.360E+02	-.163E-05	.768E+03	.141E+11	-.101E+01
378.0	.317E-05	.118E+04	-.399E+02	-.107E-05	.768E+03	.141E+11	-.304E+00
384.0	-.176E-05	.941E+03	-.403E+02	-.622E-06	.767E+03	.141E+11	.177E+00
390.0	-.430E-05	.702E+03	-.384E+02	-.274E-06	.767E+03	.141E+11	.454E+00
396.0	-.505E-05	.480E+03	-.354E+02	-.226E-07	.766E+03	.141E+11	.557E+00
402.0	-.457E-05	.278E+03	-.321E+02	.138E-06	.766E+03	.141E+11	.526E+00
408.0	-.339E-05	.941E+02	-.293E+02	.217E-06	.766E+03	.141E+11	.406E+00
414.0	-.196E-05	-.749E+02	-.274E+02	.221E-06	.765E+03	.141E+11	.245E+00
420.0	-.731E-06	-.235E+03	-.989E+01	.155E-06	.766E+03	.141E+11	.559E+01
426.0	-.972E-07	-.194E+03	.143E+02	.644E-07	.766E+03	.141E+11	.249E+01
432.0	.425E-07	-.630E+02	.161E+02	.992E-08	.765E+03	.141E+11	-.189E+01
438.0	.218E-07	-.191E+00	.592E+01	-.350E-08	.765E+03	.141E+11	-.151E+01
444.0	.527E-09	.810E+01	.366E-01	-.182E-08	.765E+03	.141E+11	-.433E+00
450.0	-.562E-10	.251E+00	-.677E+00	-.439E-10	.765E+03	.141E+11	.206E+00
456.0	-.702E-14	-.221E-01	-.209E-01	.469E-11	.765E+03	.141E+11	.794E-02
462.0	.525E-15	-.317E-05	.184E-02	.585E-15	.765E+03	.141E+11	-.600E-03
468.0	.852E-19	.206E-06	.264E-06	-.437E-16	.765E+03	.141E+11	-.966E-07

474.0	-.490E-20	.103E-10	-.172E-07	-.128E-19	.765E+03	.141E+11	.560E-08
480.0	-.689E-19	.854E-11	-.281E-12	-.885E-20	.765E+03	.141E+11	.220E-14
486.0	-.111E-18	.690E-11	-.263E-12	-.557E-20	.765E+03	.141E+11	.363E-14
492.0	-.136E-18	.540E-11	-.238E-12	-.296E-20	.765E+03	.141E+11	.453E-14
498.0	-.147E-18	.406E-11	-.208E-12	-.954E-21	.765E+03	.141E+11	.500E-14
504.0	-.147E-18	.290E-11	-.177E-12	.523E-21	.765E+03	.141E+11	.513E-14
510.0	-.140E-18	.193E-11	-.146E-12	.155E-20	.765E+03	.141E+11	.499E-14
516.0	-.129E-18	.115E-11	-.116E-12	.220E-20	.765E+03	.141E+11	.466E-14
522.0	-.114E-18	.539E-12	-.884E-13	.256E-20	.765E+03	.141E+11	.422E-14
528.0	-.978E-19	.843E-13	-.640E-13	.269E-20	.765E+03	.141E+11	.369E-14
534.0	-.816E-19	-.234E-12	-.429E-13	.266E-20	.765E+03	.141E+11	.314E-14
540.0	-.659E-19	-.436E-12	-.253E-13	.252E-20	.765E+03	.141E+11	.258E-14
546.0	-.513E-19	-.542E-12	-.110E-13	.231E-20	.765E+03	.141E+11	.205E-14
552.0	-.381E-19	-.572E-12	.120E-15	.208E-20	.765E+03	.141E+11	.155E-14
558.0	-.264E-19	-.544E-12	.827E-14	.184E-20	.765E+03	.141E+11	.109E-14
564.0	-.160E-19	-.476E-12	.137E-13	.162E-20	.765E+03	.141E+11	.675E-15
570.0	-.690E-20	-.382E-12	.167E-13	.144E-20	.765E+03	.141E+11	.296E-15
576.0	.126E-20	-.278E-12	.175E-13	.130E-20	.765E+03	.141E+11	-.548E-16
582.0	.871E-20	-.175E-12	.161E-13	.121E-20	.765E+03	.141E+11	-.386E-15
588.0	.157E-19	-.865E-13	.127E-13	.115E-20	.765E+03	.141E+11	-.708E-15
594.0	.225E-19	-.242E-13	.737E-14	.113E-20	.765E+03	.141E+11	-.103E-14
600.0	.292E-19	.000E+00	.000E+00	.112E-20	.765E+03	.141E+11	-.136E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.105E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .805E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .404E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.532E-02
MAXIMUM BENDING MOMENT = .672E+06 LBS-IN
MAXIMUM SHEAR FORCE = .220E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 8

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .230E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.452E+00	.218E-07	.230E+05	-.581E-02	.765E+03	.141E+11	-.340E+03
6.0	.417E+00	.137E+06	.209E+05	-.579E-02	.107E+04	.141E+11	-.360E+03
12.0	.382E+00	.261E+06	.187E+05	-.570E-02	.134E+04	.141E+11	-.379E+03
18.0	.348E+00	.372E+06	.164E+05	-.557E-02	.158E+04	.141E+11	-.396E+03
24.0	.316E+00	.468E+06	.139E+05	-.539E-02	.179E+04	.141E+11	-.411E+03
30.0	.284E+00	.549E+06	.114E+05	-.517E-02	.196E+04	.141E+11	-.425E+03

36.0	.253E+00	.614E+06	.884E+04	-.493E-02	.211E+04	.141E+11	-.437E+03
42.0	.225E+00	.663E+06	.619E+04	-.465E-02	.222E+04	.141E+11	-.447E+03
48.0	.198E+00	.697E+06	.348E+04	-.437E-02	.229E+04	.141E+11	-.456E+03
54.0	.172E+00	.713E+06	.724E+03	-.407E-02	.232E+04	.141E+11	-.462E+03
60.0	.149E+00	.713E+06	-.111E+04	-.376E-02	.232E+04	.141E+11	-.149E+03
66.0	.127E+00	.706E+06	-.193E+04	-.346E-02	.231E+04	.141E+11	-.124E+03
72.0	.107E+00	.696E+06	-.265E+04	-.317E-02	.229E+04	.141E+11	-.117E+03
78.0	.892E-01	.680E+06	-.333E+04	-.287E-02	.225E+04	.141E+11	-.110E+03
84.0	.728E-01	.661E+06	-.397E+04	-.259E-02	.221E+04	.141E+11	-.103E+03
90.0	.581E-01	.637E+06	-.456E+04	-.231E-02	.216E+04	.141E+11	-.954E+02
96.0	.451E-01	.610E+06	-.511E+04	-.205E-02	.210E+04	.141E+11	-.876E+02
102.0	.335E-01	.580E+06	-.561E+04	-.180E-02	.203E+04	.141E+11	-.794E+02
108.0	.235E-01	.546E+06	-.606E+04	-.156E-02	.196E+04	.141E+11	-.705E+02
114.0	.149E-01	.510E+06	-.646E+04	-.133E-02	.188E+04	.141E+11	-.605E+02
120.0	.753E-02	.471E+06	-.678E+04	-.112E-02	.180E+04	.141E+11	-.483E+02
126.0	.139E-02	.431E+06	-.701E+04	-.932E-03	.171E+04	.141E+11	-.275E+02
132.0	-.366E-02	.389E+06	-.698E+04	-.758E-03	.162E+04	.141E+11	.379E+02
138.0	-.771E-02	.348E+06	-.672E+04	-.602E-03	.153E+04	.141E+11	.486E+02
144.0	-.109E-01	.309E+06	-.641E+04	-.463E-03	.144E+04	.141E+11	.546E+02
150.0	-.133E-01	.272E+06	-.607E+04	-.339E-03	.136E+04	.141E+11	.583E+02
156.0	-.150E-01	.237E+06	-.571E+04	-.231E-03	.128E+04	.141E+11	.607E+02
162.0	-.160E-01	.204E+06	-.535E+04	-.138E-03	.121E+04	.141E+11	.621E+02
168.0	-.166E-01	.173E+06	-.497E+04	-.575E-04	.114E+04	.141E+11	.628E+02
174.0	-.167E-01	.144E+06	-.459E+04	.990E-05	.108E+04	.141E+11	.630E+02
180.0	-.165E-01	.118E+06	-.422E+04	.656E-04	.102E+04	.141E+11	.627E+02
186.0	-.159E-01	.937E+05	-.384E+04	.110E-03	.970E+03	.141E+11	.620E+02
192.0	-.152E-01	.716E+05	-.347E+04	.146E-03	.922E+03	.141E+11	.609E+02
198.0	-.142E-01	.517E+05	-.311E+04	.172E-03	.878E+03	.141E+11	.596E+02
204.0	-.131E-01	.339E+05	-.276E+04	.190E-03	.840E+03	.141E+11	.580E+02
210.0	-.119E-01	.183E+05	-.242E+04	.201E-03	.805E+03	.141E+11	.562E+02
216.0	-.107E-01	.458E+04	-.209E+04	.206E-03	.775E+03	.141E+11	.542E+02
222.0	-.944E-02	-.714E+04	-.177E+04	.205E-03	.781E+03	.141E+11	.520E+02
228.0	-.822E-02	-.170E+05	-.146E+04	.200E-03	.802E+03	.141E+11	.497E+02
234.0	-.704E-02	-.250E+05	-.117E+04	.191E-03	.820E+03	.141E+11	.472E+02
240.0	-.592E-02	-.314E+05	-.896E+03	.179E-03	.834E+03	.141E+11	.445E+02
246.0	-.489E-02	-.361E+05	-.637E+03	.165E-03	.844E+03	.141E+11	.418E+02
252.0	-.394E-02	-.393E+05	-.395E+03	.149E-03	.851E+03	.141E+11	.389E+02
258.0	-.310E-02	-.411E+05	-.170E+03	.132E-03	.855E+03	.141E+11	.359E+02
264.0	-.236E-02	-.416E+05	.358E+02	.114E-03	.856E+03	.141E+11	.328E+02
270.0	-.173E-02	-.409E+05	.223E+03	.968E-04	.855E+03	.141E+11	.295E+02
276.0	-.120E-02	-.391E+05	.390E+03	.798E-04	.851E+03	.141E+11	.262E+02
282.0	-.770E-03	-.364E+05	.536E+03	.638E-04	.845E+03	.141E+11	.226E+02
288.0	-.434E-03	-.328E+05	.660E+03	.492E-04	.837E+03	.141E+11	.186E+02
294.0	-.181E-03	-.285E+05	.757E+03	.361E-04	.828E+03	.141E+11	.139E+02
300.0	-.356E-09	-.238E+05	.800E+03	.250E-04	.817E+03	.141E+11	.168E+00
306.0	.120E-03	-.190E+05	.764E+03	.160E-04	.807E+03	.141E+11	-.121E+02
312.0	.192E-03	-.146E+05	.685E+03	.884E-05	.797E+03	.141E+11	-.142E+02
318.0	.226E-03	-.108E+05	.597E+03	.345E-05	.789E+03	.141E+11	-.150E+02
324.0	.233E-03	-.746E+04	.507E+03	-.416E-06	.782E+03	.141E+11	-.152E+02
330.0	.221E-03	-.469E+04	.417E+03	-.299E-05	.776E+03	.141E+11	-.149E+02
336.0	.197E-03	-.245E+04	.329E+03	-.451E-05	.771E+03	.141E+11	-.143E+02
342.0	.167E-03	-.730E+03	.245E+03	-.518E-05	.767E+03	.141E+11	-.136E+02
348.0	.135E-03	.503E+03	.167E+03	-.523E-05	.766E+03	.141E+11	-.126E+02
354.0	.104E-03	.128E+04	.942E+02	-.485E-05	.768E+03	.141E+11	-.116E+02
360.0	.767E-04	.164E+04	.406E+02	-.423E-05	.769E+03	.141E+11	-.625E+01
366.0	.534E-04	.178E+04	.805E+01	-.351E-05	.769E+03	.141E+11	-.461E+01
372.0	.346E-04	.174E+04	-.152E+02	-.276E-05	.769E+03	.141E+11	-.315E+01
378.0	.203E-04	.160E+04	-.305E+02	-.205E-05	.769E+03	.141E+11	-.194E+01
384.0	.999E-05	.138E+04	-.394E+02	-.142E-05	.768E+03	.141E+11	-.101E+01
390.0	.324E-05	.113E+04	-.434E+02	-.887E-06	.768E+03	.141E+11	-.341E+00
396.0	-.647E-06	.862E+03	-.442E+02	-.464E-06	.767E+03	.141E+11	.713E-01
402.0	-.233E-05	.598E+03	-.432E+02	-.154E-06	.767E+03	.141E+11	.269E+00
408.0	-.250E-05	.344E+03	-.415E+02	.456E-07	.766E+03	.141E+11	.300E+00

414.0	-.179E-05	.997E+02	-.399E+02	.140E-06	.766E+03	.141E+11	.223E+00
420.0	-.821E-06	-.136E+03	-.219E+02	.132E-06	.766E+03	.141E+11	.581E+01
426.0	-.202E-06	-.163E+03	.511E+01	.686E-07	.766E+03	.141E+11	.318E+01
432.0	.182E-08	-.749E+02	.127E+02	.181E-07	.765E+03	.141E+11	-.661E+00
438.0	.152E-07	-.107E+02	.666E+01	-.588E-10	.765E+03	.141E+11	-.134E+01
444.0	.111E-08	.507E+01	.932E+00	-.126E-08	.765E+03	.141E+11	-.559E+00
450.0	-.103E-10	.446E+00	-.423E+00	-.929E-10	.765E+03	.141E+11	.119E+00
456.0	-.115E-13	-.404E-02	-.371E-01	.859E-12	.765E+03	.141E+11	.120E-01
462.0	.959E-16	-.458E-05	.337E-03	.956E-15	.765E+03	.141E+11	-.115E-03
468.0	.111E-18	.375E-07	.382E-06	-.799E-17	.765E+03	.141E+11	-.124E-06
474.0	-.893E-21	.126E-10	-.313E-08	-.159E-19	.765E+03	.141E+11	.107E-08
480.0	-.804E-19	.105E-10	-.343E-12	-.110E-19	.765E+03	.141E+11	.253E-14
486.0	-.133E-18	.851E-11	-.322E-12	-.698E-20	.765E+03	.141E+11	.428E-14
492.0	-.164E-18	.667E-11	-.291E-12	-.376E-20	.765E+03	.141E+11	.540E-14
498.0	-.178E-18	.502E-11	-.256E-12	-.128E-20	.765E+03	.141E+11	.599E-14
504.0	-.179E-18	.360E-11	-.217E-12	.555E-21	.765E+03	.141E+11	.616E-14
510.0	-.172E-18	.241E-11	-.179E-12	.183E-20	.765E+03	.141E+11	.601E-14
516.0	-.157E-18	.145E-11	-.143E-12	.265E-20	.765E+03	.141E+11	.563E-14
522.0	-.140E-18	.692E-12	-.109E-12	.310E-20	.765E+03	.141E+11	.510E-14
528.0	-.120E-18	.129E-12	-.794E-13	.328E-20	.765E+03	.141E+11	.447E-14
534.0	-.100E-18	-.266E-12	-.535E-13	.325E-20	.765E+03	.141E+11	.381E-14
540.0	-.812E-19	-.519E-12	-.317E-13	.308E-20	.765E+03	.141E+11	.314E-14
546.0	-.633E-19	-.653E-12	-.141E-13	.283E-20	.765E+03	.141E+11	.249E-14
552.0	-.472E-19	-.693E-12	-.356E-15	.255E-20	.765E+03	.141E+11	.189E-14
558.0	-.328E-19	-.661E-12	.975E-14	.226E-20	.765E+03	.141E+11	.134E-14
564.0	-.200E-19	-.580E-12	.165E-13	.200E-20	.765E+03	.141E+11	.831E-15
570.0	-.877E-20	-.467E-12	.203E-13	.178E-20	.765E+03	.141E+11	.370E-15
576.0	.129E-20	-.339E-12	.213E-13	.161E-20	.765E+03	.141E+11	-.556E-16
582.0	.105E-19	-.214E-12	.197E-13	.149E-20	.765E+03	.141E+11	-.458E-15
588.0	.191E-19	-.106E-12	.156E-13	.142E-20	.765E+03	.141E+11	-.850E-15
594.0	.275E-19	-.296E-13	.903E-14	.139E-20	.765E+03	.141E+11	-.124E-14
600.0	.358E-19	.000E+00	.000E+00	.138E-20	.765E+03	.141E+11	-.164E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.319E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .304E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .452E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.581E-02
MAXIMUM BENDING MOMENT = .713E+06 LBS-IN
MAXIMUM SHEAR FORCE = .230E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 9

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .240E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.503E+00	.523E-06	.240E+05	-.632E-02	.765E+03	.141E+11	-.349E+03
6.0	.465E+00	.143E+06	.218E+05	-.629E-02	.108E+04	.141E+11	-.370E+03
12.0	.428E+00	.273E+06	.196E+05	-.620E-02	.136E+04	.141E+11	-.390E+03
18.0	.391E+00	.389E+06	.172E+05	-.606E-02	.162E+04	.141E+11	-.408E+03
24.0	.355E+00	.490E+06	.147E+05	-.588E-02	.184E+04	.141E+11	-.424E+03
30.0	.320E+00	.576E+06	.121E+05	-.565E-02	.202E+04	.141E+11	-.438E+03
36.0	.287E+00	.646E+06	.942E+04	-.539E-02	.218E+04	.141E+11	-.451E+03
42.0	.256E+00	.699E+06	.668E+04	-.511E-02	.229E+04	.141E+11	-.462E+03
48.0	.226E+00	.735E+06	.388E+04	-.480E-02	.237E+04	.141E+11	-.471E+03
54.0	.198E+00	.754E+06	.104E+04	-.449E-02	.241E+04	.141E+11	-.478E+03
60.0	.172E+00	.756E+06	-.867E+03	-.417E-02	.242E+04	.141E+11	-.156E+03
66.0	.148E+00	.751E+06	-.173E+04	-.385E-02	.241E+04	.141E+11	-.130E+03
72.0	.126E+00	.742E+06	-.249E+04	-.353E-02	.239E+04	.141E+11	-.123E+03
78.0	.106E+00	.728E+06	-.321E+04	-.322E-02	.236E+04	.141E+11	-.116E+03
84.0	.874E-01	.709E+06	-.388E+04	-.291E-02	.232E+04	.141E+11	-.109E+03
90.0	.708E-01	.686E+06	-.452E+04	-.262E-02	.227E+04	.141E+11	-.102E+03
96.0	.560E-01	.660E+06	-.511E+04	-.233E-02	.221E+04	.141E+11	-.942E+02
102.0	.429E-01	.629E+06	-.565E+04	-.206E-02	.214E+04	.141E+11	-.862E+02
108.0	.313E-01	.595E+06	-.614E+04	-.180E-02	.207E+04	.141E+11	-.776E+02
114.0	.213E-01	.559E+06	-.658E+04	-.155E-02	.199E+04	.141E+11	-.683E+02
120.0	.127E-01	.519E+06	-.695E+04	-.132E-02	.190E+04	.141E+11	-.575E+02
126.0	.545E-02	.478E+06	-.726E+04	-.111E-02	.181E+04	.141E+11	-.433E+02
132.0	-.604E-03	.434E+06	-.732E+04	-.917E-03	.171E+04	.141E+11	.208E+02
138.0	-.555E-02	.391E+06	-.713E+04	-.742E-03	.162E+04	.141E+11	.436E+02
144.0	-.951E-02	.350E+06	-.684E+04	-.585E-03	.153E+04	.141E+11	.522E+02
150.0	-.126E-01	.310E+06	-.652E+04	-.444E-03	.144E+04	.141E+11	.572E+02
156.0	-.148E-01	.273E+06	-.616E+04	-.321E-03	.136E+04	.141E+11	.605E+02
162.0	-.164E-01	.237E+06	-.579E+04	-.212E-03	.128E+04	.141E+11	.626E+02
168.0	-.174E-01	.204E+06	-.541E+04	-.119E-03	.121E+04	.141E+11	.638E+02
174.0	-.178E-01	.172E+06	-.503E+04	-.392E-04	.114E+04	.141E+11	.643E+02
180.0	-.179E-01	.143E+06	-.464E+04	.278E-04	.108E+04	.141E+11	.644E+02
186.0	-.175E-01	.116E+06	-.426E+04	.829E-04	.102E+04	.141E+11	.639E+02
192.0	-.169E-01	.920E+05	-.388E+04	.127E-03	.966E+03	.141E+11	.631E+02
198.0	-.160E-01	.697E+05	-.350E+04	.161E-03	.918E+03	.141E+11	.620E+02
204.0	-.149E-01	.496E+05	-.313E+04	.187E-03	.874E+03	.141E+11	.606E+02
210.0	-.137E-01	.318E+05	-.278E+04	.204E-03	.835E+03	.141E+11	.590E+02
216.0	-.125E-01	.160E+05	-.243E+04	.214E-03	.800E+03	.141E+11	.571E+02
222.0	-.112E-01	.224E+04	-.209E+04	.218E-03	.770E+03	.141E+11	.550E+02
228.0	-.986E-02	-.951E+04	-.177E+04	.217E-03	.786E+03	.141E+11	.528E+02
234.0	-.858E-02	-.194E+05	-.146E+04	.210E-03	.808E+03	.141E+11	.504E+02
240.0	-.734E-02	-.274E+05	-.116E+04	.200E-03	.825E+03	.141E+11	.478E+02
246.0	-.617E-02	-.337E+05	-.884E+03	.188E-03	.839E+03	.141E+11	.452E+02
252.0	-.509E-02	-.383E+05	-.621E+03	.172E-03	.849E+03	.141E+11	.423E+02
258.0	-.410E-02	-.414E+05	-.376E+03	.155E-03	.856E+03	.141E+11	.394E+02
264.0	-.322E-02	-.431E+05	-.149E+03	.137E-03	.860E+03	.141E+11	.364E+02
270.0	-.246E-02	-.435E+05	.600E+02	.119E-03	.860E+03	.141E+11	.332E+02
276.0	-.180E-02	-.426E+05	.249E+03	.101E-03	.858E+03	.141E+11	.299E+02
282.0	-.125E-02	-.407E+05	.419E+03	.830E-04	.854E+03	.141E+11	.265E+02
288.0	-.801E-03	-.377E+05	.567E+03	.664E-04	.848E+03	.141E+11	.229E+02
294.0	-.451E-03	-.340E+05	.692E+03	.511E-04	.840E+03	.141E+11	.189E+02
300.0	-.188E-03	-.295E+05	.791E+03	.377E-04	.830E+03	.141E+11	.141E+02
306.0	.757E-06	-.246E+05	.827E+03	.262E-04	.819E+03	.141E+11	-.227E+01
312.0	.127E-03	-.197E+05	.783E+03	.168E-04	.808E+03	.141E+11	-.124E+02
318.0	.202E-03	-.152E+05	.703E+03	.940E-05	.799E+03	.141E+11	-.145E+02
324.0	.239E-03	-.112E+05	.613E+03	.379E-05	.790E+03	.141E+11	-.153E+02
330.0	.248E-03	-.783E+04	.521E+03	-.262E-06	.782E+03	.141E+11	-.155E+02
336.0	.236E-03	-.498E+04	.429E+03	-.298E-05	.776E+03	.141E+11	-.152E+02
342.0	.212E-03	-.268E+04	.340E+03	-.461E-05	.771E+03	.141E+11	-.147E+02
348.0	.181E-03	-.900E+03	.254E+03	-.537E-05	.767E+03	.141E+11	-.139E+02

354.0	.147E-03	.377E+03	.173E+03	-.548E-05	.766E+03	.141E+11	-.130E+02
360.0	.115E-03	.119E+04	.106E+03	-.515E-05	.768E+03	.141E+11	-.939E+01
366.0	.857E-04	.166E+04	.554E+02	-.454E-05	.769E+03	.141E+11	-.740E+01
372.0	.606E-04	.186E+04	.166E+02	-.380E-05	.769E+03	.141E+11	-.552E+01
378.0	.402E-04	.186E+04	-.115E+02	-.301E-05	.769E+03	.141E+11	-.385E+01
384.0	.245E-04	.173E+04	-.305E+02	-.225E-05	.769E+03	.141E+11	-.247E+01
390.0	.132E-04	.150E+04	-.420E+02	-.156E-05	.769E+03	.141E+11	-.139E+01
396.0	.572E-05	.122E+04	-.481E+02	-.985E-06	.768E+03	.141E+11	-.631E+00
402.0	.137E-05	.924E+03	-.505E+02	-.529E-06	.767E+03	.141E+11	-.158E+00
408.0	-.622E-06	.619E+03	-.507E+02	-.201E-06	.767E+03	.141E+11	.746E-01
414.0	-.104E-05	.316E+03	-.501E+02	-.272E-08	.766E+03	.141E+11	.130E+00
420.0	-.654E-06	.177E+02	-.336E+02	.681E-07	.765E+03	.141E+11	.539E+01
426.0	-.223E-06	-.868E+02	-.755E+01	.534E-07	.765E+03	.141E+11	.329E+01
432.0	-.132E-07	-.730E+02	.614E+01	.195E-07	.765E+03	.141E+11	.128E+01
438.0	.108E-07	-.132E+02	.637E+01	.118E-08	.765E+03	.141E+11	-.120E+01
444.0	.102E-08	.343E+01	.114E+01	-.899E-09	.765E+03	.141E+11	-.546E+00
450.0	-.253E-11	.404E+00	-.286E+00	-.853E-10	.765E+03	.141E+11	.743E-01
456.0	-.965E-14	-.984E-03	-.337E-01	.210E-12	.765E+03	.141E+11	.112E-01
462.0	.232E-16	-.381E-05	.820E-04	.805E-15	.765E+03	.141E+11	-.277E-04
468.0	.910E-19	.905E-08	.317E-06	-.194E-17	.765E+03	.141E+11	-.106E-06
474.0	-.215E-21	.103E-10	-.753E-09	-.130E-19	.765E+03	.141E+11	.256E-09
480.0	-.652E-19	.859E-11	-.280E-12	-.901E-20	.765E+03	.141E+11	.214E-14
486.0	-.108E-18	.696E-11	-.263E-12	-.571E-20	.765E+03	.141E+11	.363E-14
492.0	-.134E-18	.545E-11	-.238E-12	-.308E-20	.765E+03	.141E+11	.459E-14
498.0	-.145E-18	.411E-11	-.209E-12	-.105E-20	.765E+03	.141E+11	.509E-14
504.0	-.146E-18	.295E-11	-.178E-12	.445E-21	.765E+03	.141E+11	.524E-14
510.0	-.140E-18	.197E-11	-.147E-12	.149E-20	.765E+03	.141E+11	.511E-14
516.0	-.129E-18	.118E-11	-.117E-12	.216E-20	.765E+03	.141E+11	.479E-14
522.0	-.114E-18	.568E-12	-.894E-13	.253E-20	.765E+03	.141E+11	.434E-14
528.0	-.982E-19	.108E-12	-.649E-13	.268E-20	.765E+03	.141E+11	.381E-14
534.0	-.820E-19	-.216E-12	-.437E-13	.265E-20	.765E+03	.141E+11	.324E-14
540.0	-.663E-19	-.422E-12	-.260E-13	.252E-20	.765E+03	.141E+11	.267E-14
546.0	-.518E-19	-.532E-12	-.116E-13	.231E-20	.765E+03	.141E+11	.212E-14
552.0	-.386E-19	-.565E-12	-.341E-15	.208E-20	.765E+03	.141E+11	.161E-14
558.0	-.268E-19	-.540E-12	.792E-14	.185E-20	.765E+03	.141E+11	.114E-14
564.0	-.164E-19	-.473E-12	.135E-13	.163E-20	.765E+03	.141E+11	.709E-15
570.0	-.719E-20	-.381E-12	.166E-13	.145E-20	.765E+03	.141E+11	.317E-15
576.0	.103E-20	-.277E-12	.174E-13	.131E-20	.765E+03	.141E+11	-.461E-16
582.0	.855E-20	-.175E-12	.161E-13	.122E-20	.765E+03	.141E+11	-.389E-15
588.0	.156E-19	-.864E-13	.127E-13	.116E-20	.765E+03	.141E+11	-.722E-15
594.0	.225E-19	-.242E-13	.737E-14	.114E-20	.765E+03	.141E+11	-.106E-14
600.0	.293E-19	.000E+00	.000E+00	.113E-20	.765E+03	.141E+11	-.140E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.198E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .180E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .503E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.632E-02
MAXIMUM BENDING MOMENT = .756E+06 LBS-IN
MAXIMUM SHEAR FORCE = .240E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 10

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BOUNDARY CONDITION CODE              =        1
LATERAL LOAD AT THE PILE HEAD        =    .250E+05 LBS
MOMENT AT THE PILE HEAD              =    .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD          =    .150E+06 LBS
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X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.558E+00	.174E-06	.250E+05	-.686E-02	.765E+03	.141E+11	-.358E+03
6.0	.516E+00	.150E+06	.228E+05	-.683E-02	.109E+04	.141E+11	-.380E+03
12.0	.476E+00	.286E+06	.204E+05	-.674E-02	.139E+04	.141E+11	-.400E+03
18.0	.436E+00	.407E+06	.180E+05	-.659E-02	.166E+04	.141E+11	-.419E+03
24.0	.397E+00	.513E+06	.154E+05	-.639E-02	.189E+04	.141E+11	-.436E+03
30.0	.359E+00	.604E+06	.128E+05	-.616E-02	.209E+04	.141E+11	-.451E+03
36.0	.323E+00	.678E+06	.100E+05	-.588E-02	.225E+04	.141E+11	-.464E+03
42.0	.288E+00	.735E+06	.720E+04	-.558E-02	.237E+04	.141E+11	-.476E+03
48.0	.256E+00	.774E+06	.431E+04	-.526E-02	.246E+04	.141E+11	-.486E+03
54.0	.225E+00	.796E+06	.137E+04	-.493E-02	.251E+04	.141E+11	-.494E+03
60.0	.197E+00	.800E+06	-.596E+03	-.459E-02	.251E+04	.141E+11	-.163E+03
66.0	.170E+00	.797E+06	-.150E+04	-.425E-02	.251E+04	.141E+11	-.136E+03
72.0	.145E+00	.789E+06	-.229E+04	-.392E-02	.249E+04	.141E+11	-.129E+03
78.0	.123E+00	.777E+06	-.305E+04	-.358E-02	.246E+04	.141E+11	-.122E+03
84.0	.102E+00	.759E+06	-.376E+04	-.326E-02	.243E+04	.141E+11	-.115E+03
90.0	.839E-01	.737E+06	-.443E+04	-.294E-02	.238E+04	.141E+11	-.108E+03
96.0	.672E-01	.711E+06	-.505E+04	-.263E-02	.232E+04	.141E+11	-.100E+03
102.0	.523E-01	.681E+06	-.563E+04	-.234E-02	.226E+04	.141E+11	-.921E+02
108.0	.391E-01	.648E+06	-.616E+04	-.205E-02	.218E+04	.141E+11	-.836E+02
114.0	.276E-01	.611E+06	-.663E+04	-.179E-02	.210E+04	.141E+11	-.744E+02
120.0	.177E-01	.572E+06	-.705E+04	-.154E-02	.202E+04	.141E+11	-.641E+02
126.0	.919E-02	.529E+06	-.739E+04	-.130E-02	.192E+04	.141E+11	-.516E+02
132.0	.205E-02	.485E+06	-.764E+04	-.109E-02	.183E+04	.141E+11	-.313E+02
138.0	-.386E-02	.440E+06	-.762E+04	-.891E-03	.173E+04	.141E+11	.386E+02
144.0	-.865E-02	.395E+06	-.735E+04	-.714E-03	.163E+04	.141E+11	.505E+02
150.0	-.124E-01	.353E+06	-.703E+04	-.555E-03	.154E+04	.141E+11	.570E+02
156.0	-.153E-01	.312E+06	-.668E+04	-.414E-03	.145E+04	.141E+11	.611E+02
162.0	-.174E-01	.273E+06	-.630E+04	-.290E-03	.136E+04	.141E+11	.638E+02
168.0	-.188E-01	.237E+06	-.591E+04	-.182E-03	.128E+04	.141E+11	.655E+02
174.0	-.196E-01	.203E+06	-.552E+04	-.885E-04	.121E+04	.141E+11	.664E+02
180.0	-.199E-01	.171E+06	-.512E+04	-.929E-05	.114E+04	.141E+11	.667E+02
186.0	-.197E-01	.141E+06	-.472E+04	.569E-04	.107E+04	.141E+11	.665E+02
192.0	-.192E-01	.114E+06	-.432E+04	.111E-03	.101E+04	.141E+11	.659E+02
198.0	-.184E-01	.891E+05	-.393E+04	.154E-03	.960E+03	.141E+11	.650E+02
204.0	-.173E-01	.665E+05	-.354E+04	.187E-03	.911E+03	.141E+11	.637E+02
210.0	-.161E-01	.462E+05	-.317E+04	.211E-03	.866E+03	.141E+11	.622E+02
216.0	-.148E-01	.282E+05	-.280E+04	.227E-03	.827E+03	.141E+11	.604E+02
222.0	-.134E-01	.122E+05	-.244E+04	.236E-03	.792E+03	.141E+11	.585E+02
228.0	-.120E-01	-.158E+04	-.210E+04	.238E-03	.769E+03	.141E+11	.563E+02
234.0	-.105E-01	-.134E+05	-.177E+04	.235E-03	.795E+03	.141E+11	.540E+02
240.0	-.915E-02	-.232E+05	-.145E+04	.227E-03	.816E+03	.141E+11	.515E+02
246.0	-.781E-02	-.312E+05	-.115E+04	.215E-03	.834E+03	.141E+11	.489E+02
252.0	-.656E-02	-.374E+05	-.865E+03	.201E-03	.847E+03	.141E+11	.461E+02
258.0	-.540E-02	-.419E+05	-.597E+03	.184E-03	.857E+03	.141E+11	.432E+02
264.0	-.435E-02	-.449E+05	-.347E+03	.166E-03	.863E+03	.141E+11	.402E+02
270.0	-.342E-02	-.464E+05	-.115E+03	.146E-03	.867E+03	.141E+11	.371E+02
276.0	-.260E-02	-.465E+05	.978E+02	.126E-03	.867E+03	.141E+11	.339E+02
282.0	-.190E-02	-.454E+05	.291E+03	.107E-03	.865E+03	.141E+11	.305E+02
288.0	-.132E-02	-.432E+05	.463E+03	.881E-04	.860E+03	.141E+11	.270E+02

294.0	-.845E-03	-.400E+05	.614E+03	.704E-04	.853E+03	.141E+11	.233E+02
300.0	-.474E-03	-.360E+05	.742E+03	.542E-04	.844E+03	.141E+11	.192E+02
306.0	-.194E-03	-.312E+05	.842E+03	.400E-04	.834E+03	.141E+11	.143E+02
312.0	.594E-05	-.260E+05	.871E+03	.278E-04	.822E+03	.141E+11	-.448E+01
318.0	.140E-03	-.208E+05	.820E+03	.179E-04	.811E+03	.141E+11	-.128E+02
324.0	.221E-03	-.162E+05	.737E+03	.100E-04	.801E+03	.141E+11	-.149E+02
330.0	.260E-03	-.120E+05	.645E+03	.406E-05	.792E+03	.141E+11	-.157E+02
336.0	.269E-03	-.842E+04	.550E+03	-.278E-06	.784E+03	.141E+11	-.159E+02
342.0	.257E-03	-.540E+04	.456E+03	-.321E-05	.777E+03	.141E+11	-.157E+02
348.0	.231E-03	-.295E+04	.363E+03	-.499E-05	.772E+03	.141E+11	-.151E+02
354.0	.197E-03	-.103E+04	.275E+03	-.583E-05	.768E+03	.141E+11	-.143E+02
360.0	.161E-03	.366E+03	.193E+03	-.597E-05	.766E+03	.141E+11	-.131E+02
366.0	.125E-03	.129E+04	.121E+03	-.562E-05	.768E+03	.141E+11	-.108E+02
372.0	.934E-04	.183E+04	.630E+02	-.496E-05	.769E+03	.141E+11	-.851E+01
378.0	.660E-04	.206E+04	.185E+02	-.413E-05	.770E+03	.141E+11	-.633E+01
384.0	.438E-04	.206E+04	-.137E+02	-.326E-05	.770E+03	.141E+11	-.441E+01
390.0	.269E-04	.190E+04	-.354E+02	-.242E-05	.769E+03	.141E+11	-.283E+01
396.0	.148E-04	.164E+04	-.488E+02	-.167E-05	.769E+03	.141E+11	-.163E+01
402.0	.686E-05	.132E+04	-.561E+02	-.104E-05	.768E+03	.141E+11	-.789E+00
408.0	.230E-05	.967E+03	-.593E+02	-.555E-06	.767E+03	.141E+11	-.275E+00
414.0	.203E-06	.607E+03	-.602E+02	-.220E-06	.767E+03	.141E+11	-.252E-01
420.0	-.346E-06	.246E+03	-.472E+02	-.393E-07	.766E+03	.141E+11	.436E+01
426.0	-.268E-06	.410E+02	-.237E+02	.216E-07	.765E+03	.141E+11	.350E+01
432.0	-.860E-07	-.383E+02	-.604E+01	.222E-07	.765E+03	.141E+11	.239E+01
438.0	-.155E-08	-.316E+02	.299E+01	.736E-08	.765E+03	.141E+11	.629E+00
444.0	.234E-08	-.244E+01	.271E+01	.130E-09	.765E+03	.141E+11	-.721E+00
450.0	.102E-10	.912E+00	.204E+00	-.195E-09	.765E+03	.141E+11	-.117E+00
456.0	-.100E-12	.407E-02	-.760E-01	-.848E-12	.765E+03	.141E+11	.252E-01
462.0	-.988E-16	-.393E-04	-.339E-03	.837E-14	.765E+03	.141E+11	.114E-03
468.0	.934E-18	-.395E-07	.328E-05	.823E-17	.765E+03	.141E+11	-.110E-05
474.0	.943E-21	.105E-09	.330E-08	-.133E-18	.765E+03	.141E+11	-.109E-08
480.0	-.664E-18	.878E-10	-.286E-11	-.922E-19	.765E+03	.141E+11	.219E-13
486.0	-.111E-17	.711E-10	-.268E-11	-.585E-19	.765E+03	.141E+11	.373E-13
492.0	-.137E-17	.557E-10	-.243E-11	-.316E-19	.765E+03	.141E+11	.472E-13
498.0	-.148E-17	.420E-10	-.213E-11	-.108E-19	.765E+03	.141E+11	.524E-13
504.0	-.150E-17	.301E-10	-.182E-11	.449E-20	.765E+03	.141E+11	.539E-13
510.0	-.143E-17	.202E-10	-.150E-11	.152E-19	.765E+03	.141E+11	.526E-13
516.0	-.131E-17	.121E-10	-.119E-11	.220E-19	.765E+03	.141E+11	.493E-13
522.0	-.117E-17	.583E-11	-.914E-12	.259E-19	.765E+03	.141E+11	.447E-13
528.0	-.100E-17	.112E-11	-.664E-12	.273E-19	.765E+03	.141E+11	.392E-13
534.0	-.838E-18	-.219E-11	-.447E-12	.271E-19	.765E+03	.141E+11	.334E-13
540.0	-.678E-18	-.430E-11	-.266E-12	.257E-19	.765E+03	.141E+11	.275E-13
546.0	-.529E-18	-.543E-11	-.119E-12	.237E-19	.765E+03	.141E+11	.219E-13
552.0	-.394E-18	-.577E-11	-.380E-14	.213E-19	.765E+03	.141E+11	.166E-13
558.0	-.274E-18	-.551E-11	.807E-13	.189E-19	.765E+03	.141E+11	.117E-13
564.0	-.168E-18	-.483E-11	.138E-12	.167E-19	.765E+03	.141E+11	.731E-14
570.0	-.737E-19	-.389E-11	.169E-12	.148E-19	.765E+03	.141E+11	.327E-14
576.0	.104E-19	-.283E-11	.177E-12	.134E-19	.765E+03	.141E+11	-.468E-15
582.0	.872E-19	-.179E-11	.164E-12	.124E-19	.765E+03	.141E+11	-.400E-14
588.0	.160E-18	-.883E-12	.130E-12	.119E-19	.765E+03	.141E+11	-.744E-14
594.0	.230E-18	-.247E-12	.754E-13	.116E-19	.765E+03	.141E+11	-.109E-13
600.0	.299E-18	.000E+00	.000E+00	.116E-19	.765E+03	.141E+11	-.144E-13

OUTPUT VERIFICATION

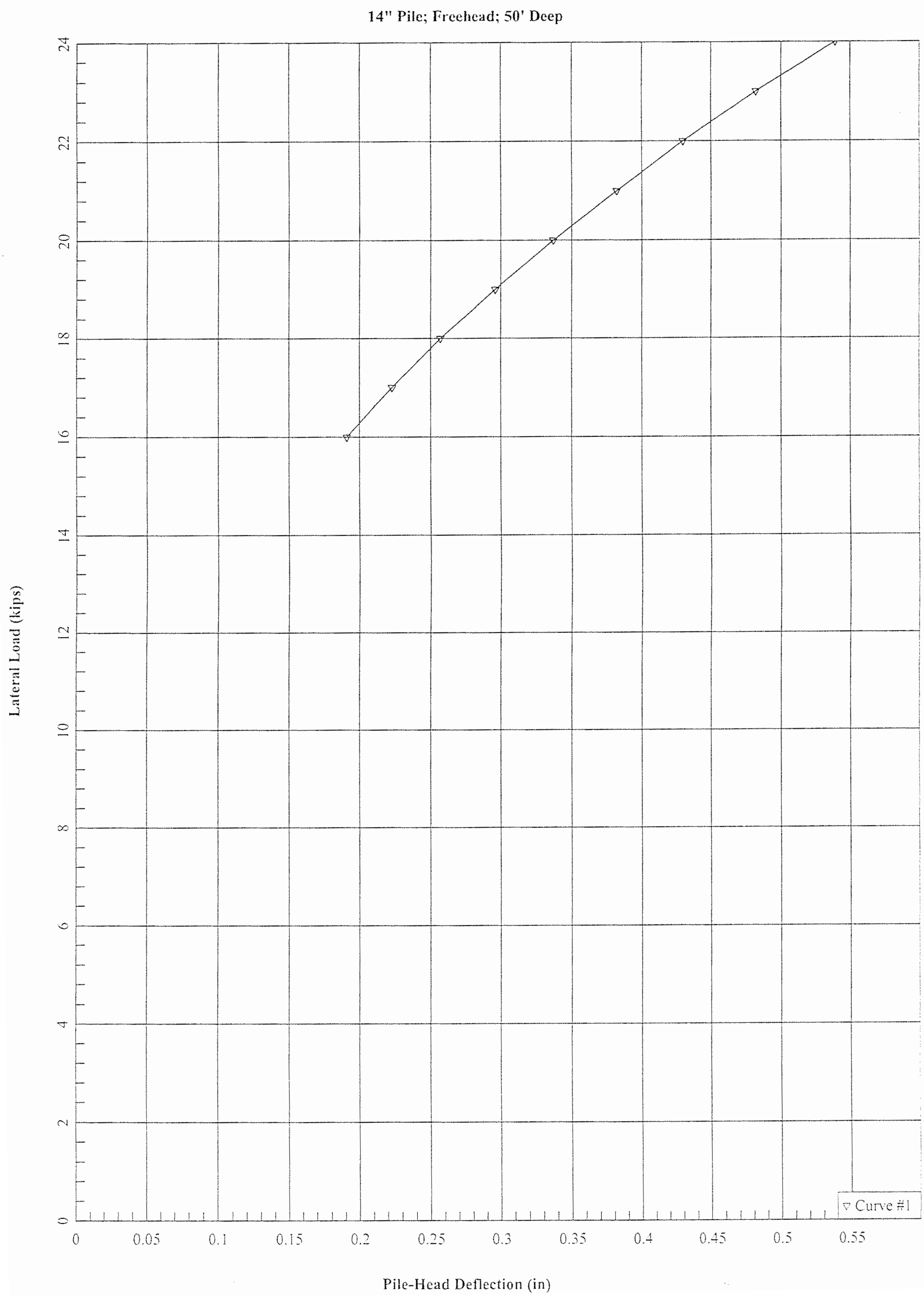
THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .844E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .126E-07 LBS

OUTPUT SUMMARY

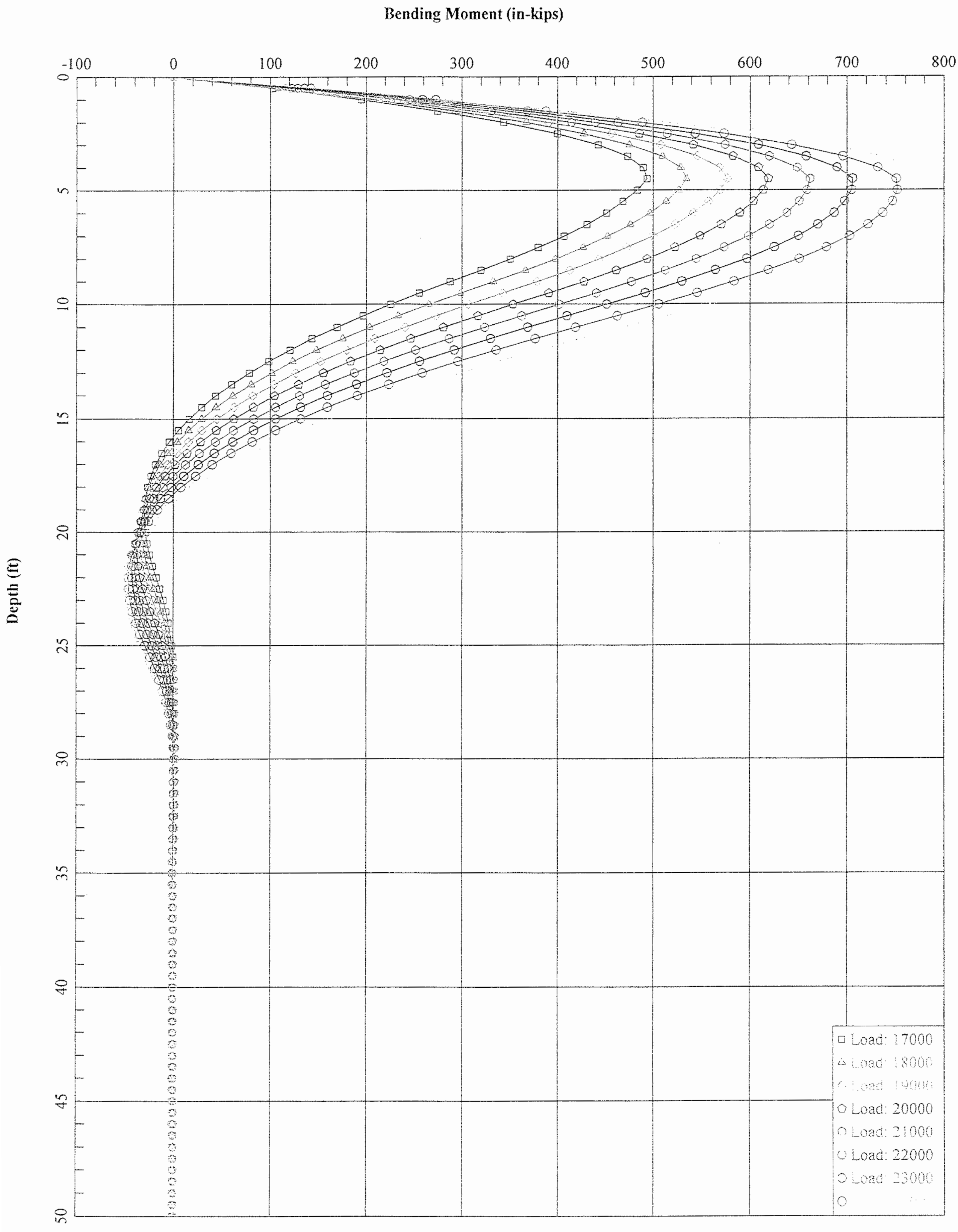
```
PILE-HEAD DEFLECTION            =    .558E+00 IN
COMPUTED SLOPE AT PILE HEAD     =  -.686E-02
MAXIMUM BENDING MOMENT          =    .800E+06 LBS-IN
MAXIMUM SHEAR FORCE             =    .250E+05 LBS
NO. OF ITERATIONS               =          31
NO. OF ZERO DEFLECTION POINTS   =           8
```

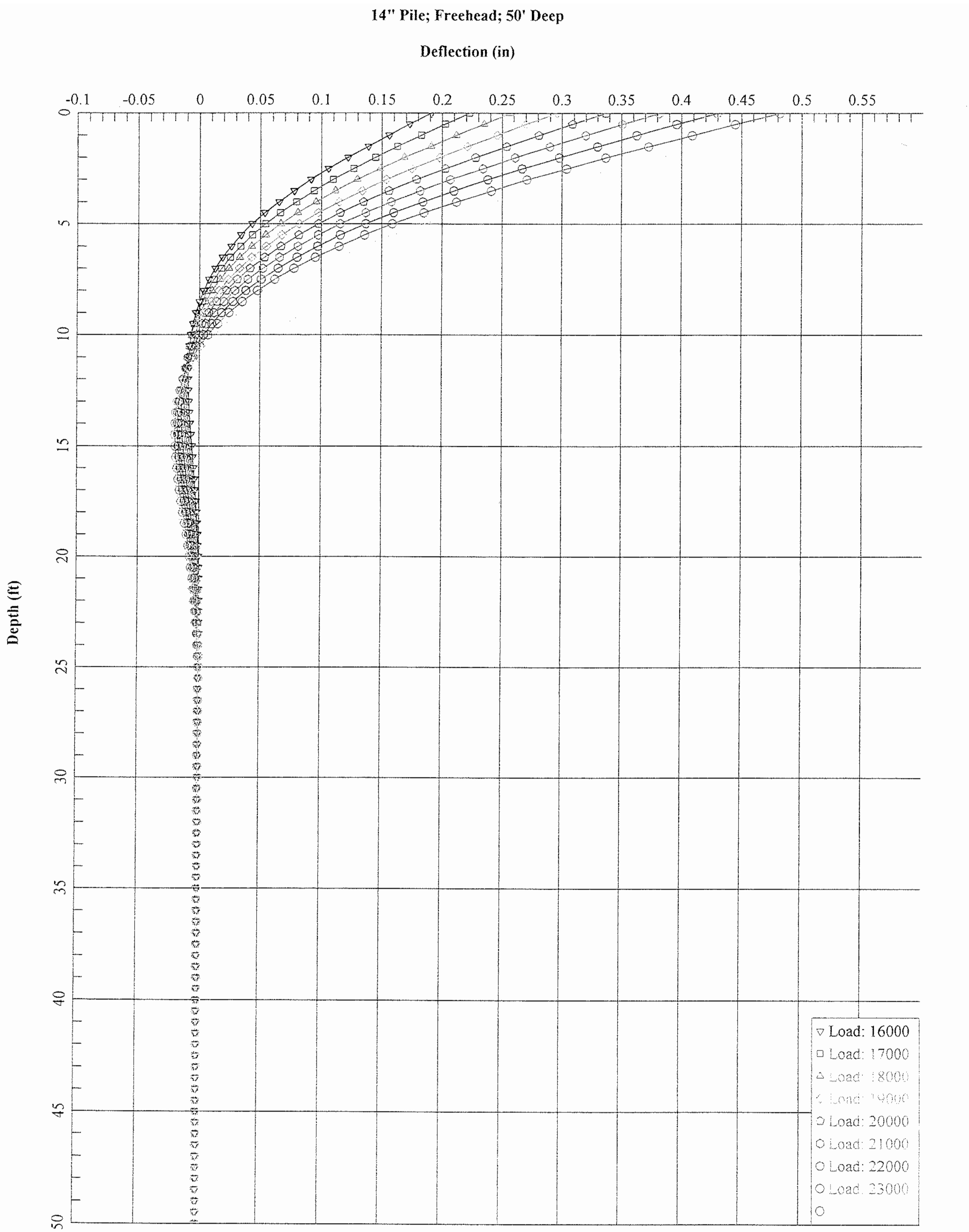
S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.1600E+05	.0000E+00	.1500E+06	.1828E+00	.4371E+06	.1600E+05
.1700E+05	.0000E+00	.1500E+06	.2125E+00	.4749E+06	.1700E+05
.1800E+05	.0000E+00	.1500E+06	.2446E+00	.5135E+06	.1800E+05
.1900E+05	.0000E+00	.1500E+06	.2801E+00	.5523E+06	.1900E+05
.2000E+05	.0000E+00	.1500E+06	.3183E+00	.5918E+06	.2000E+05
.2100E+05	.0000E+00	.1500E+06	.3594E+00	.6319E+06	.2100E+05
.2200E+05	.0000E+00	.1500E+06	.4043E+00	.6720E+06	.2200E+05
.2300E+05	.0000E+00	.1500E+06	.4518E+00	.7130E+06	.2300E+05
.2400E+05	.0000E+00	.1500E+06	.5033E+00	.7556E+06	.2400E+05
.2500E+05	.0000E+00	.1500E+06	.5575E+00	.7995E+06	.2500E+05


14" Pile; Freehead; 50' Deep
Lateral Load (kips)
0
2
4
6
8
10
12
14
16
18
20
22
24
Pile-Head Deflection (in)
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
▽ Curve #1

14" Pile; Freehead; 50' Deep




14" Pile; Freehead; 50' Deep
Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 16000
Load: 17000
Load: 18000
Load: 19000
Load: 20000
Load: 21000
Load: 22000
Load: 23000

Licensed to: LEROY CHAN

ENGEO, INC.

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 14"sq. Concrete Pile; Axial L=300kips; 50'deep;

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N
****

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	14.000	.320E+04	.196E+03	.442E+07
600.00	14.000	.320E+04	.196E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN

```
X AT THE BOTTOM OF THE LAYER      =     360.00 IN
MODULUS OF SUBGRADE REACTION      =   .300E+02 LBS/IN**3

LAYER  3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER         =     360.00 IN
X AT THE BOTTOM OF THE LAYER      =     420.00 IN
MODULUS OF SUBGRADE REACTION      =   .800E+03 LBS/IN**3

LAYER  4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER         =     420.00 IN
X AT THE BOTTOM OF THE LAYER      =     480.00 IN
MODULUS OF SUBGRADE REACTION      =   .100E+03 LBS/IN**3

LAYER  5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER         =     480.00 IN
X AT THE BOTTOM OF THE LAYER      =     720.00 IN
MODULUS OF SUBGRADE REACTION      =   .125E+03 LBS/IN**3


DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
                  8 POINTS
           X,IN     WEIGHT,LBS/IN**3
            .00        .67E-01
          60.00        .67E-01
          60.00        .22E-01
         360.00        .22E-01
         360.00        .28E-01
         480.00        .28E-01
         480.00        .30E-01
         720.00        .30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
                 10 POINTS
           X,IN       C,LBS/IN**2       PHI,DEGREES       E50
            .00        .139E+02            .000         .700E-02
          60.00        .139E+02            .000         .700E-02
          60.00        .347E+01            .000         .200E-01
         360.00        .347E+01            .000         .200E-01
         360.00        .139E+02            .000         .500E-02
         420.00        .139E+02            .000         .500E-02
         420.00        .694E+01            .000         .150E-01
         480.00        .694E+01            .000         .150E-01
         480.00        .000E+00         .260E+02        -----
         720.00        .000E+00         .260E+02        -----


BOUNDARY AND LOADING CONDITIONS
-------------------------------


LOADING NUMBER   1

BOUNDARY-CONDITION CODE                 =          1
LATERAL LOAD AT THE PILE HEAD           =   .160E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   2
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BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .170E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   3

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .180E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   4

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .190E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   5

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .200E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   6

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .210E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   7

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .220E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   8

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .230E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS


LOADING NUMBER   9

BOUNDARY-CONDITION CODE                 =        1
LATERAL LOAD AT THE PILE HEAD           =   .240E+05 LBS
MOMENT AT THE PILE HEAD                 =   .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD             =   .300E+06 LBS
```

FINITE-DIFFERENCE PARAMETERS
    NUMBER OF PILE INCREMENTS = 100
    DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE = .100E-04 IN
    MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS = 100
    MAXIMUM ALLOWABLE DEFLECTION = .10E+03 IN

OUTPUT CODES
    KOUTPT = 1
    KPYOP = 0
    INC = 1

O U T P U T   I N F O R M A T I O N
****

****
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING *
****

LOADING NUMBER 1

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .160E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.191E+00	-.545E-07	.160E+05	-.299E-02	.153E+04	.141E+11	-.274E+03
6.0	.173E+00	.964E+05	.143E+05	-.297E-02	.174E+04	.141E+11	-.289E+03
12.0	.156E+00	.182E+06	.125E+05	-.291E-02	.193E+04	.141E+11	-.303E+03
18.0	.139E+00	.257E+06	.107E+05	-.281E-02	.209E+04	.141E+11	-.314E+03
24.0	.122E+00	.321E+06	.877E+04	-.269E-02	.223E+04	.141E+11	-.324E+03
30.0	.106E+00	.372E+06	.679E+04	-.254E-02	.234E+04	.141E+11	-.333E+03
36.0	.915E-01	.411E+06	.478E+04	-.238E-02	.243E+04	.141E+11	-.339E+03
42.0	.778E-01	.438E+06	.273E+04	-.220E-02	.249E+04	.141E+11	-.343E+03
48.0	.652E-01	.452E+06	.669E+03	-.201E-02	.252E+04	.141E+11	-.345E+03
54.0	.537E-01	.453E+06	-.140E+04	-.182E-02	.252E+04	.141E+11	-.345E+03
60.0	.434E-01	.442E+06	-.273E+04	-.163E-02	.250E+04	.141E+11	-.986E+02
66.0	.342E-01	.426E+06	-.327E+04	-.144E-02	.246E+04	.141E+11	-.799E+02
72.0	.261E-01	.408E+06	-.373E+04	-.126E-02	.242E+04	.141E+11	-.730E+02
78.0	.190E-01	.386E+06	-.414E+04	-.110E-02	.238E+04	.141E+11	-.657E+02
84.0	.129E-01	.362E+06	-.451E+04	-.936E-03	.232E+04	.141E+11	-.578E+02
90.0	.778E-02	.335E+06	-.483E+04	-.788E-03	.226E+04	.141E+11	-.488E+02
96.0	.348E-02	.307E+06	-.509E+04	-.652E-03	.220E+04	.141E+11	-.373E+02
102.0	-.391E-04	.277E+06	-.518E+04	-.528E-03	.214E+04	.141E+11	.846E+01
108.0	-.286E-02	.247E+06	-.505E+04	-.417E-03	.207E+04	.141E+11	.349E+02
114.0	-.504E-02	.218E+06	-.482E+04	-.319E-03	.201E+04	.141E+11	.422E+02
120.0	-.668E-02	.190E+06	-.455E+04	-.232E-03	.195E+04	.141E+11	.464E+02

126.0	-.783E-02	.164E+06	-.427E+04	-.157E-03	.189E+04	.141E+11	.489E+02
132.0	-.856E-02	.139E+06	-.397E+04	-.927E-04	.184E+04	.141E+11	.504E+02
138.0	-.894E-02	.116E+06	-.367E+04	-.385E-04	.179E+04	.141E+11	.511E+02
144.0	-.902E-02	.953E+05	-.336E+04	.645E-05	.174E+04	.141E+11	.513E+02
150.0	-.886E-02	.761E+05	-.305E+04	.428E-04	.170E+04	.141E+11	.510E+02
156.0	-.851E-02	.586E+05	-.275E+04	.714E-04	.166E+04	.141E+11	.503E+02
162.0	-.801E-02	.428E+05	-.245E+04	.929E-04	.162E+04	.141E+11	.493E+02
168.0	-.740E-02	.288E+05	-.216E+04	.108E-03	.159E+04	.141E+11	.480E+02
174.0	-.671E-02	.165E+05	-.188E+04	.118E-03	.157E+04	.141E+11	.464E+02
180.0	-.598E-02	.590E+04	-.160E+04	.123E-03	.154E+04	.141E+11	.447E+02
186.0	-.524E-02	-.313E+04	-.134E+04	.123E-03	.154E+04	.141E+11	.428E+02
192.0	-.450E-02	-.106E+05	-.109E+04	.120E-03	.155E+04	.141E+11	.407E+02
198.0	-.380E-02	-.166E+05	-.852E+03	.114E-03	.157E+04	.141E+11	.384E+02
204.0	-.313E-02	-.213E+05	-.629E+03	.106E-03	.158E+04	.141E+11	.360E+02
210.0	-.252E-02	-.246E+05	-.420E+03	.967E-04	.158E+04	.141E+11	.335E+02
216.0	-.197E-02	-.266E+05	-.227E+03	.858E-04	.159E+04	.141E+11	.309E+02
222.0	-.149E-02	-.276E+05	-.499E+02	.743E-04	.159E+04	.141E+11	.281E+02
228.0	-.108E-02	-.275E+05	.110E+03	.626E-04	.159E+04	.141E+11	.253E+02
234.0	-.740E-03	-.265E+05	.253E+03	.511E-04	.159E+04	.141E+11	.223E+02
240.0	-.467E-03	-.247E+05	.377E+03	.403E-04	.158E+04	.141E+11	.191E+02
246.0	-.257E-03	-.221E+05	.481E+03	.303E-04	.158E+04	.141E+11	.157E+02
252.0	-.103E-03	-.190E+05	.563E+03	.216E-04	.157E+04	.141E+11	.115E+02
258.0	.228E-05	-.154E+05	.588E+03	.143E-04	.156E+04	.141E+11	-.328E+01
264.0	.684E-04	-.120E+05	.549E+03	.848E-05	.156E+04	.141E+11	-.101E+02
270.0	.104E-03	-.888E+04	.484E+03	.405E-05	.155E+04	.141E+11	-.116E+02
276.0	.117E-03	-.619E+04	.413E+03	.855E-06	.154E+04	.141E+11	-.120E+02
282.0	.114E-03	-.393E+04	.341E+03	-.129E-05	.154E+04	.141E+11	-.120E+02
288.0	.102E-03	-.210E+04	.271E+03	-.257E-05	.154E+04	.141E+11	-.115E+02
294.0	.835E-04	-.673E+03	.204E+03	-.316E-05	.153E+04	.141E+11	-.108E+02
300.0	.636E-04	.362E+03	.142E+03	-.323E-05	.153E+04	.141E+11	-.983E+01
306.0	.448E-04	.104E+04	.864E+02	-.293E-05	.153E+04	.141E+11	-.874E+01
312.0	.285E-04	.141E+04	.376E+02	-.241E-05	.153E+04	.141E+11	-.752E+01
318.0	.159E-04	.150E+04	-.355E+01	-.179E-05	.153E+04	.141E+11	-.619E+01
324.0	.706E-05	.137E+04	-.363E+02	-.118E-05	.153E+04	.141E+11	-.472E+01
330.0	.175E-05	.107E+04	-.593E+02	-.659E-06	.153E+04	.141E+11	-.297E+01
336.0	-.839E-06	.663E+03	-.613E+02	-.290E-06	.153E+04	.141E+11	.232E+01
342.0	-.173E-05	.338E+03	-.454E+02	-.777E-07	.153E+04	.141E+11	.296E+01
348.0	-.177E-05	.119E+03	-.276E+02	.192E-07	.153E+04	.141E+11	.298E+01
354.0	-.150E-05	.654E+01	-.102E+02	.458E-07	.153E+04	.141E+11	.282E+01
360.0	-.122E-05	-.387E+01	-.142E+01	.463E-07	.153E+04	.141E+11	.994E-01
366.0	-.948E-06	-.107E+02	-.878E+00	.433E-07	.153E+04	.141E+11	.817E-01
372.0	-.702E-06	-.146E+02	-.441E+00	.379E-07	.153E+04	.141E+11	.639E-01
378.0	-.493E-06	-.161E+02	-.107E+00	.314E-07	.153E+04	.141E+11	.472E-01
384.0	-.326E-06	-.160E+02	.134E+00	.246E-07	.153E+04	.141E+11	.327E-01
390.0	-.199E-06	-.146E+02	.295E+00	.181E-07	.153E+04	.141E+11	.209E-01
396.0	-.109E-06	-.125E+02	.394E+00	.123E-07	.153E+04	.141E+11	.120E-01
402.0	-.508E-07	-.993E+01	.447E+00	.756E-08	.153E+04	.141E+11	.582E-02
408.0	-.181E-07	-.715E+01	.471E+00	.393E-08	.153E+04	.141E+11	.216E-02
414.0	-.358E-08	-.429E+01	.479E+00	.151E-08	.153E+04	.141E+11	.442E-03
420.0	.392E-12	-.141E+01	.357E+00	.298E-09	.153E+04	.141E+11	-.478E-01
426.0	.309E-12	-.889E-04	.117E+00	-.327E-13	.153E+04	.141E+11	-.355E-01
432.0	.789E-17	.121E-03	.740E-05	-.258E-13	.153E+04	.141E+11	-.730E-05
438.0	-.289E-17	.536E-08	-.101E-04	-.657E-18	.153E+04	.141E+11	.307E-05
444.0	-.182E-21	-.113E-08	-.447E-09	.241E-18	.153E+04	.141E+11	.183E-09
450.0	.270E-22	-.924E-13	.945E-10	.151E-22	.153E+04	.141E+11	-.287E-10
456.0	.270E-26	.106E-13	.770E-14	-.225E-23	.153E+04	.141E+11	-.278E-14
462.0	-.252E-27	.126E-17	-.882E-15	-.225E-27	.153E+04	.141E+11	.267E-15
468.0	-.346E-31	-.988E-19	-.105E-18	.210E-28	.153E+04	.141E+11	.359E-19
474.0	.235E-32	-.421E-23	.823E-20	.527E-32	.153E+04	.141E+11	-.250E-20
480.0	.286E-31	-.351E-23	.116E-24	.363E-32	.153E+04	.141E+11	-.837E-27
486.0	.459E-31	-.284E-23	.108E-24	.229E-32	.153E+04	.141E+11	-.137E-26
492.0	.560E-31	-.222E-23	.977E-25	.121E-32	.153E+04	.141E+11	-.171E-26
498.0	.605E-31	-.167E-23	.856E-25	.388E-33	.153E+04	.141E+11	-.189E-26

504.0	.607E-31	-.119E-23	.727E-25	-.220E-33	.153E+04	.141E+11	-.194E-26
510.0	.579E-31	-.795E-24	.598E-25	-.642E-33	.153E+04	.141E+11	-.188E-26
516.0	.530E-31	-.473E-24	.475E-25	-.911E-33	.153E+04	.141E+11	-.176E-26
522.0	.469E-31	-.221E-24	.362E-25	-.106E-32	.153E+04	.141E+11	-.159E-26
528.0	.403E-31	-.339E-25	.262E-25	-.111E-32	.153E+04	.141E+11	-.139E-26
534.0	.336E-31	.971E-25	.175E-25	-.110E-32	.153E+04	.141E+11	-.118E-26
540.0	.271E-31	.180E-24	.102E-25	-.104E-32	.153E+04	.141E+11	-.973E-27
546.0	.211E-31	.224E-24	.436E-26	-.954E-33	.153E+04	.141E+11	-.771E-27
552.0	.157E-31	.236E-24	-.208E-27	-.857E-33	.153E+04	.141E+11	-.583E-27
558.0	.108E-31	.224E-24	-.356E-26	-.759E-33	.153E+04	.141E+11	-.410E-27
564.0	.655E-32	.196E-24	-.579E-26	-.670E-33	.153E+04	.141E+11	-.252E-27
570.0	.278E-32	.157E-24	-.701E-26	-.595E-33	.153E+04	.141E+11	-.109E-27
576.0	-.588E-33	.114E-24	-.730E-26	-.537E-33	.153E+04	.141E+11	.236E-28
582.0	-.367E-32	.716E-25	-.672E-26	-.498E-33	.153E+04	.141E+11	.149E-27
588.0	-.656E-32	.351E-25	-.530E-26	-.475E-33	.153E+04	.141E+11	.271E-27
594.0	-.937E-32	.963E-26	-.307E-26	-.466E-33	.153E+04	.141E+11	.393E-27
600.0	-.122E-31	.000E+00	.000E+00	-.464E-33	.153E+04	.141E+11	.517E-27

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .453E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.507E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .191E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.299E-02
MAXIMUM BENDING MOMENT = .453E+06 LBS-IN
MAXIMUM SHEAR FORCE = .160E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .170E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.223E+00	-.131E-06	.170E+05	-.336E-02	.153E+04	.141E+11	-.285E+03
6.0	.203E+00	.103E+06	.152E+05	-.334E-02	.176E+04	.141E+11	-.301E+03
12.0	.183E+00	.195E+06	.134E+05	-.328E-02	.196E+04	.141E+11	-.315E+03
18.0	.163E+00	.275E+06	.115E+05	-.318E-02	.213E+04	.141E+11	-.328E+03
24.0	.145E+00	.344E+06	.947E+04	-.305E-02	.228E+04	.141E+11	-.338E+03
30.0	.127E+00	.400E+06	.741E+04	-.289E-02	.241E+04	.141E+11	-.348E+03
36.0	.110E+00	.443E+06	.530E+04	-.271E-02	.250E+04	.141E+11	-.355E+03
42.0	.942E-01	.474E+06	.316E+04	-.252E-02	.257E+04	.141E+11	-.360E+03
48.0	.797E-01	.490E+06	.992E+03	-.231E-02	.260E+04	.141E+11	-.363E+03
54.0	.664E-01	.494E+06	-.119E+04	-.210E-02	.261E+04	.141E+11	-.364E+03
60.0	.544E-01	.484E+06	-.260E+04	-.190E-02	.259E+04	.141E+11	-.106E+03

66.0	.437E-01	.469E+06	-.318E+04	-.169E-02	.256E+04	.141E+11	-.867E+02
72.0	.341E-01	.452E+06	-.368E+04	-.150E-02	.252E+04	.141E+11	-.798E+02
78.0	.257E-01	.431E+06	-.414E+04	-.131E-02	.247E+04	.141E+11	-.727E+02
84.0	.184E-01	.407E+06	-.455E+04	-.113E-02	.242E+04	.141E+11	-.650E+02
90.0	.121E-01	.380E+06	-.491E+04	-.966E-03	.236E+04	.141E+11	-.565E+02
96.0	.679E-02	.351E+06	-.522E+04	-.811E-03	.230E+04	.141E+11	-.466E+02
102.0	.238E-02	.320E+06	-.546E+04	-.668E-03	.223E+04	.141E+11	-.328E+02
108.0	-.122E-02	.288E+06	-.548E+04	-.539E-03	.216E+04	.141E+11	.264E+02
114.0	-.409E-02	.256E+06	-.529E+04	-.424E-03	.209E+04	.141E+11	.394E+02
120.0	-.631E-02	.226E+06	-.503E+04	-.321E-03	.203E+04	.141E+11	.455E+02
126.0	-.795E-02	.197E+06	-.475E+04	-.231E-03	.196E+04	.141E+11	.491E+02
132.0	-.908E-02	.170E+06	-.445E+04	-.153E-03	.190E+04	.141E+11	.514E+02
138.0	-.978E-02	.144E+06	-.413E+04	-.865E-04	.185E+04	.141E+11	.527E+02
144.0	-.101E-01	.121E+06	-.382E+04	-.303E-04	.179E+04	.141E+11	.533E+02
150.0	-.101E-01	.988E+05	-.350E+04	.163E-04	.175E+04	.141E+11	.533E+02
156.0	-.992E-02	.787E+05	-.318E+04	.540E-04	.170E+04	.141E+11	.529E+02
162.0	-.950E-02	.604E+05	-.286E+04	.835E-04	.166E+04	.141E+11	.521E+02
168.0	-.892E-02	.440E+05	-.255E+04	.106E-03	.163E+04	.141E+11	.511E+02
174.0	-.823E-02	.294E+05	-.225E+04	.121E-03	.159E+04	.141E+11	.497E+02
180.0	-.747E-02	.166E+05	-.196E+04	.131E-03	.157E+04	.141E+11	.481E+02
186.0	-.666E-02	.546E+04	-.167E+04	.136E-03	.154E+04	.141E+11	.463E+02
192.0	-.584E-02	-.400E+04	-.140E+04	.136E-03	.154E+04	.141E+11	.443E+02
198.0	-.503E-02	-.119E+05	-.114E+04	.133E-03	.156E+04	.141E+11	.422E+02
204.0	-.425E-02	-.182E+05	-.896E+03	.126E-03	.157E+04	.141E+11	.399E+02
210.0	-.351E-02	-.231E+05	-.664E+03	.118E-03	.158E+04	.141E+11	.374E+02
216.0	-.284E-02	-.266E+05	-.448E+03	.107E-03	.159E+04	.141E+11	.348E+02
222.0	-.223E-02	-.288E+05	-.247E+03	.952E-04	.159E+04	.141E+11	.322E+02
228.0	-.169E-02	-.299E+05	-.621E+02	.828E-04	.160E+04	.141E+11	.293E+02
234.0	-.123E-02	-.299E+05	.105E+03	.701E-04	.160E+04	.141E+11	.264E+02
240.0	-.852E-03	-.289E+05	.254E+03	.576E-04	.159E+04	.141E+11	.233E+02
246.0	-.543E-03	-.270E+05	.385E+03	.457E-04	.159E+04	.141E+11	.201E+02
252.0	-.303E-03	-.244E+05	.495E+03	.348E-04	.158E+04	.141E+11	.165E+02
258.0	-.125E-03	-.212E+05	.581E+03	.251E-04	.158E+04	.141E+11	.123E+02
264.0	-.154E-05	-.175E+05	.627E+03	.169E-04	.157E+04	.141E+11	.282E+01
270.0	.776E-04	-.138E+05	.604E+03	.103E-04	.156E+04	.141E+11	-.105E+02
276.0	.122E-03	-.103E+05	.536E+03	.516E-05	.155E+04	.141E+11	-.122E+02
282.0	.140E-03	-.734E+04	.461E+03	.141E-05	.155E+04	.141E+11	-.128E+02
288.0	.139E-03	-.480E+04	.385E+03	-.117E-05	.154E+04	.141E+11	-.127E+02
294.0	.126E-03	-.272E+04	.309E+03	-.276E-05	.154E+04	.141E+11	-.123E+02
300.0	.106E-03	-.108E+04	.237E+03	-.357E-05	.153E+04	.141E+11	-.116E+02
306.0	.827E-04	.143E+03	.170E+03	-.377E-05	.153E+04	.141E+11	-.107E+02
312.0	.603E-04	.979E+03	.109E+03	-.353E-05	.153E+04	.141E+11	-.966E+01
318.0	.404E-04	.147E+04	.549E+02	-.301E-05	.153E+04	.141E+11	-.845E+01
324.0	.242E-04	.165E+04	.824E+01	-.235E-05	.153E+04	.141E+11	-.712E+01
330.0	.122E-04	.157E+04	-.301E+02	-.167E-05	.153E+04	.141E+11	-.567E+01
336.0	.419E-05	.129E+04	-.590E+02	-.106E-05	.153E+04	.141E+11	-.397E+01
342.0	-.505E-06	.869E+03	-.650E+02	-.598E-06	.153E+04	.141E+11	.196E+01
348.0	-.298E-05	.515E+03	-.485E+02	-.304E-06	.153E+04	.141E+11	.354E+01
354.0	-.415E-05	.288E+03	-.260E+02	-.133E-06	.153E+04	.141E+11	.396E+01
360.0	-.458E-05	.204E+03	-.130E+02	-.288E-07	.153E+04	.141E+11	.374E+00
366.0	-.450E-05	.133E+03	-.107E+02	.427E-07	.153E+04	.141E+11	.388E+00
372.0	-.407E-05	.753E+02	-.843E+01	.868E-07	.153E+04	.141E+11	.371E+00
378.0	-.345E-05	.313E+02	-.632E+01	.109E-06	.153E+04	.141E+11	.332E+00
384.0	-.276E-05	-.859E+00	-.449E+01	.116E-06	.153E+04	.141E+11	.278E+00
390.0	-.206E-05	-.230E+02	-.300E+01	.111E-06	.153E+04	.141E+11	.218E+00
396.0	-.143E-05	-.373E+02	-.188E+01	.981E-07	.153E+04	.141E+11	.158E+00
402.0	-.887E-06	-.459E+02	-.110E+01	.804E-07	.153E+04	.141E+11	.102E+00
408.0	-.463E-06	-.508E+02	-.625E+00	.599E-07	.153E+04	.141E+11	.555E-01
414.0	-.168E-06	-.536E+02	-.395E+00	.377E-07	.153E+04	.141E+11	.210E-01
420.0	-.103E-07	-.556E+02	.374E+01	.146E-07	.153E+04	.141E+11	.134E+01
426.0	.622E-08	-.881E+01	.482E+01	.877E-09	.153E+04	.141E+11	-.998E+00
432.0	.263E-09	.224E+01	.743E+00	-.518E-09	.153E+04	.141E+11	-.338E+00
438.0	-.116E-11	.104E+00	-.186E+00	-.219E-10	.153E+04	.141E+11	.574E-01

444.0	-.250E-14	-.455E-03	-.868E-02	.969E-13	.153E+04	.141E+11	.270E-02
450.0	.108E-16	-.990E-06	.379E-04	.208E-15	.153E+04	.141E+11	-.128E-04
456.0	.237E-19	.421E-08	.825E-07	-.897E-18	.153E+04	.141E+11	-.257E-07
462.0	-.997E-22	.940E-11	-.351E-09	-.198E-20	.153E+04	.141E+11	.119E-09
468.0	-.225E-24	-.390E-13	-.783E-12	.831E-23	.153E+04	.141E+11	.245E-12
474.0	.926E-27	-.255E-16	.324E-14	.323E-25	.153E+04	.141E+11	-.110E-14
480.0	.162E-24	-.213E-16	.695E-18	.224E-25	.153E+04	.141E+11	-.496E-20
486.0	.269E-24	-.173E-16	.652E-18	.142E-25	.153E+04	.141E+11	-.841E-20
492.0	.333E-24	-.135E-16	.590E-18	.765E-26	.153E+04	.141E+11	-.106E-19
498.0	.361E-24	-.102E-16	.518E-18	.262E-26	.153E+04	.141E+11	-.118E-19
504.0	.364E-24	-.732E-17	.441E-18	-.110E-26	.153E+04	.141E+11	-.121E-19
510.0	.348E-24	-.491E-17	.363E-18	-.370E-26	.153E+04	.141E+11	-.118E-19
516.0	.320E-24	-.295E-17	.289E-18	-.537E-26	.153E+04	.141E+11	-.111E-19
522.0	.284E-24	-.142E-17	.221E-18	-.630E-26	.153E+04	.141E+11	-.100E-19
528.0	.244E-24	-.271E-18	.160E-18	-.665E-26	.153E+04	.141E+11	-.881E-20
534.0	.204E-24	.533E-18	.108E-18	-.660E-26	.153E+04	.141E+11	-.750E-20
540.0	.165E-24	.105E-17	.637E-19	-.626E-26	.153E+04	.141E+11	-.618E-20
546.0	.129E-24	.132E-17	.279E-19	-.576E-26	.153E+04	.141E+11	-.491E-20
552.0	.957E-25	.140E-17	.486E-22	-.518E-26	.153E+04	.141E+11	-.372E-20
558.0	.664E-25	.134E-17	-.204E-19	-.460E-26	.153E+04	.141E+11	-.263E-20
564.0	.405E-25	.117E-17	-.342E-19	-.407E-26	.153E+04	.141E+11	-.163E-20
570.0	.176E-25	.944E-18	-.418E-19	-.362E-26	.153E+04	.141E+11	-.721E-21
576.0	-.290E-26	.685E-18	-.437E-19	-.327E-26	.153E+04	.141E+11	.121E-21
582.0	-.217E-25	.431E-18	-.404E-19	-.303E-26	.153E+04	.141E+11	.918E-21
588.0	-.393E-25	.212E-18	-.319E-19	-.290E-26	.153E+04	.141E+11	.169E-20
594.0	-.564E-25	.581E-19	-.185E-19	-.284E-26	.153E+04	.141E+11	.247E-20
600.0	-.734E-25	.000E+00	.000E+00	-.283E-26	.153E+04	.141E+11	.326E-20

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.224E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.427E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .223E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.336E-02
MAXIMUM BENDING MOMENT = .494E+06 LBS-IN
MAXIMUM SHEAR FORCE = .170E+05 LBS
NO. OF ITERATIONS = 29
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .180E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.257E+00	.131E-06	.180E+05	-.377E-02	.153E+04	.141E+11	-.295E+03

6.0	.235E+00	.109E+06	.162E+05	-.375E-02	.177E+04	.141E+11	-.312E+03
12.0	.212E+00	.208E+06	.143E+05	-.368E-02	.198E+04	.141E+11	-.327E+03
18.0	.191E+00	.294E+06	.123E+05	-.357E-02	.217E+04	.141E+11	-.340E+03
24.0	.169E+00	.368E+06	.102E+05	-.343E-02	.233E+04	.141E+11	-.352E+03
30.0	.149E+00	.428E+06	.804E+04	-.326E-02	.247E+04	.141E+11	-.362E+03
36.0	.130E+00	.476E+06	.584E+04	-.307E-02	.257E+04	.141E+11	-.370E+03
42.0	.112E+00	.510E+06	.360E+04	-.286E-02	.264E+04	.141E+11	-.376E+03
48.0	.960E-01	.529E+06	.133E+04	-.264E-02	.269E+04	.141E+11	-.380E+03
54.0	.808E-01	.535E+06	-.957E+03	-.242E-02	.270E+04	.141E+11	-.382E+03
60.0	.670E-01	.527E+06	-.245E+04	-.219E-02	.268E+04	.141E+11	-.114E+03
66.0	.545E-01	.514E+06	-.307E+04	-.197E-02	.265E+04	.141E+11	-.933E+02
72.0	.433E-01	.497E+06	-.361E+04	-.176E-02	.262E+04	.141E+11	-.865E+02
78.0	.334E-01	.477E+06	-.410E+04	-.155E-02	.257E+04	.141E+11	-.793E+02
84.0	.247E-01	.453E+06	-.456E+04	-.135E-02	.252E+04	.141E+11	-.717E+02
90.0	.172E-01	.427E+06	-.496E+04	-.117E-02	.246E+04	.141E+11	-.635E+02
96.0	.107E-01	.398E+06	-.532E+04	-.990E-03	.240E+04	.141E+11	-.543E+02
102.0	.531E-02	.367E+06	-.561E+04	-.828E-03	.233E+04	.141E+11	-.430E+02
108.0	.812E-03	.333E+06	-.581E+04	-.679E-03	.226E+04	.141E+11	-.229E+02
114.0	-.284E-02	.299E+06	-.577E+04	-.545E-03	.219E+04	.141E+11	.349E+02
120.0	-.573E-02	.266E+06	-.553E+04	-.425E-03	.211E+04	.141E+11	.441E+02
126.0	-.794E-02	.234E+06	-.525E+04	-.319E-03	.204E+04	.141E+11	.491E+02
132.0	-.955E-02	.204E+06	-.495E+04	-.225E-03	.198E+04	.141E+11	.522E+02
138.0	-.106E-01	.176E+06	-.463E+04	-.145E-03	.192E+04	.141E+11	.542E+02
144.0	-.113E-01	.149E+06	-.430E+04	-.758E-04	.186E+04	.141E+11	.552E+02
150.0	-.116E-01	.124E+06	-.397E+04	-.177E-04	.180E+04	.141E+11	.557E+02
156.0	-.115E-01	.102E+06	-.364E+04	.303E-04	.175E+04	.141E+11	.556E+02
162.0	-.112E-01	.807E+05	-.331E+04	.690E-04	.171E+04	.141E+11	.551E+02
168.0	-.107E-01	.617E+05	-.298E+04	.992E-04	.167E+04	.141E+11	.542E+02
174.0	-.100E-01	.446E+05	-.266E+04	.122E-03	.163E+04	.141E+11	.530E+02
180.0	-.921E-02	.294E+05	-.234E+04	.138E-03	.159E+04	.141E+11	.516E+02
186.0	-.835E-02	.160E+05	-.204E+04	.147E-03	.157E+04	.141E+11	.499E+02
192.0	-.744E-02	.442E+04	-.174E+04	.151E-03	.154E+04	.141E+11	.481E+02
198.0	-.653E-02	-.545E+04	-.146E+04	.151E-03	.154E+04	.141E+11	.460E+02
204.0	-.563E-02	-.137E+05	-.119E+04	.147E-03	.156E+04	.141E+11	.438E+02
210.0	-.476E-02	-.203E+05	-.936E+03	.140E-03	.157E+04	.141E+11	.414E+02
216.0	-.395E-02	-.254E+05	-.695E+03	.130E-03	.159E+04	.141E+11	.389E+02
222.0	-.320E-02	-.291E+05	-.469E+03	.119E-03	.159E+04	.141E+11	.363E+02
228.0	-.252E-02	-.314E+05	-.260E+03	.106E-03	.160E+04	.141E+11	.335E+02
234.0	-.193E-02	-.326E+05	-.672E+02	.923E-04	.160E+04	.141E+11	.306E+02
240.0	-.142E-02	-.326E+05	.108E+03	.785E-04	.160E+04	.141E+11	.277E+02
246.0	-.987E-03	-.316E+05	.264E+03	.649E-04	.160E+04	.141E+11	.245E+02
252.0	-.638E-03	-.296E+05	.401E+03	.519E-04	.160E+04	.141E+11	.212E+02
258.0	-.365E-03	-.269E+05	.518E+03	.399E-04	.159E+04	.141E+11	.176E+02
264.0	-.160E-03	-.236E+05	.611E+03	.291E-04	.158E+04	.141E+11	.134E+02
270.0	-.150E-04	-.197E+05	.669E+03	.199E-04	.157E+04	.141E+11	.606E+01
276.0	.795E-04	-.156E+05	.656E+03	.124E-04	.156E+04	.141E+11	-.106E+02
282.0	.134E-03	-.119E+05	.586E+03	.660E-05	.156E+04	.141E+11	-.126E+02
288.0	.159E-03	-.861E+04	.508E+03	.225E-05	.155E+04	.141E+11	-.133E+02
294.0	.161E-03	-.580E+04	.428E+03	-.810E-06	.154E+04	.141E+11	-.134E+02
300.0	.149E-03	-.347E+04	.349E+03	-.278E-05	.154E+04	.141E+11	-.131E+02
306.0	.128E-03	-.161E+04	.272E+03	-.386E-05	.153E+04	.141E+11	-.124E+02
312.0	.103E-03	-.189E+03	.201E+03	-.424E-05	.153E+04	.141E+11	-.115E+02
318.0	.771E-04	.814E+03	.135E+03	-.411E-05	.153E+04	.141E+11	-.105E+02
324.0	.535E-04	.144E+04	.754E+02	-.363E-05	.153E+04	.141E+11	-.928E+01
330.0	.335E-04	.173E+04	.237E+02	-.295E-05	.153E+04	.141E+11	-.794E+01
336.0	.180E-04	.174E+04	-.194E+02	-.222E-05	.153E+04	.141E+11	-.645E+01
342.0	.690E-05	.151E+04	-.528E+02	-.153E-05	.153E+04	.141E+11	-.469E+01
348.0	-.361E-06	.111E+04	-.616E+02	-.975E-06	.153E+04	.141E+11	.175E+01
354.0	-.480E-05	.771E+03	-.439E+02	-.577E-06	.153E+04	.141E+11	.415E+01
360.0	-.728E-05	.582E+03	-.297E+02	-.289E-06	.153E+04	.141E+11	.594E+00
366.0	-.827E-05	.415E+03	-.258E+02	-.775E-07	.153E+04	.141E+11	.715E+00
372.0	-.821E-05	.274E+03	-.214E+02	.687E-07	.153E+04	.141E+11	.749E+00
378.0	-.745E-05	.159E+03	-.170E+02	.160E-06	.153E+04	.141E+11	.715E+00

384.0	-.628E-05	.692E+02	-.129E+02	.209E-06	.153E+04	.141E+11	.633E+00
390.0	-.494E-05	.248E+01	-.948E+01	.224E-06	.153E+04	.141E+11	.522E+00
396.0	-.359E-05	-.454E+02	-.673E+01	.215E-06	.153E+04	.141E+11	.397E+00
402.0	-.236E-05	-.790E+02	-.472E+01	.189E-06	.153E+04	.141E+11	.272E+00
408.0	-.133E-05	-.103E+03	-.343E+01	.150E-06	.153E+04	.141E+11	.160E+00
414.0	-.564E-06	-.121E+03	-.274E+01	.102E-06	.153E+04	.141E+11	.704E-01
420.0	-.103E-06	-.136E+03	.619E+01	.480E-07	.153E+04	.141E+11	.291E+01
426.0	.121E-07	-.466E+02	.112E+02	.927E-08	.153E+04	.141E+11	-.125E+01
432.0	.842E-08	-.183E+01	.415E+01	-.100E-08	.153E+04	.141E+11	-.110E+01
438.0	.627E-10	.325E+01	.154E+00	-.702E-09	.153E+04	.141E+11	-.208E+00
444.0	-.373E-11	.276E-01	-.271E+00	-.523E-11	.153E+04	.141E+11	.818E-01
450.0	-.725E-15	-.146E-02	-.230E-02	.311E-12	.153E+04	.141E+11	.767E-03
456.0	.348E-16	-.312E-06	.122E-03	.604E-16	.153E+04	.141E+11	-.375E-04
462.0	.807E-20	.137E-07	.260E-07	-.290E-17	.153E+04	.141E+11	-.856E-08
468.0	-.325E-21	.343E-11	-.114E-08	-.673E-21	.153E+04	.141E+11	.349E-09
474.0	-.825E-25	-.366E-13	-.288E-12	.464E-22	.153E+04	.141E+11	.876E-13
480.0	.232E-21	-.306E-13	.996E-15	.321E-22	.153E+04	.141E+11	-.700E-17
486.0	.385E-21	-.248E-13	.934E-15	.204E-22	.153E+04	.141E+11	-.119E-16
492.0	.476E-21	-.194E-13	.846E-15	.110E-22	.153E+04	.141E+11	-.151E-16
498.0	.518E-21	-.146E-13	.743E-15	.378E-23	.153E+04	.141E+11	-.167E-16
504.0	.522E-21	-.105E-13	.632E-15	-.156E-23	.153E+04	.141E+11	-.172E-16
510.0	.499E-21	-.705E-14	.521E-15	-.529E-23	.153E+04	.141E+11	-.168E-16
516.0	.458E-21	-.424E-14	.415E-15	-.768E-23	.153E+04	.141E+11	-.158E-16
522.0	.407E-21	-.204E-14	.318E-15	-.902E-23	.153E+04	.141E+11	-.143E-16
528.0	.350E-21	-.396E-15	.230E-15	-.953E-23	.153E+04	.141E+11	-.125E-16
534.0	.292E-21	.759E-15	.155E-15	-.946E-23	.153E+04	.141E+11	-.107E-16
540.0	.236E-21	.150E-14	.915E-16	-.898E-23	.153E+04	.141E+11	-.878E-17
546.0	.184E-21	.189E-14	.402E-16	-.826E-23	.153E+04	.141E+11	-.698E-17
552.0	.137E-21	.201E-14	.209E-18	-.743E-23	.153E+04	.141E+11	-.529E-17
558.0	.953E-22	.192E-14	-.292E-16	-.660E-23	.153E+04	.141E+11	-.374E-17
564.0	.582E-22	.168E-14	-.489E-16	-.583E-23	.153E+04	.141E+11	-.232E-17
570.0	.253E-22	.135E-14	-.599E-16	-.519E-23	.153E+04	.141E+11	-.103E-17
576.0	-.410E-23	.982E-15	-.627E-16	-.469E-23	.153E+04	.141E+11	.169E-18
582.0	-.310E-22	.618E-15	-.579E-16	-.435E-23	.153E+04	.141E+11	.130E-17
588.0	-.563E-22	.304E-15	-.458E-16	-.416E-23	.153E+04	.141E+11	.240E-17
594.0	-.809E-22	.833E-16	-.265E-16	-.408E-23	.153E+04	.141E+11	.351E-17
600.0	-.105E-21	.000E+00	.000E+00	-.406E-23	.153E+04	.141E+11	.464E-17

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.125E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .160E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .257E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.377E-02
MAXIMUM BENDING MOMENT = .535E+06 LBS-IN
MAXIMUM SHEAR FORCE = .180E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .190E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.296E+00	.349E-06	.190E+05	-.420E-02	.153E+04	.141E+11	-.306E+03
6.0	.270E+00	.116E+06	.171E+05	-.417E-02	.178E+04	.141E+11	-.323E+03
12.0	.246E+00	.220E+06	.151E+05	-.410E-02	.201E+04	.141E+11	-.339E+03
18.0	.221E+00	.312E+06	.130E+05	-.399E-02	.221E+04	.141E+11	-.353E+03
24.0	.198E+00	.391E+06	.109E+05	-.384E-02	.239E+04	.141E+11	-.366E+03
30.0	.175E+00	.457E+06	.866E+04	-.366E-02	.253E+04	.141E+11	-.377E+03
36.0	.154E+00	.508E+06	.637E+04	-.345E-02	.264E+04	.141E+11	-.386E+03
42.0	.134E+00	.546E+06	.404E+04	-.323E-02	.272E+04	.141E+11	-.393E+03
48.0	.115E+00	.569E+06	.167E+04	-.299E-02	.277E+04	.141E+11	-.398E+03
54.0	.977E-01	.577E+06	-.731E+03	-.275E-02	.279E+04	.141E+11	-.401E+03
60.0	.819E-01	.570E+06	-.230E+04	-.251E-02	.278E+04	.141E+11	-.122E+03
66.0	.676E-01	.558E+06	-.297E+04	-.227E-02	.275E+04	.141E+11	-.100E+03
72.0	.547E-01	.542E+06	-.355E+04	-.204E-02	.272E+04	.141E+11	-.935E+02
78.0	.432E-01	.523E+06	-.409E+04	-.181E-02	.267E+04	.141E+11	-.864E+02
84.0	.330E-01	.500E+06	-.458E+04	-.159E-02	.262E+04	.141E+11	-.790E+02
90.0	.241E-01	.473E+06	-.503E+04	-.139E-02	.257E+04	.141E+11	-.711E+02
96.0	.164E-01	.444E+06	-.543E+04	-.119E-02	.250E+04	.141E+11	-.625E+02
102.0	.980E-02	.413E+06	-.578E+04	-.101E-02	.243E+04	.141E+11	-.527E+02
108.0	.427E-02	.379E+06	-.606E+04	-.841E-03	.236E+04	.141E+11	-.399E+02
114.0	-.292E-03	.343E+06	-.613E+04	-.688E-03	.228E+04	.141E+11	.164E+02
120.0	-.398E-02	.307E+06	-.596E+04	-.550E-03	.220E+04	.141E+11	.390E+02
126.0	-.689E-02	.273E+06	-.571E+04	-.427E-03	.213E+04	.141E+11	.469E+02
132.0	-.910E-02	.241E+06	-.541E+04	-.318E-03	.206E+04	.141E+11	.514E+02
138.0	-.107E-01	.209E+06	-.509E+04	-.222E-03	.199E+04	.141E+11	.543E+02
144.0	-.118E-01	.180E+06	-.476E+04	-.139E-03	.192E+04	.141E+11	.560E+02
150.0	-.124E-01	.153E+06	-.442E+04	-.687E-04	.186E+04	.141E+11	.570E+02
156.0	-.126E-01	.127E+06	-.408E+04	-.921E-05	.181E+04	.141E+11	.573E+02
162.0	-.125E-01	.104E+06	-.374E+04	.399E-04	.176E+04	.141E+11	.571E+02
168.0	-.121E-01	.823E+05	-.340E+04	.794E-04	.171E+04	.141E+11	.565E+02
174.0	-.115E-01	.628E+05	-.306E+04	.110E-03	.167E+04	.141E+11	.556E+02
180.0	-.108E-01	.452E+05	-.273E+04	.133E-03	.163E+04	.141E+11	.544E+02
186.0	-.994E-02	.296E+05	-.241E+04	.149E-03	.160E+04	.141E+11	.529E+02
192.0	-.900E-02	.158E+05	-.210E+04	.159E-03	.157E+04	.141E+11	.512E+02
198.0	-.803E-02	.382E+04	-.180E+04	.163E-03	.154E+04	.141E+11	.493E+02
204.0	-.705E-02	-.636E+04	-.151E+04	.162E-03	.154E+04	.141E+11	.472E+02
210.0	-.608E-02	-.148E+05	-.123E+04	.158E-03	.156E+04	.141E+11	.449E+02
216.0	-.516E-02	-.217E+05	-.967E+03	.150E-03	.158E+04	.141E+11	.425E+02
222.0	-.428E-02	-.270E+05	-.719E+03	.140E-03	.159E+04	.141E+11	.400E+02
228.0	-.348E-02	-.308E+05	-.487E+03	.127E-03	.160E+04	.141E+11	.373E+02
234.0	-.276E-02	-.333E+05	-.272E+03	.114E-03	.160E+04	.141E+11	.345E+02
240.0	-.212E-02	-.345E+05	-.733E+02	.994E-04	.161E+04	.141E+11	.316E+02
246.0	-.156E-02	-.345E+05	.107E+03	.848E-04	.161E+04	.141E+11	.286E+02
252.0	-.110E-02	-.335E+05	.269E+03	.703E-04	.160E+04	.141E+11	.254E+02
258.0	-.718E-03	-.315E+05	.411E+03	.565E-04	.160E+04	.141E+11	.220E+02
264.0	-.419E-03	-.288E+05	.533E+03	.437E-04	.159E+04	.141E+11	.184E+02
270.0	-.193E-03	-.253E+05	.631E+03	.323E-04	.159E+04	.141E+11	.142E+02
276.0	-.321E-04	-.213E+05	.697E+03	.224E-04	.158E+04	.141E+11	.781E+01
282.0	.750E-04	-.170E+05	.690E+03	.142E-04	.157E+04	.141E+11	-.104E+02
288.0	.139E-03	-.131E+05	.620E+03	.785E-05	.156E+04	.141E+11	-.127E+02
294.0	.169E-03	-.960E+04	.541E+03	.303E-05	.155E+04	.141E+11	-.136E+02
300.0	.175E-03	-.660E+04	.459E+03	-.404E-06	.155E+04	.141E+11	-.138E+02
306.0	.164E-03	-.409E+04	.377E+03	-.267E-05	.154E+04	.141E+11	-.135E+02
312.0	.143E-03	-.206E+04	.298E+03	-.398E-05	.154E+04	.141E+11	-.129E+02
318.0	.117E-03	-.494E+03	.224E+03	-.452E-05	.153E+04	.141E+11	-.120E+02

324.0	.888E-04	.639E+03	.155E+03	-.449E-05	.153E+04	.141E+11	-.110E+02
330.0	.627E-04	.138E+04	.923E+02	-.406E-05	.153E+04	.141E+11	-.978E+01
336.0	.401E-04	.176E+04	.376E+02	-.340E-05	.153E+04	.141E+11	-.843E+01
342.0	.220E-04	.184E+04	-.832E+01	-.263E-05	.153E+04	.141E+11	-.690E+01
348.0	.853E-05	.167E+04	-.441E+02	-.189E-05	.153E+04	.141E+11	-.503E+01
354.0	-.654E-06	.132E+04	-.528E+02	-.125E-05	.153E+04	.141E+11	.214E+01
360.0	-.649E-05	.104E+04	-.448E+02	-.751E-06	.153E+04	.141E+11	.529E+00
366.0	-.966E-05	.784E+03	-.407E+02	-.363E-06	.153E+04	.141E+11	.835E+00
372.0	-.108E-04	.555E+03	-.352E+02	-.792E-07	.153E+04	.141E+11	.989E+00
378.0	-.106E-04	.361E+03	-.292E+02	.115E-06	.153E+04	.141E+11	.102E+01
384.0	-.946E-05	.204E+03	-.233E+02	.235E-06	.153E+04	.141E+11	.953E+00
390.0	-.779E-05	.812E+02	-.180E+02	.296E-06	.153E+04	.141E+11	.822E+00
396.0	-.591E-05	-.123E+02	-.135E+02	.311E-06	.153E+04	.141E+11	.652E+00
402.0	-.406E-05	-.823E+02	-.102E+02	.291E-06	.153E+04	.141E+11	.468E+00
408.0	-.242E-05	-.135E+03	-.790E+01	.244E-06	.153E+04	.141E+11	.291E+00
414.0	-.113E-05	-.178E+03	-.660E+01	.178E-06	.153E+04	.141E+11	.141E+00
420.0	-.290E-06	-.215E+03	.613E+01	.944E-07	.153E+04	.141E+11	.411E+01
426.0	.213E-08	-.105E+03	.164E+02	.265E-07	.153E+04	.141E+11	-.697E+00
432.0	.276E-07	-.191E+02	.934E+01	.187E-09	.153E+04	.141E+11	-.164E+01
438.0	.438E-08	.740E+01	.174E+01	-.230E-08	.153E+04	.141E+11	-.883E+00
444.0	-.105E-10	.173E+01	-.617E+00	-.365E-09	.153E+04	.141E+11	.124E+00
450.0	-.482E-12	-.375E-02	-.144E+00	.877E-12	.153E+04	.141E+11	.399E-01
456.0	.803E-16	-.189E-03	.313E-03	.402E-13	.153E+04	.141E+11	-.112E-03
462.0	.450E-17	.280E-07	.158E-04	-.669E-17	.153E+04	.141E+11	-.436E-05
468.0	-.581E-21	.177E-08	-.233E-08	-.375E-18	.153E+04	.141E+11	.884E-09
474.0	-.421E-22	-.600E-13	-.147E-09	.772E-22	.153E+04	.141E+11	.407E-10
480.0	.345E-21	-.502E-13	.161E-14	.538E-22	.153E+04	.141E+11	-.158E-16
486.0	.603E-21	-.408E-13	.152E-14	.345E-22	.153E+04	.141E+11	-.278E-16
492.0	.758E-21	-.321E-13	.138E-14	.190E-22	.153E+04	.141E+11	-.354E-16
498.0	.831E-21	-.243E-13	.121E-14	.704E-23	.153E+04	.141E+11	-.396E-16
504.0	.843E-21	-.175E-13	.104E-14	-.184E-23	.153E+04	.141E+11	-.409E-16
510.0	.809E-21	-.118E-13	.857E-15	-.807E-23	.153E+04	.141E+11	-.400E-16
516.0	.746E-21	-.721E-14	.685E-15	-.121E-22	.153E+04	.141E+11	-.376E-16
522.0	.664E-21	-.358E-14	.526E-15	-.144E-22	.153E+04	.141E+11	-.341E-16
528.0	.573E-21	-.854E-15	.383E-15	-.154E-22	.153E+04	.141E+11	-.300E-16
534.0	.480E-21	.107E-14	.259E-15	-.153E-22	.153E+04	.141E+11	-.255E-16
540.0	.389E-21	.231E-14	.155E-15	-.146E-22	.153E+04	.141E+11	-.211E-16
546.0	.305E-21	.299E-14	.706E-16	-.135E-22	.153E+04	.141E+11	-.168E-16
552.0	.228E-21	.321E-14	.447E-17	-.121E-22	.153E+04	.141E+11	-.128E-16
558.0	.159E-21	.308E-14	-.444E-16	-.108E-22	.153E+04	.141E+11	-.904E-17
564.0	.979E-22	.271E-14	-.774E-16	-.958E-23	.153E+04	.141E+11	-.565E-17
570.0	.438E-22	.219E-14	-.959E-16	-.854E-23	.153E+04	.141E+11	-.255E-17
576.0	-.464E-23	.159E-14	-.101E-15	-.774E-23	.153E+04	.141E+11	.328E-18
582.0	-.490E-22	.100E-14	-.938E-16	-.719E-23	.153E+04	.141E+11	.305E-17
588.0	-.909E-22	.494E-15	-.744E-16	-.687E-23	.153E+04	.141E+11	.570E-17
594.0	-.131E-21	.136E-15	-.432E-16	-.674E-23	.153E+04	.141E+11	.836E-17
600.0	-.172E-21	.000E+00	.000E+00	-.671E-23	.153E+04	.141E+11	.111E-16

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.923E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.695E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .296E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.420E-02
MAXIMUM BENDING MOMENT = .577E+06 LBS-IN
MAXIMUM SHEAR FORCE = .190E+05 LBS
NO. OF ITERATIONS = 30

NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .200E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.337E+00	.109E-06	.200E+05	-.465E-02	.153E+04	.141E+11	-.316E+03
6.0	.309E+00	.123E+06	.181E+05	-.463E-02	.180E+04	.141E+11	-.334E+03
12.0	.281E+00	.233E+06	.160E+05	-.455E-02	.204E+04	.141E+11	-.351E+03
18.0	.254E+00	.331E+06	.138E+05	-.443E-02	.225E+04	.141E+11	-.366E+03
24.0	.228E+00	.415E+06	.116E+05	-.428E-02	.244E+04	.141E+11	-.379E+03
30.0	.203E+00	.486E+06	.930E+04	-.408E-02	.259E+04	.141E+11	-.391E+03
36.0	.179E+00	.542E+06	.692E+04	-.387E-02	.272E+04	.141E+11	-.401E+03
42.0	.156E+00	.583E+06	.449E+04	-.363E-02	.280E+04	.141E+11	-.409E+03
48.0	.135E+00	.609E+06	.203E+04	-.337E-02	.286E+04	.141E+11	-.415E+03
54.0	.116E+00	.619E+06	-.474E+03	-.311E-02	.288E+04	.141E+11	-.418E+03
60.0	.981E-01	.614E+06	-.212E+04	-.285E-02	.287E+04	.141E+11	-.129E+03
66.0	.818E-01	.604E+06	-.283E+04	-.259E-02	.285E+04	.141E+11	-.107E+03
72.0	.670E-01	.590E+06	-.345E+04	-.234E-02	.282E+04	.141E+11	-.100E+03
78.0	.537E-01	.571E+06	-.403E+04	-.209E-02	.278E+04	.141E+11	-.929E+02
84.0	.419E-01	.549E+06	-.456E+04	-.186E-02	.273E+04	.141E+11	-.855E+02
90.0	.314E-01	.523E+06	-.505E+04	-.163E-02	.267E+04	.141E+11	-.777E+02
96.0	.223E-01	.494E+06	-.549E+04	-.141E-02	.261E+04	.141E+11	-.693E+02
102.0	.145E-01	.462E+06	-.588E+04	-.121E-02	.254E+04	.141E+11	-.600E+02
108.0	.782E-02	.428E+06	-.621E+04	-.102E-02	.247E+04	.141E+11	-.489E+02
114.0	.225E-02	.391E+06	-.645E+04	-.846E-03	.239E+04	.141E+11	-.322E+02
120.0	-.233E-02	.354E+06	-.645E+04	-.688E-03	.230E+04	.141E+11	.327E+02
126.0	-.601E-02	.317E+06	-.622E+04	-.546E-03	.222E+04	.141E+11	.448E+02
132.0	-.889E-02	.281E+06	-.593E+04	-.419E-03	.214E+04	.141E+11	.510E+02
138.0	-.110E-01	.247E+06	-.561E+04	-.307E-03	.207E+04	.141E+11	.548E+02
144.0	-.126E-01	.215E+06	-.528E+04	-.209E-03	.200E+04	.141E+11	.573E+02
150.0	-.136E-01	.184E+06	-.493E+04	-.125E-03	.193E+04	.141E+11	.587E+02
156.0	-.141E-01	.156E+06	-.457E+04	-.524E-04	.187E+04	.141E+11	.594E+02
162.0	-.142E-01	.130E+06	-.422E+04	.821E-05	.181E+04	.141E+11	.596E+02
168.0	-.140E-01	.105E+06	-.386E+04	.581E-04	.176E+04	.141E+11	.593E+02
174.0	-.135E-01	.831E+05	-.351E+04	.981E-04	.171E+04	.141E+11	.586E+02
180.0	-.128E-01	.629E+05	-.316E+04	.129E-03	.167E+04	.141E+11	.576E+02
186.0	-.119E-01	.448E+05	-.282E+04	.152E-03	.163E+04	.141E+11	.563E+02
192.0	-.110E-01	.286E+05	-.248E+04	.167E-03	.159E+04	.141E+11	.547E+02
198.0	-.993E-02	.144E+05	-.216E+04	.177E-03	.156E+04	.141E+11	.529E+02
204.0	-.885E-02	.203E+04	-.185E+04	.180E-03	.154E+04	.141E+11	.509E+02
210.0	-.777E-02	-.847E+04	-.155E+04	.179E-03	.155E+04	.141E+11	.488E+02
216.0	-.671E-02	-.172E+05	-.126E+04	.173E-03	.157E+04	.141E+11	.464E+02
222.0	-.569E-02	-.243E+05	-.992E+03	.164E-03	.158E+04	.141E+11	.440E+02
228.0	-.474E-02	-.297E+05	-.736E+03	.153E-03	.160E+04	.141E+11	.413E+02
234.0	-.385E-02	-.336E+05	-.496E+03	.140E-03	.160E+04	.141E+11	.386E+02
240.0	-.306E-02	-.362E+05	-.273E+03	.125E-03	.161E+04	.141E+11	.357E+02
246.0	-.236E-02	-.374E+05	-.679E+02	.109E-03	.161E+04	.141E+11	.328E+02
252.0	-.175E-02	-.374E+05	.119E+03	.933E-04	.161E+04	.141E+11	.297E+02
258.0	-.124E-02	-.363E+05	.288E+03	.777E-04	.161E+04	.141E+11	.264E+02

264.0	-.819E-03	-.342E+05	.436E+03	.627E-04	.161E+04	.141E+11	.230E+02
270.0	-.486E-03	-.313E+05	.563E+03	.488E-04	.160E+04	.141E+11	.194E+02
276.0	-.233E-03	-.276E+05	.667E+03	.363E-04	.159E+04	.141E+11	.151E+02
282.0	-.503E-04	-.234E+05	.740E+03	.255E-04	.158E+04	.141E+11	.908E+01
288.0	.728E-04	-.188E+05	.736E+03	.165E-04	.157E+04	.141E+11	-.103E+02
294.0	.148E-03	-.146E+05	.666E+03	.941E-05	.156E+04	.141E+11	-.130E+02
300.0	.186E-03	-.109E+05	.585E+03	.400E-05	.155E+04	.141E+11	-.140E+02
306.0	.196E-03	-.761E+04	.500E+03	.811E-07	.155E+04	.141E+11	-.143E+02
312.0	.187E-03	-.487E+04	.415E+03	-.257E-05	.154E+04	.141E+11	-.141E+02
318.0	.165E-03	-.262E+04	.332E+03	-.416E-05	.154E+04	.141E+11	-.135E+02
324.0	.137E-03	-.864E+03	.254E+03	-.490E-05	.153E+04	.141E+11	-.127E+02
330.0	.106E-03	.439E+03	.181E+03	-.499E-05	.153E+04	.141E+11	-.117E+02
336.0	.770E-04	.132E+04	.114E+03	-.461E-05	.153E+04	.141E+11	-.105E+02
342.0	.510E-04	.183E+04	.555E+02	-.395E-05	.153E+04	.141E+11	-.913E+01
348.0	.296E-04	.200E+04	.524E+01	-.313E-05	.153E+04	.141E+11	-.762E+01
354.0	.134E-04	.190E+04	-.351E+02	-.231E-05	.153E+04	.141E+11	-.585E+01
360.0	.196E-05	.159E+04	-.531E+02	-.156E-05	.153E+04	.141E+11	-.161E+00
366.0	-.540E-05	.127E+04	-.522E+02	-.958E-06	.153E+04	.141E+11	.466E+00
372.0	-.953E-05	.965E+03	-.482E+02	-.484E-06	.153E+04	.141E+11	.869E+00
378.0	-.112E-04	.692E+03	-.424E+02	-.132E-06	.153E+04	.141E+11	.108E+01
384.0	-.111E-04	.457E+03	-.358E+02	.112E-06	.153E+04	.141E+11	.112E+01
390.0	-.987E-05	.262E+03	-.293E+02	.264E-06	.153E+04	.141E+11	.104E+01
396.0	-.795E-05	.104E+03	-.235E+02	.342E-06	.153E+04	.141E+11	.877E+00
402.0	-.577E-05	-.218E+02	-.189E+02	.359E-06	.153E+04	.141E+11	.664E+00
408.0	-.364E-05	-.124E+03	-.156E+02	.329E-06	.153E+04	.141E+11	.436E+00
414.0	-.182E-05	-.210E+03	-.136E+02	.258E-06	.153E+04	.141E+11	.228E+00
420.0	-.547E-06	-.289E+03	.227E+01	.152E-06	.153E+04	.141E+11	.507E+01
426.0	-.444E-08	-.184E+03	.201E+02	.514E-07	.153E+04	.141E+11	.897E+00
432.0	.698E-07	-.473E+02	.161E+02	.233E-08	.153E+04	.141E+11	-.223E+01
438.0	.236E-07	.892E+01	.470E+01	-.581E-08	.153E+04	.141E+11	-.155E+01
444.0	.908E-10	.915E+01	-.736E+00	-.197E-08	.153E+04	.141E+11	-.237E+00
450.0	-.816E-10	.997E-01	-.765E+00	-.757E-11	.153E+04	.141E+11	.229E+00
456.0	-.389E-14	-.320E-01	-.831E-02	.680E-11	.153E+04	.141E+11	.420E-02
462.0	.762E-15	-.213E-05	.267E-02	.325E-15	.153E+04	.141E+11	-.822E-03
468.0	.648E-19	.299E-06	.177E-06	-.635E-16	.153E+04	.141E+11	-.699E-07
474.0	-.711E-20	.824E-11	-.249E-07	-.102E-19	.153E+04	.141E+11	.767E-08
480.0	-.581E-19	.685E-11	-.227E-12	-.704E-20	.153E+04	.141E+11	.176E-14
486.0	-.915E-19	.553E-11	-.212E-12	-.441E-20	.153E+04	.141E+11	.284E-14
492.0	-.111E-18	.432E-11	-.192E-12	-.231E-20	.153E+04	.141E+11	.352E-14
498.0	-.119E-18	.324E-11	-.168E-12	-.708E-21	.153E+04	.141E+11	.387E-14
504.0	-.119E-18	.232E-11	-.142E-12	.473E-21	.153E+04	.141E+11	.395E-14
510.0	-.114E-18	.154E-11	-.117E-12	.129E-20	.153E+04	.141E+11	.384E-14
516.0	-.104E-18	.908E-12	-.927E-13	.181E-20	.153E+04	.141E+11	.358E-14
522.0	-.919E-19	.418E-12	-.706E-13	.209E-20	.153E+04	.141E+11	.323E-14
528.0	-.788E-19	.539E-13	-.509E-13	.219E-20	.153E+04	.141E+11	.283E-14
534.0	-.656E-19	-.200E-12	-.339E-13	.216E-20	.153E+04	.141E+11	.240E-14
540.0	-.529E-19	-.361E-12	-.197E-13	.204E-20	.153E+04	.141E+11	.197E-14
546.0	-.411E-19	-.444E-12	-.824E-14	.187E-20	.153E+04	.141E+11	.156E-14
552.0	-.305E-19	-.466E-12	.655E-15	.168E-20	.153E+04	.141E+11	.118E-14
558.0	-.210E-19	-.442E-12	.716E-14	.148E-20	.153E+04	.141E+11	.826E-15
564.0	-.127E-19	-.386E-12	.115E-13	.131E-20	.153E+04	.141E+11	.507E-15
570.0	-.530E-20	-.309E-12	.138E-13	.116E-20	.153E+04	.141E+11	.216E-15
576.0	.127E-20	-.224E-12	.144E-13	.105E-20	.153E+04	.141E+11	-.528E-16
582.0	.728E-20	-.140E-12	.132E-13	.971E-21	.153E+04	.141E+11	-.306E-15
588.0	.129E-19	-.689E-13	.104E-13	.926E-21	.153E+04	.141E+11	-.553E-15
594.0	.184E-19	-.189E-13	.602E-14	.908E-21	.153E+04	.141E+11	-.800E-15
600.0	.238E-19	.000E+00	.000E+00	.904E-21	.153E+04	.141E+11	-.105E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.265E-06 IN-LBS

THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .225E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .337E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.465E-02
MAXIMUM BENDING MOMENT = .619E+06 LBS-IN
MAXIMUM SHEAR FORCE = .200E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .210E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.382E+00	-.109E-06	.210E+05	-.514E-02	.153E+04	.141E+11	-.326E+03
6.0	.351E+00	.129E+06	.190E+05	-.511E-02	.181E+04	.141E+11	-.345E+03
12.0	.320E+00	.246E+06	.169E+05	-.503E-02	.207E+04	.141E+11	-.362E+03
18.0	.290E+00	.350E+06	.146E+05	-.490E-02	.230E+04	.141E+11	-.378E+03
24.0	.261E+00	.440E+06	.123E+05	-.474E-02	.249E+04	.141E+11	-.393E+03
30.0	.234E+00	.515E+06	.994E+04	-.453E-02	.266E+04	.141E+11	-.405E+03
36.0	.207E+00	.575E+06	.748E+04	-.430E-02	.279E+04	.141E+11	-.416E+03
42.0	.182E+00	.620E+06	.496E+04	-.405E-02	.289E+04	.141E+11	-.424E+03
48.0	.158E+00	.649E+06	.239E+04	-.378E-02	.295E+04	.141E+11	-.431E+03
54.0	.137E+00	.662E+06	-.210E+03	-.350E-02	.298E+04	.141E+11	-.436E+03
60.0	.116E+00	.659E+06	-.193E+04	-.322E-02	.297E+04	.141E+11	-.137E+03
66.0	.979E-01	.651E+06	-.268E+04	-.294E-02	.295E+04	.141E+11	-.113E+03
72.0	.811E-01	.638E+06	-.334E+04	-.267E-02	.293E+04	.141E+11	-.107E+03
78.0	.659E-01	.620E+06	-.396E+04	-.240E-02	.289E+04	.141E+11	-.994E+02
84.0	.523E-01	.599E+06	-.453E+04	-.214E-02	.284E+04	.141E+11	-.921E+02
90.0	.402E-01	.574E+06	-.506E+04	-.189E-02	.279E+04	.141E+11	-.843E+02
96.0	.295E-01	.545E+06	-.554E+04	-.166E-02	.272E+04	.141E+11	-.761E+02
102.0	.203E-01	.513E+06	-.597E+04	-.143E-02	.265E+04	.141E+11	-.672E+02
108.0	.124E-01	.478E+06	-.635E+04	-.122E-02	.258E+04	.141E+11	-.569E+02
114.0	.565E-02	.441E+06	-.665E+04	-.103E-02	.250E+04	.141E+11	-.439E+02
120.0	.591E-04	.402E+06	-.681E+04	-.847E-03	.241E+04	.141E+11	-.952E+01
126.0	-.451E-02	.363E+06	-.672E+04	-.684E-03	.232E+04	.141E+11	.407E+02
132.0	-.815E-02	.324E+06	-.645E+04	-.538E-03	.224E+04	.141E+11	.496E+02
138.0	-.110E-01	.287E+06	-.613E+04	-.409E-03	.216E+04	.141E+11	.547E+02
144.0	-.131E-01	.252E+06	-.579E+04	-.294E-03	.208E+04	.141E+11	.580E+02
150.0	-.145E-01	.219E+06	-.544E+04	-.194E-03	.201E+04	.141E+11	.600E+02
156.0	-.154E-01	.188E+06	-.508E+04	-.108E-03	.194E+04	.141E+11	.612E+02
162.0	-.158E-01	.158E+06	-.471E+04	-.344E-04	.188E+04	.141E+11	.618E+02
168.0	-.158E-01	.131E+06	-.434E+04	.270E-04	.182E+04	.141E+11	.618E+02
174.0	-.155E-01	.106E+06	-.397E+04	.774E-04	.176E+04	.141E+11	.613E+02
180.0	-.149E-01	.833E+05	-.360E+04	.118E-03	.171E+04	.141E+11	.605E+02
186.0	-.141E-01	.626E+05	-.324E+04	.149E-03	.167E+04	.141E+11	.594E+02
192.0	-.131E-01	.439E+05	-.289E+04	.171E-03	.163E+04	.141E+11	.580E+02
198.0	-.120E-01	.273E+05	-.255E+04	.186E-03	.159E+04	.141E+11	.564E+02

204.0	-.109E-01	.127E+05	-.221E+04	.195E-03	.156E+04	.141E+11	.545E+02
210.0	-.967E-02	.632E+01	-.189E+04	.197E-03	.153E+04	.141E+11	.524E+02
216.0	-.848E-02	-.108E+05	-.158E+04	.195E-03	.155E+04	.141E+11	.502E+02
222.0	-.732E-02	-.197E+05	-.129E+04	.189E-03	.157E+04	.141E+11	.478E+02
228.0	-.622E-02	-.269E+05	-.101E+04	.179E-03	.159E+04	.141E+11	.453E+02
234.0	-.518E-02	-.325E+05	-.748E+03	.166E-03	.160E+04	.141E+11	.426E+02
240.0	-.422E-02	-.365E+05	-.501E+03	.152E-03	.161E+04	.141E+11	.398E+02
246.0	-.336E-02	-.390E+05	-.271E+03	.136E-03	.162E+04	.141E+11	.369E+02
252.0	-.260E-02	-.402E+05	-.586E+02	.119E-03	.162E+04	.141E+11	.338E+02
258.0	-.193E-02	-.402E+05	.135E+03	.102E-03	.162E+04	.141E+11	.307E+02
264.0	-.138E-02	-.390E+05	.309E+03	.848E-04	.162E+04	.141E+11	.274E+02
270.0	-.916E-03	-.368E+05	.463E+03	.688E-04	.161E+04	.141E+11	.239E+02
276.0	-.551E-03	-.337E+05	.595E+03	.538E-04	.160E+04	.141E+11	.202E+02
282.0	-.271E-03	-.298E+05	.704E+03	.403E-04	.160E+04	.141E+11	.159E+02
288.0	-.667E-04	-.254E+05	.782E+03	.286E-04	.159E+04	.141E+11	.997E+01
294.0	.726E-04	-.205E+05	.781E+03	.189E-04	.158E+04	.141E+11	-.103E+02
300.0	.160E-03	-.161E+05	.710E+03	.111E-04	.157E+04	.141E+11	-.134E+02
306.0	.206E-03	-.121E+05	.626E+03	.511E-05	.156E+04	.141E+11	-.145E+02
312.0	.221E-03	-.857E+04	.538E+03	.728E-06	.155E+04	.141E+11	-.149E+02
318.0	.214E-03	-.561E+04	.449E+03	-.228E-05	.154E+04	.141E+11	-.147E+02
324.0	.194E-03	-.317E+04	.363E+03	-.415E-05	.154E+04	.141E+11	-.142E+02
330.0	.165E-03	-.124E+04	.279E+03	-.508E-05	.153E+04	.141E+11	-.135E+02
336.0	.133E-03	.198E+03	.201E+03	-.531E-05	.153E+04	.141E+11	-.126E+02
342.0	.101E-03	.119E+04	.129E+03	-.501E-05	.153E+04	.141E+11	-.115E+02
348.0	.724E-04	.177E+04	.640E+02	-.438E-05	.153E+04	.141E+11	-.103E+02
354.0	.483E-04	.197E+04	.637E+01	-.359E-05	.153E+04	.141E+11	-.897E+01
360.0	.293E-04	.186E+04	-.277E+02	-.278E-05	.153E+04	.141E+11	-.239E+01
366.0	.150E-04	.165E+04	-.387E+02	-.203E-05	.153E+04	.141E+11	-.129E+01
372.0	.489E-05	.140E+04	-.440E+02	-.139E-05	.153E+04	.141E+11	-.446E+00
378.0	-.164E-05	.113E+04	-.448E+02	-.849E-06	.153E+04	.141E+11	.157E+00
384.0	-.530E-05	.864E+03	-.427E+02	-.426E-06	.153E+04	.141E+11	.534E+00
390.0	-.675E-05	.617E+03	-.390E+02	-.112E-06	.153E+04	.141E+11	.713E+00
396.0	-.664E-05	.396E+03	-.347E+02	.104E-06	.153E+04	.141E+11	.732E+00
402.0	-.551E-05	.201E+03	-.306E+02	.230E-06	.153E+04	.141E+11	.635E+00
408.0	-.387E-05	.285E+02	-.273E+02	.279E-06	.153E+04	.141E+11	.465E+00
414.0	-.216E-05	-.127E+03	-.251E+02	.258E-06	.153E+04	.141E+11	.270E+00
420.0	-.776E-06	-.273E+03	-.717E+01	.173E-06	.153E+04	.141E+11	.570E+01
426.0	-.858E-07	-.214E+03	.171E+02	.696E-07	.153E+04	.141E+11	.239E+01
432.0	.589E-07	-.686E+02	.179E+02	.955E-08	.153E+04	.141E+11	-.211E+01
438.0	.288E-07	.866E+00	.660E+01	-.483E-08	.153E+04	.141E+11	-.166E+01
444.0	.944E-09	.105E+02	-.346E-01	-.241E-08	.153E+04	.141E+11	-.524E+00
450.0	-.113E-09	.460E+00	-.881E+00	-.787E-10	.153E+04	.141E+11	.260E+00
456.0	-.166E-13	-.444E-01	-.383E-01	.943E-11	.153E+04	.141E+11	.132E-01
462.0	.106E-14	-.735E-05	.370E-02	.138E-14	.153E+04	.141E+11	-.121E-02
468.0	.194E-18	.415E-06	.612E-06	-.880E-16	.153E+04	.141E+11	-.202E-06
474.0	-.986E-20	.232E-10	-.345E-07	-.291E-19	.153E+04	.141E+11	.113E-07
480.0	-.155E-18	.193E-10	-.636E-12	-.201E-19	.153E+04	.141E+11	.457E-14
486.0	-.251E-18	.156E-10	-.595E-12	-.127E-19	.153E+04	.141E+11	.755E-14
492.0	-.307E-18	.122E-10	-.538E-12	-.675E-20	.153E+04	.141E+11	.943E-14
498.0	-.332E-18	.921E-11	-.471E-12	-.220E-20	.153E+04	.141E+11	.104E-13
504.0	-.334E-18	.659E-11	-.401E-12	.116E-20	.153E+04	.141E+11	.107E-13
510.0	-.318E-18	.440E-11	-.330E-12	.349E-20	.153E+04	.141E+11	.104E-13
516.0	-.292E-18	.262E-11	-.262E-12	.498E-20	.153E+04	.141E+11	.973E-14
522.0	-.258E-18	.124E-11	-.200E-12	.580E-20	.153E+04	.141E+11	.879E-14
528.0	-.222E-18	.202E-12	-.145E-12	.611E-20	.153E+04	.141E+11	.770E-14
534.0	-.185E-18	-.522E-12	-.969E-13	.604E-20	.153E+04	.141E+11	.654E-14
540.0	-.150E-18	-.982E-12	-.568E-13	.572E-20	.153E+04	.141E+11	.538E-14
546.0	-.116E-18	-.122E-11	-.244E-13	.525E-20	.153E+04	.141E+11	.427E-14
552.0	-.865E-19	-.129E-11	.844E-15	.472E-20	.153E+04	.141E+11	.323E-14
558.0	-.598E-19	-.123E-11	.193E-13	.418E-20	.153E+04	.141E+11	.227E-14
564.0	-.363E-19	-.108E-11	.317E-13	.369E-20	.153E+04	.141E+11	.140E-14
570.0	-.155E-19	-.864E-12	.385E-13	.328E-20	.153E+04	.141E+11	.608E-15
576.0	.309E-20	-.627E-12	.401E-13	.296E-20	.153E+04	.141E+11	-.125E-15

582.0	.201E-19	-.394E-12	.369E-13	.275E-20	.153E+04	.141E+11	-.819E-15
588.0	.361E-19	-.193E-12	.292E-13	.262E-20	.153E+04	.141E+11	-.149E-14
594.0	.515E-19	-.530E-13	.169E-13	.257E-20	.153E+04	.141E+11	-.217E-14
600.0	.669E-19	.000E+00	.000E+00	.256E-20	.153E+04	.141E+11	-.286E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .517E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .787E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .382E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.514E-02
MAXIMUM BENDING MOMENT = .662E+06 LBS-IN
MAXIMUM SHEAR FORCE = .210E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 7

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .220E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.430E+00	-.218E-07	.220E+05	-.564E-02	.153E+04	.141E+11	-.336E+03
6.0	.396E+00	.136E+06	.199E+05	-.562E-02	.183E+04	.141E+11	-.356E+03
12.0	.363E+00	.259E+06	.177E+05	-.553E-02	.210E+04	.141E+11	-.374E+03
18.0	.330E+00	.369E+06	.154E+05	-.540E-02	.234E+04	.141E+11	-.391E+03
24.0	.298E+00	.464E+06	.131E+05	-.522E-02	.255E+04	.141E+11	-.406E+03
30.0	.267E+00	.544E+06	.106E+05	-.501E-02	.272E+04	.141E+11	-.419E+03
36.0	.238E+00	.609E+06	.803E+04	-.476E-02	.286E+04	.141E+11	-.430E+03
42.0	.210E+00	.658E+06	.542E+04	-.449E-02	.297E+04	.141E+11	-.440E+03
48.0	.184E+00	.690E+06	.276E+04	-.421E-02	.304E+04	.141E+11	-.448E+03
54.0	.160E+00	.706E+06	.560E+02	-.391E-02	.307E+04	.141E+11	-.453E+03
60.0	.137E+00	.705E+06	-.174E+04	-.361E-02	.307E+04	.141E+11	-.145E+03
66.0	.116E+00	.698E+06	-.253E+04	-.331E-02	.306E+04	.141E+11	-.120E+03
72.0	.974E-01	.687E+06	-.323E+04	-.302E-02	.303E+04	.141E+11	-.113E+03
78.0	.802E-01	.670E+06	-.389E+04	-.273E-02	.300E+04	.141E+11	-.106E+03
84.0	.647E-01	.650E+06	-.451E+04	-.245E-02	.295E+04	.141E+11	-.988E+02
90.0	.508E-01	.625E+06	-.508E+04	-.218E-02	.290E+04	.141E+11	-.912E+02
96.0	.385E-01	.597E+06	-.560E+04	-.192E-02	.284E+04	.141E+11	-.831E+02
102.0	.277E-01	.565E+06	-.607E+04	-.168E-02	.277E+04	.141E+11	-.745E+02
108.0	.184E-01	.530E+06	-.649E+04	-.144E-02	.269E+04	.141E+11	-.650E+02
114.0	.104E-01	.492E+06	-.685E+04	-.123E-02	.261E+04	.141E+11	-.537E+02
120.0	.367E-02	.452E+06	-.712E+04	-.103E-02	.252E+04	.141E+11	-.380E+02
126.0	-.191E-02	.410E+06	-.715E+04	-.843E-03	.243E+04	.141E+11	.306E+02
132.0	-.644E-02	.369E+06	-.692E+04	-.677E-03	.234E+04	.141E+11	.458E+02
138.0	-.100E-01	.330E+06	-.662E+04	-.529E-03	.225E+04	.141E+11	.531E+02

144.0	-.128E-01	.292E+06	-.629E+04	-.397E-03	.217E+04	.141E+11	.576E+02
150.0	-.148E-01	.256E+06	-.593E+04	-.281E-03	.209E+04	.141E+11	.604E+02
156.0	-.162E-01	.222E+06	-.557E+04	-.179E-03	.202E+04	.141E+11	.622E+02
162.0	-.169E-01	.190E+06	-.519E+04	-.920E-04	.195E+04	.141E+11	.632E+02
168.0	-.173E-01	.160E+06	-.481E+04	-.178E-04	.188E+04	.141E+11	.636E+02
174.0	-.172E-01	.132E+06	-.443E+04	.441E-04	.182E+04	.141E+11	.635E+02
180.0	-.167E-01	.106E+06	-.405E+04	.947E-04	.176E+04	.141E+11	.630E+02
186.0	-.160E-01	.830E+05	-.367E+04	.135E-03	.171E+04	.141E+11	.621E+02
192.0	-.151E-01	.618E+05	-.330E+04	.166E-03	.167E+04	.141E+11	.609E+02
198.0	-.140E-01	.428E+05	-.294E+04	.188E-03	.162E+04	.141E+11	.594E+02
204.0	-.129E-01	.259E+05	-.259E+04	.202E-03	.159E+04	.141E+11	.577E+02
210.0	-.116E-01	.110E+05	-.225E+04	.210E-03	.155E+04	.141E+11	.558E+02
216.0	-.103E-01	-.191E+04	-.192E+04	.212E-03	.153E+04	.141E+11	.536E+02
222.0	-.906E-02	-.129E+05	-.161E+04	.209E-03	.156E+04	.141E+11	.513E+02
228.0	-.783E-02	-.220E+05	-.131E+04	.202E-03	.158E+04	.141E+11	.489E+02
234.0	-.664E-02	-.293E+05	-.102E+04	.191E-03	.159E+04	.141E+11	.463E+02
240.0	-.554E-02	-.349E+05	-.752E+03	.177E-03	.161E+04	.141E+11	.436E+02
246.0	-.452E-02	-.389E+05	-.500E+03	.161E-03	.162E+04	.141E+11	.407E+02
252.0	-.360E-02	-.415E+05	-.264E+03	.144E-03	.162E+04	.141E+11	.377E+02
258.0	-.279E-02	-.426E+05	-.472E+02	.127E-03	.162E+04	.141E+11	.346E+02
264.0	-.208E-02	-.425E+05	.151E+03	.108E-03	.162E+04	.141E+11	.314E+02
270.0	-.148E-02	-.412E+05	.330E+03	.907E-04	.162E+04	.141E+11	.281E+02
276.0	-.993E-03	-.389E+05	.488E+03	.737E-04	.162E+04	.141E+11	.246E+02
282.0	-.601E-03	-.356E+05	.624E+03	.579E-04	.161E+04	.141E+11	.208E+02
288.0	-.299E-03	-.316E+05	.735E+03	.436E-04	.160E+04	.141E+11	.165E+02
294.0	-.776E-04	-.270E+05	.816E+03	.312E-04	.159E+04	.141E+11	.105E+02
300.0	.750E-04	-.219E+05	.817E+03	.208E-04	.158E+04	.141E+11	-.104E+02
306.0	.172E-03	-.172E+05	.745E+03	.125E-04	.157E+04	.141E+11	-.137E+02
312.0	.225E-03	-.130E+05	.659E+03	.604E-05	.156E+04	.141E+11	-.150E+02
318.0	.244E-03	-.936E+04	.568E+03	.129E-05	.155E+04	.141E+11	-.154E+02
324.0	.240E-03	-.623E+04	.476E+03	-.202E-05	.154E+04	.141E+11	-.153E+02
330.0	.220E-03	-.364E+04	.385E+03	-.412E-05	.154E+04	.141E+11	-.149E+02
336.0	.191E-03	-.159E+04	.298E+03	-.523E-05	.153E+04	.141E+11	-.142E+02
342.0	.157E-03	-.497E+02	.216E+03	-.558E-05	.153E+04	.141E+11	-.133E+02
348.0	.124E-03	.101E+04	.139E+03	-.537E-05	.153E+04	.141E+11	-.123E+02
354.0	.928E-04	.164E+04	.687E+02	-.481E-05	.153E+04	.141E+11	-.111E+02
360.0	.660E-04	.186E+04	.191E+02	-.407E-05	.153E+04	.141E+11	-.538E+01
366.0	.440E-04	.188E+04	-.842E+01	-.327E-05	.153E+04	.141E+11	-.380E+01
372.0	.267E-04	.177E+04	-.271E+02	-.250E-05	.153E+04	.141E+11	-.244E+01
378.0	.140E-04	.156E+04	-.385E+02	-.179E-05	.153E+04	.141E+11	-.134E+01
384.0	.523E-05	.131E+04	-.441E+02	-.118E-05	.153E+04	.141E+11	-.527E+00
390.0	-.191E-06	.104E+04	-.456E+02	-.682E-06	.153E+04	.141E+11	.202E-01
396.0	-.296E-05	.768E+03	-.445E+02	-.298E-06	.153E+04	.141E+11	.327E+00
402.0	-.377E-05	.507E+03	-.423E+02	-.280E-07	.153E+04	.141E+11	.435E+00
408.0	-.330E-05	.261E+03	-.398E+02	.135E-06	.153E+04	.141E+11	.395E+00
414.0	-.215E-05	.290E+02	-.378E+02	.196E-06	.153E+04	.141E+11	.269E+00
420.0	-.938E-06	-.193E+03	-.188E+02	.162E-06	.153E+04	.141E+11	.607E+01
426.0	-.214E-06	-.197E+03	.917E+01	.789E-07	.153E+04	.141E+11	.324E+01
432.0	.956E-08	-.833E+02	.154E+02	.195E-07	.153E+04	.141E+11	-.115E+01
438.0	.206E-07	-.117E+02	.749E+01	-.640E-09	.153E+04	.141E+11	-.148E+01
444.0	.188E-08	.659E+01	.103E+01	-.172E-08	.153E+04	.141E+11	-.668E+00
450.0	-.183E-10	.751E+00	-.550E+00	-.156E-09	.153E+04	.141E+11	.144E+00
456.0	-.546E-13	-.715E-02	-.626E-01	.153E-11	.153E+04	.141E+11	.202E-01
462.0	.169E-15	-.216E-04	.596E-03	.455E-14	.153E+04	.141E+11	-.201E-03
468.0	.516E-18	.659E-07	.180E-05	-.141E-16	.153E+04	.141E+11	-.573E-06
474.0	-.157E-20	.583E-10	-.549E-08	-.739E-19	.153E+04	.141E+11	.186E-08
480.0	-.371E-18	.487E-10	-.159E-11	-.512E-19	.153E+04	.141E+11	.116E-13
486.0	-.616E-18	.395E-10	-.149E-11	-.325E-19	.153E+04	.141E+11	.197E-13
492.0	-.760E-18	.309E-10	-.135E-11	-.175E-19	.153E+04	.141E+11	.248E-13
498.0	-.826E-18	.233E-10	-.118E-11	-.599E-20	.153E+04	.141E+11	.276E-13
504.0	-.832E-18	.168E-10	-.101E-11	.252E-20	.153E+04	.141E+11	.284E-13
510.0	-.796E-18	.112E-10	-.831E-12	.845E-20	.153E+04	.141E+11	.277E-13
516.0	-.731E-18	.675E-11	-.662E-12	.123E-19	.153E+04	.141E+11	.260E-13

522.0	-.648E-18	.324E-11	-.506E-12	.144E-19	.153E+04	.141E+11	.235E-13
528.0	-.558E-18	.622E-12	-.367E-12	.152E-19	.153E+04	.141E+11	.206E-13
534.0	-.466E-18	-.122E-11	-.247E-12	.151E-19	.153E+04	.141E+11	.175E-13
540.0	-.377E-18	-.239E-11	-.146E-12	.143E-19	.153E+04	.141E+11	.145E-13
546.0	-.294E-18	-.302E-11	-.639E-13	.132E-19	.153E+04	.141E+11	.115E-13
552.0	-.219E-18	-.321E-11	-.165E-15	.118E-19	.153E+04	.141E+11	.871E-14
558.0	-.152E-18	-.306E-11	.467E-13	.105E-19	.153E+04	.141E+11	.615E-14
564.0	-.926E-19	-.268E-11	.781E-13	.930E-20	.153E+04	.141E+11	.382E-14
570.0	-.403E-19	-.216E-11	.955E-13	.827E-20	.153E+04	.141E+11	.169E-14
576.0	.661E-20	-.157E-11	.999E-13	.748E-20	.153E+04	.141E+11	-.282E-15
582.0	.495E-19	-.985E-12	.923E-13	.694E-20	.153E+04	.141E+11	-.215E-14
588.0	.899E-19	-.484E-12	.730E-13	.663E-20	.153E+04	.141E+11	-.396E-14
594.0	.129E-18	-.133E-12	.423E-13	.650E-20	.153E+04	.141E+11	-.578E-14
600.0	.168E-18	.000E+00	.000E+00	.647E-20	.153E+04	.141E+11	-.764E-14

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.613E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.600E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .430E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.564E-02
MAXIMUM BENDING MOMENT = .706E+06 LBS-IN
MAXIMUM SHEAR FORCE = .220E+05 LBS
NO. OF ITERATIONS = 32
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 8

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .230E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.482E+00	-.872E-07	.230E+05	-.618E-02	.153E+04	.141E+11	-.346E+03
6.0	.445E+00	.143E+06	.209E+05	-.615E-02	.184E+04	.141E+11	-.366E+03
12.0	.409E+00	.273E+06	.186E+05	-.606E-02	.213E+04	.141E+11	-.385E+03
18.0	.373E+00	.388E+06	.162E+05	-.592E-02	.238E+04	.141E+11	-.403E+03
24.0	.337E+00	.489E+06	.138E+05	-.574E-02	.260E+04	.141E+11	-.418E+03
30.0	.304E+00	.574E+06	.112E+05	-.551E-02	.279E+04	.141E+11	-.432E+03
36.0	.271E+00	.643E+06	.860E+04	-.525E-02	.294E+04	.141E+11	-.445E+03
42.0	.241E+00	.696E+06	.590E+04	-.497E-02	.305E+04	.141E+11	-.455E+03
48.0	.212E+00	.732E+06	.315E+04	-.467E-02	.313E+04	.141E+11	-.463E+03
54.0	.185E+00	.751E+06	.346E+03	-.435E-02	.317E+04	.141E+11	-.470E+03
60.0	.159E+00	.752E+06	-.152E+04	-.403E-02	.318E+04	.141E+11	-.152E+03
66.0	.136E+00	.747E+06	-.236E+04	-.371E-02	.316E+04	.141E+11	-.127E+03
72.0	.115E+00	.737E+06	-.310E+04	-.340E-02	.314E+04	.141E+11	-.120E+03
78.0	.955E-01	.722E+06	-.379E+04	-.309E-02	.311E+04	.141E+11	-.113E+03

84.0	.778E-01	.703E+06	-.445E+04	-.279E-02	.307E+04	.141E+11	-.105E+03
90.0	.620E-01	.679E+06	-.505E+04	-.249E-02	.302E+04	.141E+11	-.975E+02
96.0	.479E-01	.651E+06	-.562E+04	-.221E-02	.295E+04	.141E+11	-.894E+02
102.0	.355E-01	.619E+06	-.613E+04	-.194E-02	.289E+04	.141E+11	-.809E+02
108.0	.246E-01	.584E+06	-.658E+04	-.169E-02	.281E+04	.141E+11	-.716E+02
114.0	.153E-01	.546E+06	-.698E+04	-.145E-02	.273E+04	.141E+11	-.611E+02
120.0	.728E-02	.506E+06	-.731E+04	-.122E-02	.264E+04	.141E+11	-.477E+02
126.0	.591E-03	.463E+06	-.751E+04	-.102E-02	.254E+04	.141E+11	-.206E+02
132.0	-.492E-02	.419E+06	-.745E+04	-.829E-03	.245E+04	.141E+11	.419E+02
138.0	-.936E-02	.377E+06	-.717E+04	-.660E-03	.235E+04	.141E+11	.519E+02
144.0	-.128E-01	.336E+06	-.684E+04	-.509E-03	.226E+04	.141E+11	.577E+02
150.0	-.155E-01	.296E+06	-.648E+04	-.375E-03	.218E+04	.141E+11	.614E+02
156.0	-.173E-01	.259E+06	-.611E+04	-.257E-03	.210E+04	.141E+11	.637E+02
162.0	-.186E-01	.224E+06	-.572E+04	-.154E-03	.202E+04	.141E+11	.652E+02
168.0	-.192E-01	.191E+06	-.533E+04	-.663E-04	.195E+04	.141E+11	.659E+02
174.0	-.194E-01	.160E+06	-.493E+04	.835E-05	.188E+04	.141E+11	.661E+02
180.0	-.191E-01	.132E+06	-.454E+04	.704E-04	.182E+04	.141E+11	.658E+02
186.0	-.185E-01	.106E+06	-.414E+04	.121E-03	.176E+04	.141E+11	.651E+02
192.0	-.176E-01	.818E+05	-.376E+04	.161E-03	.171E+04	.141E+11	.641E+02
198.0	-.166E-01	.601E+05	-.338E+04	.191E-03	.166E+04	.141E+11	.628E+02
204.0	-.154E-01	.406E+05	-.300E+04	.212E-03	.162E+04	.141E+11	.612E+02
210.0	-.140E-01	.233E+05	-.264E+04	.226E-03	.158E+04	.141E+11	.594E+02
216.0	-.126E-01	.809E+04	-.229E+04	.232E-03	.155E+04	.141E+11	.574E+02
222.0	-.112E-01	-.504E+04	-.195E+04	.233E-03	.154E+04	.141E+11	.552E+02
228.0	-.985E-02	-.162E+05	-.163E+04	.229E-03	.157E+04	.141E+11	.528E+02
234.0	-.850E-02	-.254E+05	-.132E+04	.220E-03	.159E+04	.141E+11	.503E+02
240.0	-.722E-02	-.328E+05	-.103E+04	.207E-03	.160E+04	.141E+11	.476E+02
246.0	-.601E-02	-.385E+05	-.750E+03	.192E-03	.161E+04	.141E+11	.448E+02
252.0	-.491E-02	-.425E+05	-.490E+03	.175E-03	.162E+04	.141E+11	.418E+02
258.0	-.391E-02	-.450E+05	-.248E+03	.156E-03	.163E+04	.141E+11	.388E+02
264.0	-.303E-02	-.461E+05	-.250E+02	.137E-03	.163E+04	.141E+11	.356E+02
270.0	-.227E-02	-.458E+05	.179E+03	.118E-03	.163E+04	.141E+11	.324E+02
276.0	-.162E-02	-.443E+05	.363E+03	.984E-04	.163E+04	.141E+11	.289E+02
282.0	-.109E-02	-.418E+05	.526E+03	.802E-04	.162E+04	.141E+11	.253E+02
288.0	-.660E-03	-.383E+05	.666E+03	.631E-04	.161E+04	.141E+11	.214E+02
294.0	-.330E-03	-.340E+05	.781E+03	.478E-04	.161E+04	.141E+11	.170E+02
300.0	-.870E-04	-.291E+05	.865E+03	.344E-04	.159E+04	.141E+11	.109E+02
306.0	.822E-04	-.238E+05	.866E+03	.232E-04	.158E+04	.141E+11	-.107E+02
312.0	.191E-03	-.188E+05	.791E+03	.141E-04	.157E+04	.141E+11	-.142E+02
318.0	.252E-03	-.143E+05	.702E+03	.708E-05	.156E+04	.141E+11	-.155E+02
324.0	.276E-03	-.104E+05	.608E+03	.183E-05	.155E+04	.141E+11	-.160E+02
330.0	.274E-03	-.705E+04	.512E+03	-.187E-05	.155E+04	.141E+11	-.160E+02
336.0	.253E-03	-.426E+04	.417E+03	-.427E-05	.154E+04	.141E+11	-.156E+02
342.0	.222E-03	-.203E+04	.325E+03	-.561E-05	.154E+04	.141E+11	-.149E+02
348.0	.186E-03	-.334E+03	.239E+03	-.611E-05	.153E+04	.141E+11	-.141E+02
354.0	.149E-03	.856E+03	.157E+03	-.600E-05	.153E+04	.141E+11	-.131E+02
360.0	.114E-03	.157E+04	.902E+02	-.548E-05	.153E+04	.141E+11	-.930E+01
366.0	.831E-04	.196E+04	.408E+02	-.474E-05	.153E+04	.141E+11	-.718E+01
372.0	.572E-04	.208E+04	.363E+01	-.388E-05	.154E+04	.141E+11	-.522E+01
378.0	.366E-04	.202E+04	-.225E+02	-.301E-05	.154E+04	.141E+11	-.351E+01
384.0	.211E-04	.182E+04	-.395E+02	-.219E-05	.153E+04	.141E+11	-.213E+01
390.0	.103E-04	.155E+04	-.491E+02	-.148E-05	.153E+04	.141E+11	-.109E+01
396.0	.340E-05	.124E+04	-.535E+02	-.886E-06	.153E+04	.141E+11	-.374E+00
402.0	-.343E-06	.911E+03	-.545E+02	-.430E-06	.153E+04	.141E+11	.398E-01
408.0	-.176E-05	.585E+03	-.537E+02	-.112E-06	.153E+04	.141E+11	.212E+00
414.0	-.169E-05	.267E+03	-.525E+02	.687E-07	.153E+04	.141E+11	.211E+00
420.0	-.937E-06	-.446E+02	-.337E+02	.116E-06	.153E+04	.141E+11	.607E+01
426.0	-.299E-06	-.138E+03	-.460E+01	.772E-07	.153E+04	.141E+11	.362E+01
432.0	-.108E-07	-.100E+03	.981E+01	.267E-07	.153E+04	.141E+11	.120E+01
438.0	.219E-07	-.200E+02	.882E+01	.120E-08	.153E+04	.141E+11	-.152E+01
444.0	.364E-08	.572E+01	.178E+01	-.182E-08	.153E+04	.141E+11	-.835E+00
450.0	-.346E-11	.143E+01	-.477E+00	-.304E-09	.153E+04	.141E+11	.833E-01
456.0	-.356E-12	-.108E-02	-.119E+00	.288E-12	.153E+04	.141E+11	.377E-01

462.0	.190E-16	-.140E-03	.897E-04	.297E-13	.153E+04	.141E+11	-.250E-04
468.0	.333E-17	.483E-08	.117E-04	-.158E-17	.153E+04	.141E+11	-.368E-05
474.0	-.105E-21	.375E-09	-.377E-09	-.475E-18	.153E+04	.141E+11	.153E-09
480.0	-.237E-17	.313E-09	-.102E-10	-.329E-18	.153E+04	.141E+11	.737E-13
486.0	-.395E-17	.254E-09	-.957E-11	-.209E-18	.153E+04	.141E+11	.125E-12
492.0	-.488E-17	.199E-09	-.867E-11	-.113E-18	.153E+04	.141E+11	.159E-12
498.0	-.530E-17	.150E-09	-.761E-11	-.387E-19	.153E+04	.141E+11	.176E-12
504.0	-.534E-17	.108E-09	-.648E-11	.160E-19	.153E+04	.141E+11	.181E-12
510.0	-.511E-17	.722E-10	-.534E-11	.542E-19	.153E+04	.141E+11	.177E-12
516.0	-.469E-17	.434E-10	-.425E-11	.787E-19	.153E+04	.141E+11	.166E-12
522.0	-.417E-17	.209E-10	-.325E-11	.924E-19	.153E+04	.141E+11	.150E-12
528.0	-.358E-17	.405E-11	-.236E-11	.977E-19	.153E+04	.141E+11	.132E-12
534.0	-.299E-17	-.778E-11	-.159E-11	.969E-19	.153E+04	.141E+11	.112E-12
540.0	-.242E-17	-.153E-10	-.938E-12	.920E-19	.153E+04	.141E+11	.924E-13
546.0	-.189E-17	-.194E-10	-.412E-12	.846E-19	.153E+04	.141E+11	.735E-13
552.0	-.141E-17	-.206E-10	-.204E-14	.761E-19	.153E+04	.141E+11	.557E-13
558.0	-.976E-18	-.197E-10	.299E-12	.676E-19	.153E+04	.141E+11	.393E-13
564.0	-.596E-18	-.172E-10	.501E-12	.598E-19	.153E+04	.141E+11	.244E-13
570.0	-.259E-18	-.139E-10	.613E-12	.532E-19	.153E+04	.141E+11	.108E-13
576.0	.420E-19	-.101E-10	.642E-12	.481E-19	.153E+04	.141E+11	-.178E-14
582.0	.318E-18	-.633E-11	.593E-12	.446E-19	.153E+04	.141E+11	-.137E-13
588.0	.577E-18	-.311E-11	.469E-12	.426E-19	.153E+04	.141E+11	-.253E-13
594.0	.829E-18	-.854E-12	.272E-12	.418E-19	.153E+04	.141E+11	-.369E-13
600.0	.108E-17	.000E+00	.000E+00	.416E-19	.153E+04	.141E+11	-.488E-13

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .107E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.144E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .482E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.618E-02
MAXIMUM BENDING MOMENT = .752E+06 LBS-IN
MAXIMUM SHEAR FORCE = .230E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 9

BOUNDARY CONDITION CODE = 1
LATERAL LOAD AT THE PILE HEAD = .240E+05 LBS
MOMENT AT THE PILE HEAD = .000E+00 IN-LBS
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.539E+00	.828E-06	.240E+05	-.674E-02	.153E+04	.141E+11	-.355E+03
6.0	.499E+00	.150E+06	.218E+05	-.671E-02	.186E+04	.141E+11	-.377E+03
12.0	.459E+00	.286E+06	.195E+05	-.662E-02	.216E+04	.141E+11	-.396E+03
18.0	.419E+00	.407E+06	.171E+05	-.647E-02	.242E+04	.141E+11	-.415E+03

24.0	.381E+00	.514E+06	.145E+05	-.628E-02	.265E+04	.141E+11	-.431E+03
30.0	.344E+00	.604E+06	.119E+05	-.604E-02	.285E+04	.141E+11	-.446E+03
36.0	.308E+00	.678E+06	.917E+04	-.577E-02	.301E+04	.141E+11	-.459E+03
42.0	.275E+00	.735E+06	.638E+04	-.547E-02	.314E+04	.141E+11	-.470E+03
48.0	.243E+00	.774E+06	.353E+04	-.515E-02	.322E+04	.141E+11	-.480E+03
54.0	.213E+00	.796E+06	.628E+03	-.481E-02	.327E+04	.141E+11	-.487E+03
60.0	.185E+00	.799E+06	-.131E+04	-.447E-02	.328E+04	.141E+11	-.160E+03
66.0	.159E+00	.796E+06	-.219E+04	-.414E-02	.327E+04	.141E+11	-.133E+03
72.0	.135E+00	.788E+06	-.297E+04	-.380E-02	.325E+04	.141E+11	-.126E+03
78.0	.114E+00	.774E+06	-.371E+04	-.347E-02	.322E+04	.141E+11	-.119E+03
84.0	.938E-01	.756E+06	-.440E+04	-.314E-02	.318E+04	.141E+11	-.112E+03
90.0	.759E-01	.733E+06	-.505E+04	-.283E-02	.313E+04	.141E+11	-.104E+03
96.0	.599E-01	.705E+06	-.565E+04	-.252E-02	.307E+04	.141E+11	-.963E+02
102.0	.456E-01	.674E+06	-.621E+04	-.223E-02	.300E+04	.141E+11	-.880E+02
108.0	.331E-01	.639E+06	-.671E+04	-.195E-02	.293E+04	.141E+11	-.790E+02
114.0	.222E-01	.600E+06	-.715E+04	-.169E-02	.284E+04	.141E+11	-.692E+02
120.0	.128E-01	.559E+06	-.753E+04	-.144E-02	.275E+04	.141E+11	-.576E+02
126.0	.489E-02	.515E+06	-.783E+04	-.121E-02	.266E+04	.141E+11	-.418E+02
132.0	-.174E-02	.469E+06	-.787E+04	-.101E-02	.256E+04	.141E+11	.296E+02
138.0	-.717E-02	.424E+06	-.764E+04	-.815E-03	.246E+04	.141E+11	.475E+02
144.0	-.115E-01	.381E+06	-.733E+04	-.645E-03	.236E+04	.141E+11	.556E+02
150.0	-.149E-01	.339E+06	-.698E+04	-.492E-03	.227E+04	.141E+11	.606E+02
156.0	-.174E-01	.299E+06	-.661E+04	-.357E-03	.218E+04	.141E+11	.638E+02
162.0	-.192E-01	.261E+06	-.622E+04	-.238E-03	.210E+04	.141E+11	.659E+02
168.0	-.203E-01	.225E+06	-.582E+04	-.135E-03	.202E+04	.141E+11	.671E+02
174.0	-.208E-01	.191E+06	-.541E+04	-.462E-04	.195E+04	.141E+11	.677E+02
180.0	-.208E-01	.160E+06	-.501E+04	.284E-04	.188E+04	.141E+11	.677E+02
186.0	-.205E-01	.131E+06	-.460E+04	.903E-04	.182E+04	.141E+11	.673E+02
192.0	-.197E-01	.105E+06	-.420E+04	.140E-03	.176E+04	.141E+11	.665E+02
198.0	-.188E-01	.804E+05	-.380E+04	.180E-03	.171E+04	.141E+11	.654E+02
204.0	-.176E-01	.584E+05	-.342E+04	.209E-03	.166E+04	.141E+11	.640E+02
210.0	-.163E-01	.386E+05	-.304E+04	.230E-03	.162E+04	.141E+11	.624E+02
216.0	-.148E-01	.211E+05	-.267E+04	.242E-03	.158E+04	.141E+11	.605E+02
222.0	-.134E-01	.575E+04	-.231E+04	.248E-03	.154E+04	.141E+11	.584E+02
228.0	-.119E-01	-.752E+04	-.197E+04	.248E-03	.155E+04	.141E+11	.561E+02
234.0	-.104E-01	-.188E+05	-.164E+04	.242E-03	.157E+04	.141E+11	.537E+02
240.0	-.895E-02	-.280E+05	-.132E+04	.232E-03	.159E+04	.141E+11	.511E+02
246.0	-.759E-02	-.355E+05	-.102E+04	.219E-03	.161E+04	.141E+11	.484E+02
252.0	-.633E-02	-.411E+05	-.743E+03	.202E-03	.162E+04	.141E+11	.455E+02
258.0	-.516E-02	-.451E+05	-.479E+03	.184E-03	.163E+04	.141E+11	.426E+02
264.0	-.412E-02	-.475E+05	-.232E+03	.164E-03	.163E+04	.141E+11	.395E+02
270.0	-.319E-02	-.485E+05	-.536E+01	.144E-03	.164E+04	.141E+11	.362E+02
276.0	-.239E-02	-.481E+05	.202E+03	.124E-03	.164E+04	.141E+11	.329E+02
282.0	-.171E-02	-.465E+05	.389E+03	.104E-03	.163E+04	.141E+11	.294E+02
288.0	-.115E-02	-.438E+05	.555E+03	.843E-04	.163E+04	.141E+11	.258E+02
294.0	-.696E-03	-.402E+05	.697E+03	.665E-04	.162E+04	.141E+11	.218E+02
300.0	-.348E-03	-.357E+05	.815E+03	.504E-04	.161E+04	.141E+11	.173E+02
306.0	-.906E-04	-.306E+05	.900E+03	.364E-04	.160E+04	.141E+11	.111E+02
312.0	.887E-04	-.250E+05	.900E+03	.246E-04	.159E+04	.141E+11	-.110E+02
318.0	.204E-03	-.198E+05	.824E+03	.150E-04	.157E+04	.141E+11	-.145E+02
324.0	.269E-03	-.152E+05	.733E+03	.761E-05	.156E+04	.141E+11	-.159E+02
330.0	.295E-03	-.111E+05	.636E+03	.203E-05	.155E+04	.141E+11	-.164E+02
336.0	.294E-03	-.756E+04	.538E+03	-.192E-05	.155E+04	.141E+11	-.164E+02
342.0	.272E-03	-.462E+04	.441E+03	-.451E-05	.154E+04	.141E+11	-.160E+02
348.0	.239E-03	-.226E+04	.347E+03	-.597E-05	.154E+04	.141E+11	-.153E+02
354.0	.201E-03	-.439E+03	.258E+03	-.654E-05	.153E+04	.141E+11	-.144E+02
360.0	.161E-03	.860E+03	.175E+03	-.645E-05	.153E+04	.141E+11	-.131E+02
366.0	.123E-03	.169E+04	.104E+03	-.591E-05	.153E+04	.141E+11	-.106E+02
372.0	.900E-04	.213E+04	.472E+02	-.510E-05	.154E+04	.141E+11	-.820E+01
378.0	.621E-04	.227E+04	.475E+01	-.417E-05	.154E+04	.141E+11	-.596E+01
384.0	.400E-04	.220E+04	-.252E+02	-.322E-05	.154E+04	.141E+11	-.403E+01
390.0	.235E-04	.198E+04	-.447E+02	-.233E-05	.153E+04	.141E+11	-.248E+01
396.0	.120E-04	.167E+04	-.562E+02	-.156E-05	.153E+04	.141E+11	-.133E+01

402.0	.480E-05	.131E+04	-.618E+02	-.924E-06	.153E+04	.141E+11	-.553E+00
408.0	.931E-06	.932E+03	-.638E+02	-.448E-06	.153E+04	.141E+11	-.111E+00
414.0	-.568E-06	.548E+03	-.639E+02	-.134E-06	.153E+04	.141E+11	.710E-01
420.0	-.672E-06	.166E+03	-.474E+02	.180E-07	.153E+04	.141E+11	.544E+01
426.0	-.352E-06	-.210E+02	-.197E+02	.487E-07	.153E+04	.141E+11	.383E+01
432.0	-.868E-07	-.702E+02	-.987E+00	.294E-07	.153E+04	.141E+11	.240E+01
438.0	.330E-10	-.330E+02	.567E+01	.747E-08	.153E+04	.141E+11	-.172E+00
444.0	.283E-08	-.220E+01	.284E+01	-.178E-11	.153E+04	.141E+11	-.768E+00
450.0	.117E-10	.110E+01	.184E+00	-.236E-09	.153E+04	.141E+11	-.123E+00
456.0	-.180E-12	.472E-02	-.917E-01	-.971E-12	.153E+04	.141E+11	.308E-01
462.0	-.116E-15	-.707E-04	-.393E-03	.150E-13	.153E+04	.141E+11	.136E-03
468.0	.168E-17	-.467E-07	.589E-05	.963E-17	.153E+04	.141E+11	-.199E-05
474.0	.112E-20	.189E-09	.390E-08	-.240E-18	.153E+04	.141E+11	-.132E-08
480.0	-.120E-17	.158E-09	-.514E-11	-.166E-18	.153E+04	.141E+11	.398E-13
486.0	-.199E-17	.128E-09	-.483E-11	-.105E-18	.153E+04	.141E+11	.678E-13
492.0	-.246E-17	.100E-09	-.437E-11	-.569E-19	.153E+04	.141E+11	.857E-13
498.0	-.267E-17	.756E-10	-.384E-11	-.195E-19	.153E+04	.141E+11	.952E-13
504.0	-.269E-17	.543E-10	-.327E-11	.804E-20	.153E+04	.141E+11	.980E-13
510.0	-.258E-17	.364E-10	-.269E-11	.273E-19	.153E+04	.141E+11	.957E-13
516.0	-.237E-17	.219E-10	-.215E-11	.397E-19	.153E+04	.141E+11	.897E-13
522.0	-.210E-17	.105E-10	-.164E-11	.466E-19	.153E+04	.141E+11	.812E-13
528.0	-.181E-17	.205E-11	-.119E-11	.492E-19	.153E+04	.141E+11	.712E-13
534.0	-.151E-17	-.392E-11	-.800E-12	.488E-19	.153E+04	.141E+11	.606E-13
540.0	-.122E-17	-.773E-11	-.473E-12	.464E-19	.153E+04	.141E+11	.500E-13
546.0	-.953E-18	-.976E-11	-.208E-12	.427E-19	.153E+04	.141E+11	.397E-13
552.0	-.709E-18	-.104E-10	-.115E-14	.384E-19	.153E+04	.141E+11	.301E-13
558.0	-.492E-18	-.991E-11	.151E-12	.341E-19	.153E+04	.141E+11	.213E-13
564.0	-.301E-18	-.869E-11	.253E-12	.301E-19	.153E+04	.141E+11	.132E-13
570.0	-.131E-18	-.699E-11	.309E-12	.268E-19	.153E+04	.141E+11	.585E-14
576.0	.211E-19	-.507E-11	.324E-12	.242E-19	.153E+04	.141E+11	-.961E-15
582.0	.160E-18	-.319E-11	.299E-12	.225E-19	.153E+04	.141E+11	-.741E-14
588.0	.291E-18	-.157E-11	.237E-12	.215E-19	.153E+04	.141E+11	-.137E-13
594.0	.418E-18	-.430E-12	.137E-12	.211E-19	.153E+04	.141E+11	-.200E-13
600.0	.544E-18	.000E+00	.000E+00	.210E-19	.153E+04	.141E+11	-.264E-13

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.344E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.368E-07 LBS

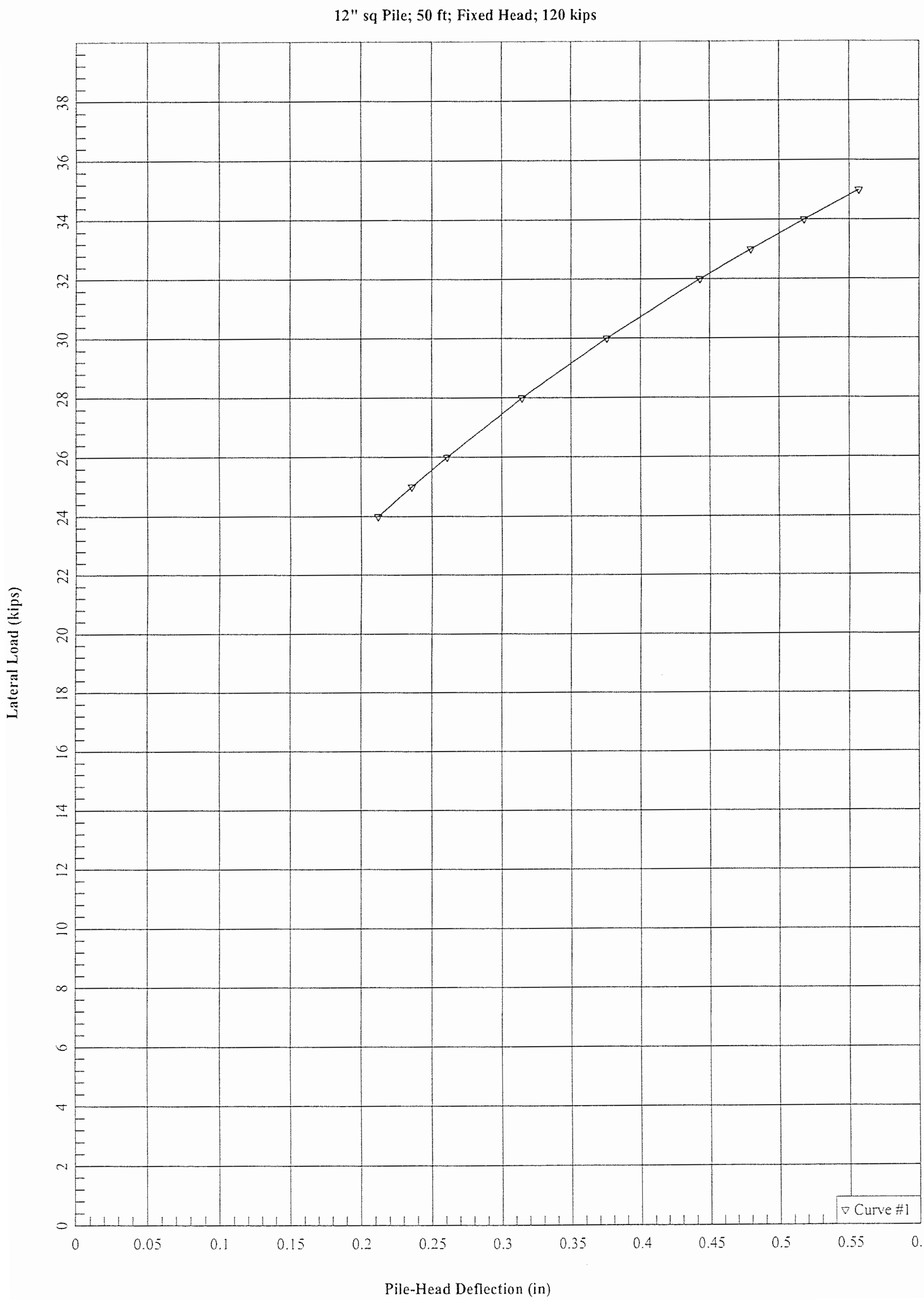
OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .539E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.674E-02
MAXIMUM BENDING MOMENT = .799E+06 LBS-IN
MAXIMUM SHEAR FORCE = .240E+05 LBS
NO. OF ITERATIONS = 33
NO. OF ZERO DEFLECTION POINTS = 8

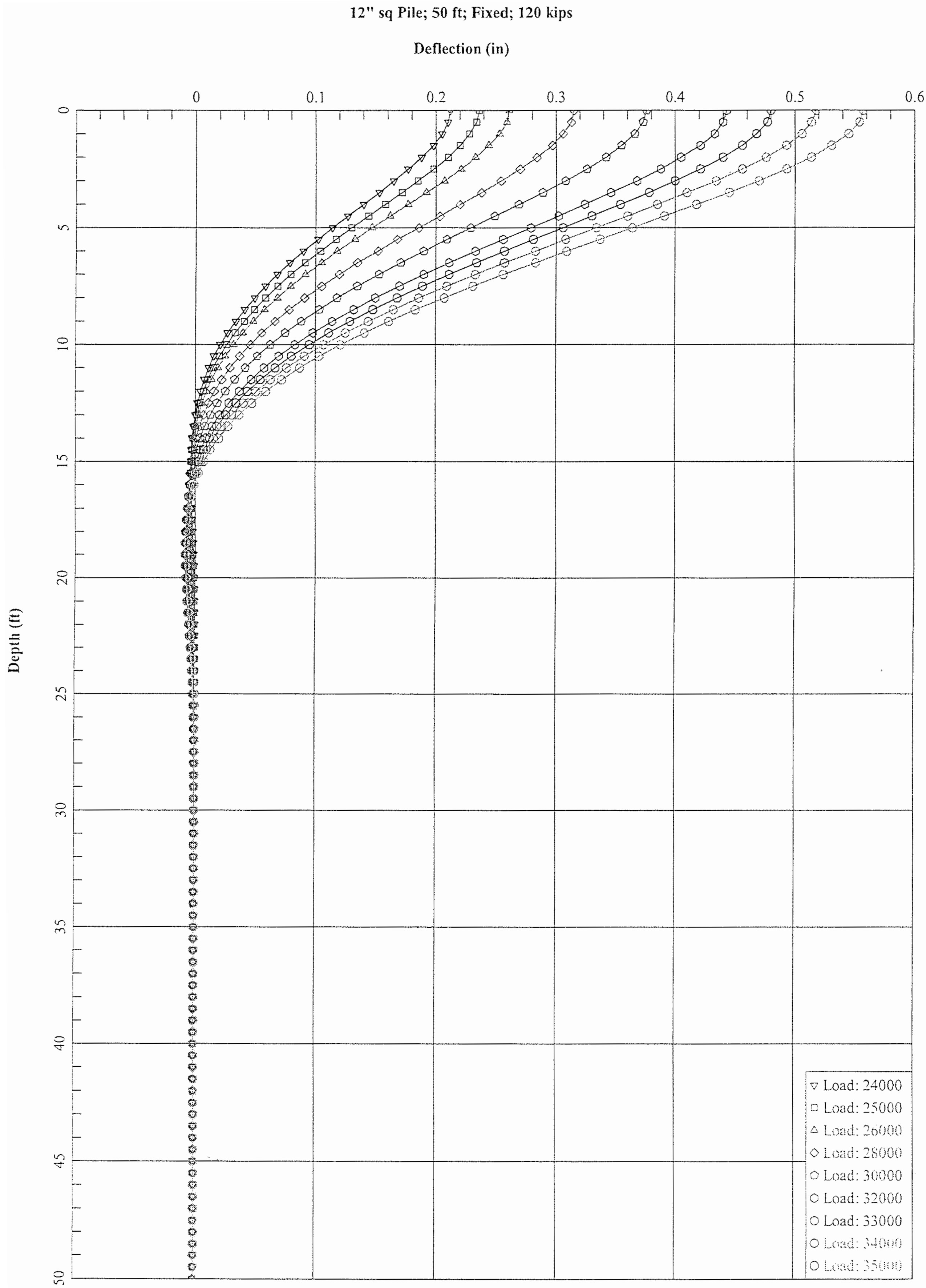
S U M M A R Y   T A B L E
****

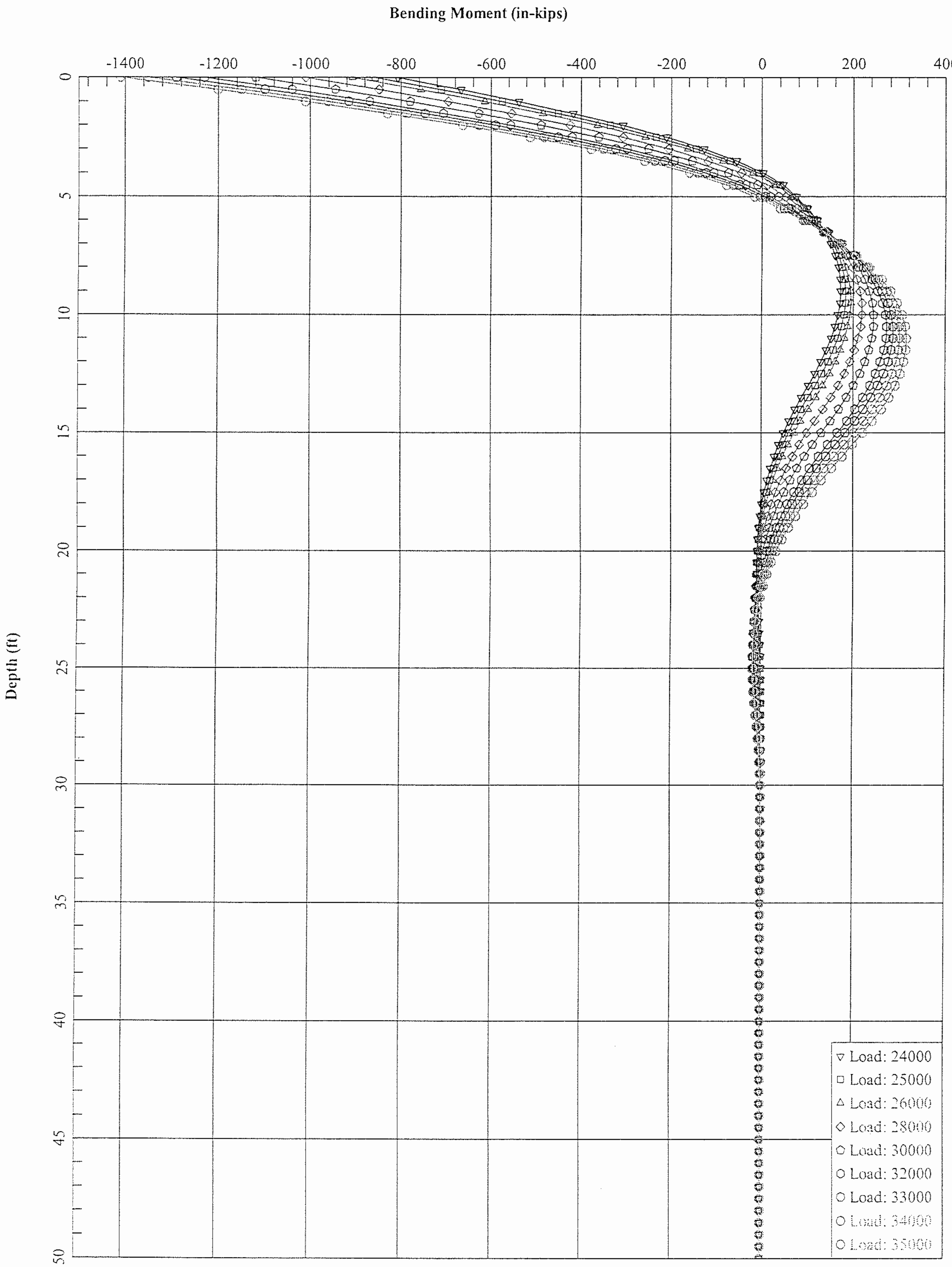
BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS

.1600E+05	.0000E+00	.3000E+06	.1914E+00	.4533E+06	.1600E+05
.1700E+05	.0000E+00	.3000E+06	.2228E+00	.4937E+06	.1700E+05
.1800E+05	.0000E+00	.3000E+06	.2573E+00	.5350E+06	.1800E+05
.1900E+05	.0000E+00	.3000E+06	.2956E+00	.5765E+06	.1900E+05
.2000E+05	.0000E+00	.3000E+06	.3368E+00	.6192E+06	.2000E+05
.2100E+05	.0000E+00	.3000E+06	.3816E+00	.6624E+06	.2100E+05
.2200E+05	.0000E+00	.3000E+06	.4303E+00	.7061E+06	.2200E+05
.2300E+05	.0000E+00	.3000E+06	.4824E+00	.7520E+06	.2300E+05
.2400E+05	.0000E+00	.3000E+06	.5391E+00	.7991E+06	.2400E+05



12" sq Pile; 50 ft; Fixed Head; 120 kips
Lateral Load (kips)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
Pile-Head Deflection (in)
▽ Curve #1


12" sq Pile; 50 ft; Fixed; 120 kips
Deflection (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 24000
Load: 25000
Load: 26000
Load: 28000
Load: 30000
Load: 32000
Load: 33000
Load: 34000
Load: 35000



12" sq Pile; 50 ft; Fixed; 120 kips

Licensed to: janet

engeo

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 12" sq Concrete Pile; Axial L=120kips; Fix Head

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N
****

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X IN	DIAMETER IN	MOMENT OF INERTIA IN**4	AREA IN**2	MODULUS OF ELASTICITY LBS/IN**2
.00	12.000	.173E+04	.144E+03	.442E+07
600.00	12.000	.173E+04	.144E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN
X AT THE BOTTOM OF THE LAYER = 360.00 IN
MODULUS OF SUBGRADE REACTION = .300E+02 LBS/IN**3

LAYER 3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER = 360.00 IN
X AT THE BOTTOM OF THE LAYER = 420.00 IN
MODULUS OF SUBGRADE REACTION = .800E+03 LBS/IN**3

LAYER 4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 420.00 IN
X AT THE BOTTOM OF THE LAYER = 480.00 IN
MODULUS OF SUBGRADE REACTION = .100E+03 LBS/IN**3

LAYER 5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = 480.00 IN

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X AT THE BOTTOM OF THE LAYER      =      720.00 IN
MODULUS OF SUBGRADE REACTION      =    .125E+03 LBS/IN**3


DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
                   8 POINTS
           X,IN     WEIGHT,LBS/IN**3
            .00         .67E-01
          60.00         .67E-01
          60.00         .22E-01
         360.00         .22E-01
         360.00         .28E-01
         480.00         .28E-01
         480.00         .30E-01
         720.00         .30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
                  10 POINTS
           X,IN       C,LBS/IN**2      PHI,DEGREES      E50
            .00       .139E+02           .000        .700E-02
          60.00       .139E+02           .000        .700E-02
          60.00       .347E+01           .000        .200E-01
         360.00       .347E+01           .000        .200E-01
         360.00       .139E+02           .000        .500E-02
         420.00       .139E+02           .000        .500E-02
         420.00       .694E+01           .000        .150E-01
         480.00       .694E+01           .000        .150E-01
         480.00       .000E+00         .260E+02      -----
         720.00       .000E+00         .260E+02      -----


BOUNDARY AND LOADING CONDITIONS
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    LOADING NUMBER   1

    BOUNDARY CONDITION CODE                =         2
    LATERAL LOAD AT THE PILE HEAD          =   .240E+05 LBS
    SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
    AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


    LOADING NUMBER   2

    BOUNDARY CONDITION CODE                =         2
    LATERAL LOAD AT THE PILE HEAD          =   .250E+05 LBS
    SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
    AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


    LOADING NUMBER   3

    BOUNDARY CONDITION CODE                =         2
    LATERAL LOAD AT THE PILE HEAD          =   .260E+05 LBS
    SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
    AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


    LOADING NUMBER   4

    BOUNDARY CONDITION CODE                =         2
    LATERAL LOAD AT THE PILE HEAD          =   .330E+05 LBS
    SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
    AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


    LOADING NUMBER   5

    BOUNDARY CONDITION CODE                =         2
    LATERAL LOAD AT THE PILE HEAD          =   .340E+05 LBS
    SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
    AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


    LOADING NUMBER   6

    BOUNDARY CONDITION CODE                =         2
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     LATERAL LOAD AT THE PILE HEAD          =   .350E+05 LBS
     SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
     AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS


  FINITE-DIFFERENCE PARAMETERS
     NUMBER OF PILE INCREMENTS                                 =       100
     DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE          =   .100E-04 IN
     MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS =       100
     MAXIMUM ALLOWABLE DEFLECTION                              =    .10E+03 IN


  OUTPUT CODES
     KOUTPT =  1
     KPYOP  =  0
     INC    =  1



                    O U T P U T   I N F O R M A T I O N
                    ***********************************


              ****************************************************
              * COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
              * CURVES FOR LATERAL LOADING                        *
              ****************************************************



     LOADING NUMBER   1

     BOUNDARY CONDITION CODE                =          2
     LATERAL LOAD AT THE PILE HEAD          =   .240E+05 LBS
     SLOPE AT THE PILE HEAD                 =   .000E+00 IN/IN
     AXIAL LOAD AT THE PILE HEAD            =   .120E+06 LBS
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X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.212E+00	-.807E+06	.240E+05	-.925E-17	.364E+04	.763E+10	-.251E+03
6.0	.210E+00	-.667E+06	.224E+05	-.580E-03	.315E+04	.763E+10	-.273E+03
12.0	.205E+00	-.537E+06	.207E+05	-.105E-02	.270E+04	.763E+10	-.295E+03
18.0	.198E+00	-.417E+06	.189E+05	-.143E-02	.228E+04	.763E+10	-.315E+03
24.0	.188E+00	-.308E+06	.169E+05	-.171E-02	.190E+04	.763E+10	-.334E+03
30.0	.177E+00	-.211E+06	.149E+05	-.192E-02	.157E+04	.763E+10	-.351E+03
36.0	.165E+00	-.127E+06	.127E+05	-.205E-02	.127E+04	.763E+10	-.367E+03
42.0	.153E+00	-.555E+05	.105E+05	-.212E-02	.103E+04	.763E+10	-.381E+03
48.0	.140E+00	.218E+04	.817E+04	-.214E-02	.841E+03	.763E+10	-.394E+03
54.0	.127E+00	.457E+05	.578E+04	-.213E-02	.992E+03	.763E+10	-.405E+03
60.0	.114E+00	.746E+05	.419E+04	-.208E-02	.109E+04	.763E+10	-.123E+03
66.0	.102E+00	.990E+05	.351E+04	-.201E-02	.118E+04	.763E+10	-.104E+03
72.0	.901E-01	.120E+06	.290E+04	-.192E-02	.125E+04	.763E+10	-.996E+02
78.0	.788E-01	.137E+06	.232E+04	-.182E-02	.131E+04	.763E+10	-.953E+02
84.0	.682E-01	.150E+06	.176E+04	-.171E-02	.135E+04	.763E+10	-.908E+02
90.0	.583E-01	.160E+06	.123E+04	-.159E-02	.139E+04	.763E+10	-.862E+02
96.0	.492E-01	.167E+06	.728E+03	-.146E-02	.141E+04	.763E+10	-.814E+02
102.0	.408E-01	.171E+06	.255E+03	-.133E-02	.143E+04	.763E+10	-.765E+02
108.0	.333E-01	.172E+06	-.189E+03	-.119E-02	.143E+04	.763E+10	-.714E+02
114.0	.265E-01	.171E+06	-.602E+03	-.106E-02	.143E+04	.763E+10	-.662E+02
120.0	.206E-01	.166E+06	-.984E+03	-.924E-03	.141E+04	.763E+10	-.609E+02
126.0	.154E-01	.160E+06	-.133E+04	-.796E-03	.139E+04	.763E+10	-.553E+02
132.0	.110E-01	.152E+06	-.165E+04	-.673E-03	.136E+04	.763E+10	-.495E+02
138.0	.735E-02	.141E+06	-.192E+04	-.558E-03	.132E+04	.763E+10	-.432E+02
144.0	.434E-02	.129E+06	-.216E+04	-.452E-03	.128E+04	.763E+10	-.362E+02
150.0	.194E-02	.116E+06	-.236E+04	-.355E-03	.124E+04	.763E+10	-.277E+02
156.0	.776E-04	.102E+06	-.247E+04	-.270E-03	.119E+04	.763E+10	-.940E+01
162.0	-.130E-02	.867E+05	-.242E+04	-.196E-03	.113E+04	.763E+10	.243E+02
168.0	-.227E-02	.728E+05	-.226E+04	-.133E-03	.109E+04	.763E+10	.292E+02
174.0	-.290E-02	.598E+05	-.208E+04	-.808E-04	.104E+04	.763E+10	.317E+02
180.0	-.324E-02	.479E+05	-.189E+04	-.384E-04	.100E+04	.763E+10	.329E+02
186.0	-.336E-02	.372E+05	-.169E+04	-.499E-05	.962E+03	.763E+10	.333E+02

192.0	-.330E-02	.276E+05	-.149E+04	.205E-04	.929E+03	.763E+10	.331E+02
198.0	-.311E-02	.193E+05	-.129E+04	.390E-04	.900E+03	.763E+10	.324E+02
204.0	-.283E-02	.121E+05	-.110E+04	.513E-04	.875E+03	.763E+10	.314E+02
210.0	-.250E-02	.599E+04	-.917E+03	.584E-04	.854E+03	.763E+10	.301E+02
216.0	-.213E-02	.987E+03	-.741E+03	.611E-04	.837E+03	.763E+10	.286E+02
222.0	-.176E-02	-.299E+04	-.574E+03	.603E-04	.844E+03	.763E+10	.268E+02
228.0	-.141E-02	-.599E+04	-.419E+03	.568E-04	.854E+03	.763E+10	.249E+02
234.0	-.108E-02	-.810E+04	-.276E+03	.513E-04	.861E+03	.763E+10	.228E+02
240.0	-.792E-03	-.938E+04	-.146E+03	.444E-04	.866E+03	.763E+10	.205E+02
246.0	-.547E-03	-.991E+04	-.299E+02	.368E-04	.868E+03	.763E+10	.182E+02
252.0	-.350E-03	-.979E+04	.716E+02	.291E-04	.867E+03	.763E+10	.156E+02
258.0	-.198E-03	-.910E+04	.158E+03	.216E-04	.865E+03	.763E+10	.130E+02
264.0	-.901E-04	-.793E+04	.226E+03	.149E-04	.861E+03	.763E+10	.995E+01
270.0	-.191E-04	-.640E+04	.274E+03	.931E-05	.856E+03	.763E+10	.593E+01
276.0	.216E-04	-.465E+04	.274E+03	.496E-05	.849E+03	.763E+10	-.620E+01
282.0	.404E-04	-.313E+04	.232E+03	.190E-05	.844E+03	.763E+10	-.763E+01
288.0	.444E-04	-.187E+04	.186E+03	-.662E-07	.840E+03	.763E+10	-.787E+01
294.0	.396E-04	-.896E+03	.140E+03	-.115E-05	.836E+03	.763E+10	-.757E+01
300.0	.305E-04	-.193E+03	.961E+02	-.158E-05	.834E+03	.763E+10	-.694E+01
306.0	.206E-04	.260E+03	.570E+02	-.156E-05	.834E+03	.763E+10	-.609E+01
312.0	.119E-04	.493E+03	.236E+02	-.126E-05	.835E+03	.763E+10	-.507E+01
318.0	.547E-05	.544E+03	-.339E+01	-.851E-06	.835E+03	.763E+10	-.391E+01
324.0	.164E-05	.454E+03	-.230E+02	-.459E-06	.835E+03	.763E+10	-.262E+01
330.0	-.359E-07	.269E+03	-.285E+02	-.174E-06	.834E+03	.763E+10	.701E+00
336.0	-.447E-06	.112E+03	-.209E+02	-.243E-07	.834E+03	.763E+10	.168E+01
342.0	-.328E-06	.185E+02	-.109E+02	.272E-07	.833E+03	.763E+10	.150E+01
348.0	-.121E-06	-.178E+02	-.240E+01	.274E-07	.833E+03	.763E+10	.105E+01
354.0	.104E-08	-.104E+02	.832E+00	.163E-07	.833E+03	.763E+10	-.287E+00
360.0	.745E-07	-.788E+01	.399E+00	.915E-08	.833E+03	.763E+10	-.530E-02
366.0	.111E-06	-.560E+01	.353E+00	.385E-08	.833E+03	.763E+10	-.829E-02
372.0	.121E-06	-.365E+01	.292E+00	.215E-09	.833E+03	.763E+10	-.951E-02
378.0	.113E-06	-.209E+01	.227E+00	-.204E-08	.833E+03	.763E+10	-.940E-02
384.0	.963E-07	-.917E+00	.166E+00	-.322E-08	.833E+03	.763E+10	-.837E-02
390.0	.747E-07	-.881E-01	.114E+00	-.362E-08	.833E+03	.763E+10	-.681E-02
396.0	.528E-07	.460E+00	.737E-01	-.347E-08	.833E+03	.763E+10	-.503E-02
402.0	.331E-07	.801E+00	.451E-01	-.298E-08	.833E+03	.763E+10	-.329E-02
408.0	.171E-07	.101E+01	.277E-01	-.227E-08	.833E+03	.763E+10	-.177E-02
414.0	.586E-08	.114E+01	.195E-01	-.142E-08	.833E+03	.763E+10	-.631E-03
420.0	.799E-13	.124E+01	-.948E-01	-.488E-09	.833E+03	.763E+10	-.194E-01
426.0	-.899E-13	.550E-04	-.103E+00	-.666E-14	.833E+03	.763E+10	.175E-01
432.0	-.246E-17	-.191E-04	-.459E-05	.749E-14	.833E+03	.763E+10	.132E-05
438.0	.502E-18	-.733E-09	.159E-05	.205E-18	.833E+03	.763E+10	-.268E-06
444.0	.249E-22	.106E-09	.611E-10	-.419E-19	.833E+03	.763E+10	-.133E-10
450.0	-.281E-23	.648E-14	-.887E-11	-.208E-23	.833E+03	.763E+10	.150E-11
456.0	-.202E-27	-.595E-15	-.540E-15	.234E-24	.833E+03	.763E+10	.108E-15
462.0	.157E-28	-.495E-19	.495E-16	.168E-28	.833E+03	.763E+10	-.836E-17
468.0	.148E-32	.332E-20	.412E-20	-.131E-29	.833E+03	.763E+10	-.790E-21
474.0	-.875E-34	.108E-24	-.277E-21	-.219E-33	.833E+03	.763E+10	.467E-22
480.0	-.114E-32	.875E-25	-.337E-26	-.142E-33	.833E+03	.763E+10	.178E-28
486.0	-.179E-32	.680E-25	-.309E-26	-.805E-34	.833E+03	.763E+10	.285E-28
492.0	-.211E-32	.505E-25	-.272E-26	-.339E-34	.833E+03	.763E+10	.344E-28
498.0	-.219E-32	.354E-25	-.230E-26	-.169E-36	.833E+03	.763E+10	.366E-28
504.0	-.211E-32	.229E-25	-.187E-26	.227E-34	.833E+03	.763E+10	.360E-28
510.0	-.192E-32	.129E-25	-.146E-26	.368E-34	.833E+03	.763E+10	.335E-28
516.0	-.167E-32	.528E-26	-.108E-26	.439E-34	.833E+03	.763E+10	.298E-28
522.0	-.139E-32	-.202E-27	-.758E-27	.459E-34	.833E+03	.763E+10	.254E-28
528.0	-.112E-32	-.388E-26	-.485E-27	.443E-34	.833E+03	.763E+10	.208E-28
534.0	-.863E-33	-.608E-26	-.265E-27	.404E-34	.833E+03	.763E+10	.164E-28
540.0	-.635E-33	-.712E-26	-.953E-28	.352E-34	.833E+03	.763E+10	.123E-28
546.0	-.440E-33	-.728E-26	.288E-28	.295E-34	.833E+03	.763E+10	.869E-29
552.0	-.280E-33	-.682E-26	.114E-27	.240E-34	.833E+03	.763E+10	.564E-29
558.0	-.152E-33	-.595E-26	.165E-27	.190E-34	.833E+03	.763E+10	.312E-29
564.0	-.526E-34	-.486E-26	.190E-27	.147E-34	.833E+03	.763E+10	.110E-29
570.0	.243E-34	-.368E-26	.194E-27	.114E-34	.833E+03	.763E+10	-.517E-30
576.0	.838E-34	-.255E-26	.180E-27	.892E-35	.833E+03	.763E+10	-.181E-29
582.0	.131E-33	-.154E-26	.152E-27	.731E-35	.833E+03	.763E+10	-.289E-29
588.0	.172E-33	-.730E-27	.112E-27	.642E-35	.833E+03	.763E+10	-.384E-29
594.0	.208E-33	-.197E-27	.616E-28	.606E-35	.833E+03	.763E+10	-.475E-29
600.0	.244E-33	.000E+00	.000E+00	.598E-35	.833E+03	.763E+10	-.566E-29

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.250E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.287E-08 LBS

OUTPUT SUMMARY

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PILE-HEAD DEFLECTION              =   .212E+00 IN
COMPUTED SLOPE AT PILE HEAD       =  -.925E-17
MAXIMUM BENDING MOMENT            =  -.807E+06 LBS-IN
MAXIMUM SHEAR FORCE               =   .240E+05 LBS
NO. OF ITERATIONS                 =        27
NO. OF ZERO DEFLECTION POINTS     =        10
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LOADING NUMBER 2

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BOUNDARY CONDITION CODE               =          2
LATERAL LOAD AT THE PILE HEAD         =   .250E+05 LBS
SLOPE AT THE PILE HEAD                =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD           =   .120E+06 LBS
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X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.236E+00	-.857E+06	.250E+05	-.116E-16	.381E+04	.763E+10	-.257E+03
6.0	.234E+00	-.711E+06	.234E+05	-.616E-03	.330E+04	.763E+10	-.281E+03
12.0	.228E+00	-.575E+06	.216E+05	-.112E-02	.283E+04	.763E+10	-.303E+03
18.0	.220E+00	-.450E+06	.198E+05	-.152E-02	.239E+04	.763E+10	-.324E+03
24.0	.210E+00	-.336E+06	.178E+05	-.183E-02	.200E+04	.763E+10	-.343E+03
30.0	.198E+00	-.234E+06	.156E+05	-.206E-02	.165E+04	.763E+10	-.361E+03
36.0	.185E+00	-.145E+06	.134E+05	-.221E-02	.134E+04	.763E+10	-.377E+03
42.0	.172E+00	-.696E+05	.111E+05	-.229E-02	.108E+04	.763E+10	-.392E+03
48.0	.158E+00	-.832E+04	.872E+04	-.232E-02	.862E+03	.763E+10	-.406E+03
54.0	.144E+00	.384E+05	.625E+04	-.231E-02	.967E+03	.763E+10	-.418E+03
60.0	.130E+00	.700E+05	.461E+04	-.227E-02	.108E+04	.763E+10	-.128E+03
66.0	.117E+00	.970E+05	.390E+04	-.220E-02	.117E+04	.763E+10	-.109E+03
72.0	.104E+00	.120E+06	.326E+04	-.212E-02	.125E+04	.763E+10	-.104E+03
78.0	.914E-01	.139E+06	.265E+04	-.201E-02	.132E+04	.763E+10	-.100E+03
84.0	.796E-01	.155E+06	.206E+04	-.190E-02	.137E+04	.763E+10	-.956E+02
90.0	.686E-01	.167E+06	.150E+04	-.177E-02	.141E+04	.763E+10	-.909E+02
96.0	.583E-01	.175E+06	.974E+03	-.164E-02	.144E+04	.763E+10	-.862E+02
102.0	.489E-01	.181E+06	.471E+03	-.150E-02	.146E+04	.763E+10	-.813E+02
108.0	.404E-01	.183E+06	-.122E+01	-.135E-02	.147E+04	.763E+10	-.762E+02
114.0	.327E-01	.183E+06	-.443E+03	-.121E-02	.147E+04	.763E+10	-.710E+02
120.0	.258E-01	.180E+06	-.853E+03	-.107E-02	.146E+04	.763E+10	-.657E+02
126.0	.199E-01	.174E+06	-.123E+04	-.929E-03	.144E+04	.763E+10	-.602E+02
132.0	.147E-01	.166E+06	-.157E+04	-.795E-03	.141E+04	.763E+10	-.544E+02
138.0	.103E-01	.156E+06	-.188E+04	-.669E-03	.138E+04	.763E+10	-.484E+02
144.0	.667E-02	.145E+06	-.215E+04	-.550E-03	.134E+04	.763E+10	-.418E+02
150.0	.371E-02	.131E+06	-.238E+04	-.442E-03	.129E+04	.763E+10	-.344E+02
156.0	.137E-02	.117E+06	-.256E+04	-.344E-03	.124E+04	.763E+10	-.247E+02
162.0	-.419E-03	.101E+06	-.258E+04	-.259E-03	.118E+04	.763E+10	.167E+02
168.0	-.173E-02	.860E+05	-.245E+04	-.185E-03	.113E+04	.763E+10	.267E+02
174.0	-.264E-02	.718E+05	-.228E+04	-.123E-03	.108E+04	.763E+10	.307E+02
180.0	-.321E-02	.588E+05	-.209E+04	-.717E-04	.104E+04	.763E+10	.328E+02
186.0	-.350E-02	.468E+05	-.189E+04	-.302E-04	.996E+03	.763E+10	.337E+02
192.0	-.357E-02	.361E+05	-.169E+04	.240E-05	.959E+03	.763E+10	.340E+02
198.0	-.347E-02	.266E+05	-.149E+04	.270E-04	.926E+03	.763E+10	.336E+02
204.0	-.325E-02	.182E+05	-.129E+04	.447E-04	.897E+03	.763E+10	.329E+02
210.0	-.294E-02	.111E+05	-.109E+04	.562E-04	.872E+03	.763E+10	.318E+02
216.0	-.257E-02	.504E+04	-.906E+03	.625E-04	.851E+03	.763E+10	.305E+02
222.0	-.219E-02	.101E+03	-.728E+03	.645E-04	.834E+03	.763E+10	.288E+02
228.0	-.180E-02	-.380E+04	-.561E+03	.631E-04	.847E+03	.763E+10	.270E+02
234.0	-.143E-02	-.672E+04	-.404E+03	.589E-04	.857E+03	.763E+10	.250E+02
240.0	-.109E-02	-.873E+04	-.261E+03	.529E-04	.864E+03	.763E+10	.229E+02
246.0	-.796E-03	-.992E+04	-.130E+03	.455E-04	.868E+03	.763E+10	.206E+02
252.0	-.546E-03	-.104E+05	-.140E+02	.376E-04	.869E+03	.763E+10	.182E+02
258.0	-.345E-03	-.101E+05	.872E+02	.295E-04	.869E+03	.763E+10	.156E+02
264.0	-.192E-03	-.936E+04	.172E+03	.218E-04	.866E+03	.763E+10	.128E+02
270.0	-.835E-04	-.810E+04	.240E+03	.150E-04	.861E+03	.763E+10	.971E+01
276.0	-.128E-04	-.650E+04	.285E+03	.922E-05	.856E+03	.763E+10	.519E+01
282.0	.272E-04	-.470E+04	.280E+03	.482E-05	.850E+03	.763E+10	-.668E+01
288.0	.450E-04	-.314E+04	.237E+03	.174E-05	.844E+03	.763E+10	-.790E+01
294.0	.480E-04	-.186E+04	.189E+03	-.229E-06	.840E+03	.763E+10	-.808E+01
300.0	.423E-04	-.871E+03	.141E+03	-.130E-05	.836E+03	.763E+10	-.774E+01
306.0	.324E-04	-.161E+03	.970E+02	-.171E-05	.834E+03	.763E+10	-.708E+01
312.0	.218E-04	.295E+03	.572E+02	-.166E-05	.834E+03	.763E+10	-.620E+01
318.0	.125E-04	.528E+03	.231E+02	-.133E-05	.835E+03	.763E+10	-.516E+01

324.0	.577E-05	.575E+03	-.429E+01	-.899E-06	.835E+03	.763E+10	-.398E+01
330.0	.173E-05	.478E+03	-.242E+02	-.485E-06	.835E+03	.763E+10	-.267E+01
336.0	-.505E-07	.285E+03	-.297E+02	-.185E-06	.834E+03	.763E+10	.807E+00
342.0	-.489E-06	.122E+03	-.218E+02	-.252E-07	.834E+03	.763E+10	.174E+01
348.0	-.353E-06	.226E+02	-.117E+02	.316E-07	.833E+03	.763E+10	.155E+01
354.0	-.110E-06	-.183E+02	-.308E+01	.333E-07	.833E+03	.763E+10	.986E+00
360.0	.462E-07	-.144E+02	.634E+00	.204E-07	.833E+03	.763E+10	-.570E-02
366.0	.135E-06	-.107E+02	.588E+00	.105E-07	.833E+03	.763E+10	-.135E-01
372.0	.172E-06	-.738E+01	.507E+00	.341E-08	.833E+03	.763E+10	-.173E-01
378.0	.176E-06	-.462E+01	.411E+00	-.131E-08	.833E+03	.763E+10	-.182E-01
384.0	.157E-06	-.245E+01	.314E+00	-.409E-08	.833E+03	.763E+10	-.168E-01
390.0	.126E-06	-.842E+00	.228E+00	-.538E-08	.833E+03	.763E+10	-.141E-01
396.0	.922E-07	.292E+00	.158E+00	-.560E-08	.833E+03	.763E+10	-.107E-01
402.0	.593E-07	.106E+01	.108E+00	-.507E-08	.833E+03	.763E+10	-.711E-02
408.0	.314E-07	.159E+01	.764E-01	-.402E-08	.833E+03	.763E+10	-.390E-02
414.0	.110E-07	.199E+01	.611E-01	-.261E-08	.833E+03	.763E+10	-.142E-02
420.0	.179E-11	.233E+01	-.166E+00	-.917E-09	.833E+03	.763E+10	-.650E-01
426.0	-.188E-11	.118E-02	-.194E+00	-.149E-12	.833E+03	.763E+10	.584E-01
432.0	-.521E-16	-.399E-03	-.982E-04	.157E-12	.833E+03	.763E+10	.493E-04
438.0	.105E-16	-.155E-07	.333E-04	.434E-17	.833E+03	.763E+10	-.100E-04
444.0	.526E-21	.223E-08	.129E-08	-.877E-18	.833E+03	.763E+10	-.499E-09
450.0	-.588E-22	.136E-12	-.186E-09	-.439E-22	.833E+03	.763E+10	.560E-10
456.0	-.426E-26	-.125E-13	-.114E-13	.490E-23	.833E+03	.763E+10	.404E-14
462.0	.329E-27	-.104E-17	.104E-14	.355E-27	.833E+03	.763E+10	-.313E-15
468.0	.311E-31	.696E-19	.868E-19	-.274E-28	.833E+03	.763E+10	-.296E-19
474.0	-.184E-32	.228E-23	-.580E-20	-.460E-32	.833E+03	.763E+10	.175E-20
480.0	-.241E-31	.184E-23	-.708E-25	-.298E-32	.833E+03	.763E+10	.665E-27
486.0	-.376E-31	.143E-23	-.651E-25	-.169E-32	.833E+03	.763E+10	.107E-26
492.0	-.444E-31	.106E-23	-.572E-25	-.714E-33	.833E+03	.763E+10	.129E-26
498.0	-.461E-31	.744E-24	-.484E-25	-.368E-35	.833E+03	.763E+10	.137E-26
504.0	-.444E-31	.481E-24	-.394E-25	.478E-33	.833E+03	.763E+10	.135E-26
510.0	-.404E-31	.271E-24	-.307E-25	.773E-33	.833E+03	.763E+10	.125E-26
516.0	-.351E-31	.111E-24	-.228E-25	.924E-33	.833E+03	.763E+10	.111E-26
522.0	-.293E-31	-.422E-26	-.160E-25	.966E-33	.833E+03	.763E+10	.950E-27
528.0	-.235E-31	-.816E-25	-.102E-25	.932E-33	.833E+03	.763E+10	.779E-27
534.0	-.181E-31	-.128E-24	-.557E-26	.849E-33	.833E+03	.763E+10	.612E-27
540.0	-.134E-31	-.150E-24	-.200E-26	.740E-33	.833E+03	.763E+10	.460E-27
546.0	-.926E-32	-.153E-24	.606E-27	.621E-33	.833E+03	.763E+10	.325E-27
552.0	-.590E-32	-.143E-24	.239E-26	.505E-33	.833E+03	.763E+10	.211E-27
558.0	-.321E-32	-.125E-24	.348E-26	.399E-33	.833E+03	.763E+10	.117E-27
564.0	-.111E-32	-.102E-24	.401E-26	.310E-33	.833E+03	.763E+10	.411E-28
570.0	.511E-33	-.775E-25	.408E-26	.239E-33	.833E+03	.763E+10	-.193E-28
576.0	.176E-32	-.536E-25	.379E-26	.188E-33	.833E+03	.763E+10	-.679E-28
582.0	.276E-32	-.323E-25	.320E-26	.154E-33	.833E+03	.763E+10	-.108E-27
588.0	.361E-32	-.154E-25	.236E-26	.135E-33	.833E+03	.763E+10	-.144E-27
594.0	.438E-32	-.413E-26	.129E-26	.127E-33	.833E+03	.763E+10	-.178E-27
600.0	.514E-32	.000E+00	.000E+00	.126E-33	.833E+03	.763E+10	-.212E-27

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .214E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .267E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .236E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.116E-16
MAXIMUM BENDING MOMENT = -.857E+06 LBS-IN
MAXIMUM SHEAR FORCE = .250E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .260E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X DEFLECTION MOMENT SHEAR SLOPE TOTAL FLEXURAL SOIL

					STRESS	RIGIDITY	REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.261E+00	-.907E+06	.260E+05	-.185E-16	.398E+04	.763E+10	-.264E+03
6.0	.259E+00	-.756E+06	.243E+05	-.654E-03	.346E+04	.763E+10	-.288E+03
12.0	.253E+00	-.614E+06	.225E+05	-.119E-02	.297E+04	.763E+10	-.311E+03
18.0	.244E+00	-.483E+06	.206E+05	-.162E-02	.251E+04	.763E+10	-.332E+03
24.0	.233E+00	-.364E+06	.186E+05	-.196E-02	.210E+04	.763E+10	-.352E+03
30.0	.221E+00	-.258E+06	.164E+05	-.220E-02	.173E+04	.763E+10	-.371E+03
36.0	.207E+00	-.164E+06	.141E+05	-.237E-02	.140E+04	.763E+10	-.388E+03
42.0	.192E+00	-.849E+05	.117E+05	-.247E-02	.113E+04	.763E+10	-.404E+03
48.0	.177E+00	-.199E+05	.929E+04	-.251E-02	.902E+03	.763E+10	-.418E+03
54.0	.162E+00	.301E+05	.674E+04	-.250E-02	.938E+03	.763E+10	-.430E+03
60.0	.147E+00	.646E+05	.505E+04	-.247E-02	.106E+04	.763E+10	-.134E+03
66.0	.133E+00	.942E+05	.431E+04	-.240E-02	.116E+04	.763E+10	-.113E+03
72.0	.118E+00	.120E+06	.364E+04	-.232E-02	.125E+04	.763E+10	-.109E+03
78.0	.105E+00	.141E+06	.300E+04	-.222E-02	.132E+04	.763E+10	-.105E+03
84.0	.918E-01	.159E+06	.238E+04	-.210E-02	.139E+04	.763E+10	-.100E+03
90.0	.796E-01	.173E+06	.180E+04	-.197E-02	.143E+04	.763E+10	-.956E+02
96.0	.682E-01	.183E+06	.124E+04	-.183E-02	.147E+04	.763E+10	-.908E+02
102.0	.576E-01	.190E+06	.707E+03	-.168E-02	.149E+04	.763E+10	-.858E+02
108.0	.480E-01	.194E+06	.208E+03	-.153E-02	.151E+04	.763E+10	-.807E+02
114.0	.393E-01	.195E+06	-.261E+03	-.138E-02	.151E+04	.763E+10	-.755E+02
120.0	.315E-01	.193E+06	-.698E+03	-.122E-02	.150E+04	.763E+10	-.701E+02
126.0	.246E-01	.188E+06	-.110E+04	-.107E-02	.149E+04	.763E+10	-.646E+02
132.0	.186E-01	.181E+06	-.147E+04	-.929E-03	.146E+04	.763E+10	-.588E+02
138.0	.134E-01	.172E+06	-.181E+04	-.790E-03	.143E+04	.763E+10	-.528E+02
144.0	.909E-02	.161E+06	-.211E+04	-.659E-03	.139E+04	.763E+10	-.464E+02
150.0	.551E-02	.148E+06	-.236E+04	-.538E-03	.135E+04	.763E+10	-.392E+02
156.0	.263E-02	.133E+06	-.257E+04	-.428E-03	.130E+04	.763E+10	-.307E+02
162.0	.382E-03	.118E+06	-.271E+04	-.329E-03	.124E+04	.763E+10	-.161E+02
168.0	-.131E-02	.101E+06	-.269E+04	-.243E-03	.118E+04	.763E+10	.243E+02
174.0	-.253E-02	.856E+05	-.252E+04	-.169E-03	.113E+04	.763E+10	.303E+02
180.0	-.335E-02	.711E+05	-.233E+04	-.108E-03	.108E+04	.763E+10	.332E+02
186.0	-.383E-02	.578E+05	-.213E+04	-.571E-04	.103E+04	.763E+10	.348E+02
192.0	-.403E-02	.456E+05	-.192E+04	-.165E-04	.992E+03	.763E+10	.354E+02
198.0	-.402E-02	.348E+05	-.171E+04	.152E-04	.954E+03	.763E+10	.353E+02
204.0	-.385E-02	.251E+05	-.150E+04	.387E-04	.921E+03	.763E+10	.348E+02
210.0	-.356E-02	.167E+05	-.129E+04	.552E-04	.891E+03	.763E+10	.339E+02
216.0	-.319E-02	.956E+04	-.109E+04	.655E-04	.867E+03	.763E+10	.327E+02
222.0	-.277E-02	.355E+04	-.900E+03	.707E-04	.846E+03	.763E+10	.312E+02
228.0	-.234E-02	-.134E+04	-.718E+03	.715E-04	.838E+03	.763E+10	.295E+02
234.0	-.191E-02	-.517E+04	-.546E+03	.690E-04	.851E+03	.763E+10	.276E+02
240.0	-.151E-02	-.800E+04	-.387E+03	.638E-04	.861E+03	.763E+10	.255E+02
246.0	-.115E-02	-.990E+04	-.241E+03	.568E-04	.868E+03	.763E+10	.233E+02
252.0	-.831E-03	-.110E+05	-.108E+03	.486E-04	.871E+03	.763E+10	.209E+02
258.0	-.566E-03	-.113E+05	.947E+01	.398E-04	.872E+03	.763E+10	.184E+02
264.0	-.354E-03	-.109E+05	.112E+03	.311E-04	.871E+03	.763E+10	.157E+02
270.0	-.193E-03	-.998E+04	.197E+03	.229E-04	.868E+03	.763E+10	.128E+02
276.0	-.792E-04	-.858E+04	.265E+03	.156E-04	.863E+03	.763E+10	.954E+01
282.0	-.593E-05	-.683E+04	.305E+03	.952E-05	.857E+03	.763E+10	.401E+01
288.0	.351E-04	-.493E+04	.296E+03	.490E-05	.850E+03	.763E+10	-.728E+01
294.0	.529E-04	-.329E+04	.249E+03	.167E-05	.845E+03	.763E+10	-.834E+01
300.0	.551E-04	-.194E+04	.198E+03	-.387E-06	.840E+03	.763E+10	-.846E+01
306.0	.482E-04	-.905E+03	.149E+03	-.151E-05	.836E+03	.763E+10	-.809E+01
312.0	.370E-04	-.157E+03	.102E+03	-.193E-05	.834E+03	.763E+10	-.740E+01
318.0	.251E-04	.325E+03	.605E+02	-.186E-05	.834E+03	.763E+10	-.650E+01
324.0	.147E-04	.572E+03	.246E+02	-.151E-05	.835E+03	.763E+10	-.544E+01
330.0	.703E-05	.623E+03	-.449E+01	-.104E-05	.835E+03	.763E+10	-.425E+01
336.0	.228E-05	.520E+03	-.261E+02	-.588E-06	.835E+03	.763E+10	-.292E+01
342.0	-.249E-07	.311E+03	-.320E+02	-.261E-06	.834E+03	.763E+10	.540E+00
348.0	-.858E-06	.136E+03	-.228E+02	-.856E-07	.834E+03	.763E+10	.209E+01
354.0	-.105E-05	.378E+02	-.933E+01	-.175E-07	.833E+03	.763E+10	.223E+01
360.0	-.107E-05	.236E+02	-.211E+01	.671E-08	.833E+03	.763E+10	.822E-01
366.0	-.972E-06	.125E+02	-.160E+01	.209E-07	.833E+03	.763E+10	.792E-01
372.0	-.817E-06	.437E+01	-.114E+01	.276E-07	.833E+03	.763E+10	.702E-01
378.0	-.641E-06	-.114E+01	-.733E+00	.288E-07	.833E+03	.763E+10	.579E-01
384.0	-.471E-06	-.447E+01	-.410E+00	.266E-07	.833E+03	.763E+10	.446E-01
390.0	-.321E-06	-.610E+01	-.169E+00	.225E-07	.833E+03	.763E+10	.319E-01
396.0	-.201E-06	-.653E+01	-.321E-02	.175E-07	.833E+03	.763E+10	.208E-01
402.0	-.111E-06	-.617E+01	.100E+00	.125E-07	.833E+03	.763E+10	.120E-01
408.0	-.504E-07	-.535E+01	.156E+00	.800E-08	.833E+03	.763E+10	.568E-02
414.0	-.151E-07	-.430E+01	.180E+00	.420E-08	.833E+03	.763E+10	.176E-02
420.0	-.482E-12	-.319E+01	.359E+00	.126E-08	.833E+03	.763E+10	.383E-01
426.0	.137E-11	-.682E-03	.266E+00	.402E-13	.833E+03	.763E+10	-.425E-01
432.0	.333E-16	.290E-03	.568E-04	-.114E-12	.833E+03	.763E+10	-.173E-04
438.0	-.765E-17	.103E-07	-.242E-04	-.277E-17	.833E+03	.763E+10	.386E-05
444.0	-.357E-21	-.162E-08	-.858E-09	.637E-18	.833E+03	.763E+10	.183E-09
450.0	.427E-22	-.937E-13	.135E-09	.297E-22	.833E+03	.763E+10	-.216E-10

456.0	.295E-26	.905E-14	.781E-14	-.356E-23	.833E+03	.763E+10	-.151E-14
462.0	-.239E-27	.726E-18	-.754E-15	-.246E-27	.833E+03	.763E+10	.120E-15
468.0	-.218E-31	-.505E-19	-.605E-19	.199E-28	.833E+03	.763E+10	.111E-19
474.0	.133E-32	-.160E-23	.421E-20	.323E-32	.833E+03	.763E+10	-.673E-21
480.0	.169E-31	-.129E-23	.498E-25	.209E-32	.833E+03	.763E+10	-.251E-27
486.0	.264E-31	-.100E-23	.457E-25	.119E-32	.833E+03	.763E+10	-.401E-27
492.0	.312E-31	-.745E-24	.402E-25	.500E-33	.833E+03	.763E+10	-.485E-27
498.0	.324E-31	-.522E-24	.340E-25	.166E-35	.833E+03	.763E+10	-.516E-27
504.0	.312E-31	-.337E-24	.276E-25	-.336E-33	.833E+03	.763E+10	-.507E-27
510.0	.284E-31	-.190E-24	.216E-25	-.544E-33	.833E+03	.763E+10	-.472E-27
516.0	.247E-31	-.779E-25	.160E-25	-.649E-33	.833E+03	.763E+10	-.419E-27
522.0	.206E-31	.311E-26	.112E-25	-.678E-33	.833E+03	.763E+10	-.357E-27
528.0	.165E-31	.575E-25	.716E-26	-.655E-33	.833E+03	.763E+10	-.293E-27
534.0	.127E-31	.899E-25	.391E-26	-.597E-33	.833E+03	.763E+10	-.230E-27
540.0	.937E-32	.105E-24	.140E-26	-.520E-33	.833E+03	.763E+10	-.173E-27
546.0	.650E-32	.108E-24	-.429E-27	-.436E-33	.833E+03	.763E+10	-.122E-27
552.0	.414E-32	.101E-24	-.168E-26	-.354E-33	.833E+03	.763E+10	-.793E-28
558.0	.225E-32	.879E-25	-.245E-26	-.280E-33	.833E+03	.763E+10	-.439E-28
564.0	.775E-33	.717E-25	-.281E-26	-.217E-33	.833E+03	.763E+10	-.154E-28
570.0	-.361E-33	.544E-25	-.286E-26	-.168E-33	.833E+03	.763E+10	.730E-29
576.0	-.124E-32	.376E-25	-.266E-26	-.132E-33	.833E+03	.763E+10	.255E-28
582.0	-.194E-32	.227E-25	-.225E-26	-.108E-33	.833E+03	.763E+10	.407E-28
588.0	-.254E-32	.108E-25	-.166E-26	-.948E-34	.833E+03	.763E+10	.541E-28
594.0	-.308E-32	.290E-26	-.909E-27	-.894E-34	.833E+03	.763E+10	.668E-28
600.0	-.361E-32	.000E+00	.000E+00	-.883E-34	.833E+03	.763E+10	.796E-28

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.770E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .624E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .261E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.185E-16
MAXIMUM BENDING MOMENT = -.907E+06 LBS-IN
MAXIMUM SHEAR FORCE = .260E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.480E+00	-.129E+07	.330E+05	.000E+00	.531E+04	.763E+10	-.307E+03
6.0	.477E+00	-.110E+07	.311E+05	-.938E-03	.464E+04	.763E+10	-.335E+03
12.0	.468E+00	-.915E+06	.290E+05	-.173E-02	.401E+04	.763E+10	-.362E+03
18.0	.456E+00	-.746E+06	.267E+05	-.238E-02	.342E+04	.763E+10	-.388E+03
24.0	.440E+00	-.590E+06	.243E+05	-.291E-02	.288E+04	.763E+10	-.413E+03
30.0	.421E+00	-.450E+06	.218E+05	-.332E-02	.239E+04	.763E+10	-.436E+03
36.0	.400E+00	-.324E+06	.191E+05	-.362E-02	.196E+04	.763E+10	-.458E+03
42.0	.378E+00	-.215E+06	.163E+05	-.383E-02	.158E+04	.763E+10	-.478E+03
48.0	.354E+00	-.123E+06	.134E+05	-.396E-02	.126E+04	.763E+10	-.497E+03
54.0	.330E+00	-.490E+05	.103E+05	-.403E-02	.100E+04	.763E+10	-.514E+03
60.0	.306E+00	.667E+04	.828E+04	-.405E-02	.856E+03	.763E+10	-.171E+03
66.0	.281E+00	.562E+05	.734E+04	-.402E-02	.103E+04	.763E+10	-.146E+03
72.0	.257E+00	.100E+06	.647E+04	-.396E-02	.118E+04	.763E+10	-.141E+03
78.0	.234E+00	.140E+06	.564E+04	-.387E-02	.132E+04	.763E+10	-.137E+03
84.0	.211E+00	.174E+06	.483E+04	-.375E-02	.144E+04	.763E+10	-.132E+03
90.0	.189E+00	.203E+06	.405E+04	-.360E-02	.154E+04	.763E+10	-.127E+03
96.0	.168E+00	.228E+06	.330E+04	-.343E-02	.162E+04	.763E+10	-.123E+03
102.0	.148E+00	.248E+06	.258E+04	-.324E-02	.169E+04	.763E+10	-.117E+03
108.0	.129E+00	.263E+06	.189E+04	-.304E-02	.175E+04	.763E+10	-.112E+03

114.0	.111E+00	.275E+06	.124E+04	-.283E-02	.179E+04	.763E+10	-.107E+03
120.0	.951E-01	.282E+06	.611E+03	-.261E-02	.181E+04	.763E+10	-.101E+03
126.0	.801E-01	.286E+06	.199E+02	-.239E-02	.183E+04	.763E+10	-.957E+02
132.0	.664E-01	.286E+06	-.537E+03	-.216E-02	.183E+04	.763E+10	-.900E+02
138.0	.541E-01	.282E+06	-.106E+04	-.194E-02	.181E+04	.763E+10	-.840E+02
144.0	.432E-01	.276E+06	-.155E+04	-.172E-02	.179E+04	.763E+10	-.779E+02
150.0	.335E-01	.266E+06	-.199E+04	-.151E-02	.176E+04	.763E+10	-.716E+02
156.0	.251E-01	.254E+06	-.240E+04	-.130E-02	.172E+04	.763E+10	-.650E+02
162.0	.179E-01	.239E+06	-.277E+04	-.111E-02	.166E+04	.763E+10	-.581E+02
168.0	.118E-01	.222E+06	-.310E+04	-.925E-03	.161E+04	.763E+10	-.506E+02
174.0	.679E-02	.204E+06	-.338E+04	-.758E-03	.154E+04	.763E+10	-.421E+02
180.0	.272E-02	.183E+06	-.360E+04	-.606E-03	.147E+04	.763E+10	-.310E+02
186.0	-.478E-03	.161E+06	-.364E+04	-.470E-03	.139E+04	.763E+10	.174E+02
192.0	-.292E-02	.140E+06	-.349E+04	-.352E-03	.132E+04	.763E+10	.318E+02
198.0	-.470E-02	.120E+06	-.328E+04	-.250E-03	.125E+04	.763E+10	.372E+02
204.0	-.591E-02	.101E+06	-.305E+04	-.163E-03	.118E+04	.763E+10	.402E+02
210.0	-.665E-02	.835E+05	-.281E+04	-.903E-04	.112E+04	.763E+10	.418E+02
216.0	-.700E-02	.674E+05	-.255E+04	-.309E-04	.107E+04	.763E+10	.425E+02
222.0	-.702E-02	.529E+05	-.230E+04	.164E-04	.102E+04	.763E+10	.425E+02
228.0	-.680E-02	.398E+05	-.204E+04	.528E-04	.972E+03	.763E+10	.421E+02
234.0	-.639E-02	.282E+05	-.179E+04	.796E-04	.931E+03	.763E+10	.412E+02
240.0	-.585E-02	.182E+05	-.155E+04	.978E-04	.896E+03	.763E+10	.400E+02
246.0	-.522E-02	.950E+04	-.132E+04	.109E-03	.866E+03	.763E+10	.385E+02
252.0	-.454E-02	.222E+04	-.109E+04	.113E-03	.841E+03	.763E+10	.368E+02
258.0	-.386E-02	-.374E+04	-.874E+03	.113E-03	.846E+03	.763E+10	.348E+02
264.0	-.319E-02	-.844E+04	-.672E+03	.108E-03	.863E+03	.763E+10	.327E+02
270.0	-.256E-02	-.120E+05	-.483E+03	.999E-04	.875E+03	.763E+10	.304E+02
276.0	-.199E-02	-.144E+05	-.308E+03	.895E-04	.883E+03	.763E+10	.279E+02
282.0	-.149E-02	-.158E+05	-.148E+03	.777E-04	.888E+03	.763E+10	.254E+02
288.0	-.106E-02	-.163E+05	-.363E+01	.651E-04	.890E+03	.763E+10	.226E+02
294.0	-.706E-03	-.159E+05	.124E+03	.525E-04	.889E+03	.763E+10	.198E+02
300.0	-.429E-03	-.148E+05	.233E+03	.404E-04	.885E+03	.763E+10	.168E+02
306.0	-.221E-03	-.132E+05	.324E+03	.293E-04	.879E+03	.763E+10	.134E+02
312.0	-.764E-04	-.110E+05	.392E+03	.198E-04	.872E+03	.763E+10	.943E+01
318.0	.167E-04	-.849E+04	.403E+03	.122E-04	.863E+03	.763E+10	-.566E+01
324.0	.697E-04	-.618E+04	.359E+03	.641E-05	.855E+03	.763E+10	-.914E+01
330.0	.936E-04	-.419E+04	.301E+03	.233E-05	.848E+03	.763E+10	-.101E+02
336.0	.977E-04	-.257E+04	.240E+03	-.327E-06	.842E+03	.763E+10	-.102E+02
342.0	.896E-04	-.131E+04	.180E+03	-.185E-05	.838E+03	.763E+10	-.994E+01
348.0	.754E-04	-.409E+03	.122E+03	-.253E-05	.835E+03	.763E+10	-.939E+01
354.0	.593E-04	.154E+03	.675E+02	-.263E-05	.834E+03	.763E+10	-.866E+01
360.0	.439E-04	.405E+03	.309E+02	-.241E-05	.835E+03	.763E+10	-.352E+01
366.0	.304E-04	.528E+03	.126E+02	-.204E-05	.835E+03	.763E+10	-.259E+01
372.0	.194E-04	.559E+03	-.431E+00	-.161E-05	.835E+03	.763E+10	-.174E+01
378.0	.111E-04	.526E+03	-.881E+01	-.119E-05	.835E+03	.763E+10	-.105E+01
384.0	.517E-05	.455E+03	-.135E+02	-.801E-06	.835E+03	.763E+10	-.514E+00
390.0	.144E-05	.365E+03	-.155E+02	-.479E-06	.835E+03	.763E+10	-.150E+00
396.0	-.577E-06	.270E+03	-.157E+02	-.230E-06	.834E+03	.763E+10	.627E-01
402.0	-.132E-05	.176E+03	-.151E+02	-.542E-07	.834E+03	.763E+10	.150E+00
408.0	-.123E-05	.884E+02	-.142E+02	.499E-07	.834E+03	.763E+10	.145E+00
414.0	-.720E-06	.564E+01	-.135E+02	.868E-07	.833E+03	.763E+10	.887E-01
420.0	-.186E-06	-.739E+02	-.364E+01	.600E-07	.834E+03	.763E+10	.319E+01
426.0	-.148E-14	-.382E+02	.597E+01	.159E-07	.833E+03	.763E+10	-.118E-01
432.0	.549E-08	-.233E+01	.328E+01	.629E-12	.833E+03	.763E+10	-.846E+00
438.0	.755E-11	.116E+01	.194E+00	-.458E-09	.833E+03	.763E+10	-.827E-01
444.0	-.135E-12	.166E-02	-.968E-01	-.629E-12	.833E+03	.763E+10	.221E-01
450.0	-.452E-16	-.285E-04	-.138E-03	.112E-13	.833E+03	.763E+10	.306E-04
456.0	.751E-18	-.990E-08	.238E-05	.377E-17	.833E+03	.763E+10	-.544E-06
462.0	.269E-21	.159E-09	.825E-09	-.626E-19	.833E+03	.763E+10	-.183E-09
468.0	-.419E-23	.588E-13	-.133E-10	-.224E-22	.833E+03	.763E+10	.304E-11
474.0	-.156E-26	-.286E-15	-.492E-14	.586E-24	.833E+03	.763E+10	.107E-14
480.0	.284E-23	-.232E-15	.883E-17	.382E-24	.833E+03	.763E+10	-.599E-19
486.0	.458E-23	-.181E-15	.814E-17	.220E-24	.833E+03	.763E+10	-.991E-19
492.0	.547E-23	-.135E-15	.718E-17	.955E-25	.833E+03	.763E+10	-.121E-18
498.0	.573E-23	-.948E-16	.609E-17	.534E-26	.833E+03	.763E+10	-.130E-18
504.0	.554E-23	-.616E-16	.496E-17	-.561E-25	.833E+03	.763E+10	-.128E-18
510.0	.505E-23	-.351E-16	.388E-17	-.942E-25	.833E+03	.763E+10	-.120E-18
516.0	.441E-23	-.149E-16	.289E-17	-.114E-24	.833E+03	.763E+10	-.107E-18
522.0	.369E-23	-.256E-18	.203E-17	-.120E-24	.833E+03	.763E+10	-.911E-19
528.0	.297E-23	.963E-17	.131E-17	-.116E-24	.833E+03	.763E+10	-.749E-19
534.0	.229E-23	.156E-16	.723E-18	-.106E-24	.833E+03	.763E+10	-.591E-19
540.0	.169E-23	.185E-16	.272E-18	-.928E-25	.833E+03	.763E+10	-.445E-19
546.0	.118E-23	.190E-16	-.600E-19	-.781E-25	.833E+03	.763E+10	-.316E-19
552.0	.756E-24	.179E-16	-.288E-18	-.636E-25	.833E+03	.763E+10	-.206E-19
558.0	.416E-24	.156E-16	-.428E-18	-.505E-25	.833E+03	.763E+10	-.116E-19
564.0	.150E-24	.128E-16	-.497E-18	-.393E-25	.833E+03	.763E+10	-.425E-20
570.0	-.554E-25	.972E-17	-.509E-18	-.304E-25	.833E+03	.763E+10	.160E-20
576.0	-.215E-24	.673E-17	-.474E-18	-.240E-25	.833E+03	.763E+10	.632E-20
582.0	-.343E-24	.406E-17	-.402E-18	-.197E-25	.833E+03	.763E+10	.102E-19

588.0	-.452E-24	.193E-17	-.297E-18	-.174E-25	.833E+03	.763E+10	.137E-19
594.0	-.551E-24	.522E-18	-.163E-18	-.164E-25	.833E+03	.763E+10	.170E-19
600.0	-.649E-24	.000E+00	.000E+00	-.162E-25	.833E+03	.763E+10	.204E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .231E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .335E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .480E+00 IN
COMPUTED SLOPE AT PILE HEAD = .000E+00
MAXIMUM BENDING MOMENT = -.129E+07 LBS-IN
MAXIMUM SHEAR FORCE = .330E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .340E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .120E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.518E+00	-.135E+07	.340E+05	.925E-16	.551E+04	.763E+10	-.313E+03
6.0	.514E+00	-.115E+07	.320E+05	-.981E-03	.482E+04	.763E+10	-.342E+03
12.0	.506E+00	-.961E+06	.299E+05	-.181E-02	.417E+04	.763E+10	-.369E+03
18.0	.493E+00	-.787E+06	.276E+05	-.250E-02	.357E+04	.763E+10	-.396E+03
24.0	.476E+00	-.627E+06	.252E+05	-.305E-02	.301E+04	.763E+10	-.421E+03
30.0	.456E+00	-.481E+06	.226E+05	-.349E-02	.250E+04	.763E+10	-.444E+03
36.0	.434E+00	-.351E+06	.198E+05	-.382E-02	.205E+04	.763E+10	-.467E+03
42.0	.410E+00	-.237E+06	.170E+05	-.405E-02	.166E+04	.763E+10	-.488E+03
48.0	.385E+00	-.141E+06	.140E+05	-.420E-02	.132E+04	.763E+10	-.507E+03
54.0	.360E+00	-.636E+05	.109E+05	-.428E-02	.105E+04	.763E+10	-.525E+03
60.0	.334E+00	-.465E+04	.878E+04	-.430E-02	.849E+03	.763E+10	-.176E+03
66.0	.308E+00	.480E+05	.780E+04	-.429E-02	.100E+04	.763E+10	-.150E+03
72.0	.283E+00	.951E+05	.691E+04	-.423E-02	.116E+04	.763E+10	-.146E+03
78.0	.257E+00	.137E+06	.605E+04	-.414E-02	.131E+04	.763E+10	-.141E+03
84.0	.233E+00	.174E+06	.522E+04	-.402E-02	.144E+04	.763E+10	-.137E+03
90.0	.209E+00	.205E+06	.441E+04	-.387E-02	.155E+04	.763E+10	-.132E+03
96.0	.186E+00	.232E+06	.363E+04	-.370E-02	.164E+04	.763E+10	-.127E+03
102.0	.165E+00	.254E+06	.289E+04	-.351E-02	.172E+04	.763E+10	-.122E+03
108.0	.144E+00	.272E+06	.217E+04	-.330E-02	.178E+04	.763E+10	-.117E+03
114.0	.125E+00	.285E+06	.149E+04	-.308E-02	.182E+04	.763E+10	-.111E+03
120.0	.107E+00	.294E+06	.840E+03	-.285E-02	.185E+04	.763E+10	-.106E+03
126.0	.910E-01	.299E+06	.224E+03	-.262E-02	.187E+04	.763E+10	-.999E+02
132.0	.760E-01	.301E+06	-.358E+03	-.238E-02	.188E+04	.763E+10	-.941E+02
138.0	.624E-01	.298E+06	-.905E+03	-.215E-02	.187E+04	.763E+10	-.881E+02
144.0	.503E-01	.293E+06	-.142E+04	-.191E-02	.185E+04	.763E+10	-.820E+02
150.0	.395E-01	.284E+06	-.189E+04	-.169E-02	.182E+04	.763E+10	-.756E+02
156.0	.300E-01	.273E+06	-.232E+04	-.147E-02	.178E+04	.763E+10	-.690E+02
162.0	.218E-01	.258E+06	-.272E+04	-.126E-02	.173E+04	.763E+10	-.621E+02
168.0	.149E-01	.242E+06	-.307E+04	-.106E-02	.167E+04	.763E+10	-.547E+02
174.0	.910E-02	.223E+06	-.337E+04	-.879E-03	.161E+04	.763E+10	-.464E+02
180.0	.435E-02	.203E+06	-.362E+04	-.712E-03	.154E+04	.763E+10	-.363E+02
186.0	.558E-03	.181E+06	-.378E+04	-.561E-03	.146E+04	.763E+10	-.183E+02
192.0	-.238E-02	.158E+06	-.375E+04	-.428E-03	.138E+04	.763E+10	.297E+02
198.0	-.457E-02	.136E+06	-.355E+04	-.312E-03	.131E+04	.763E+10	.369E+02
204.0	-.612E-02	.116E+06	-.332E+04	-.213E-03	.124E+04	.763E+10	.406E+02
210.0	-.712E-02	.970E+05	-.307E+04	-.129E-03	.117E+04	.763E+10	.428E+02
216.0	-.767E-02	.794E+05	-.281E+04	-.594E-04	.111E+04	.763E+10	.438E+02
222.0	-.784E-02	.634E+05	-.254E+04	-.318E-05	.105E+04	.763E+10	.441E+02
228.0	-.771E-02	.489E+05	-.228E+04	.410E-04	.100E+04	.763E+10	.439E+02
234.0	-.734E-02	.360E+05	-.202E+04	.744E-04	.958E+03	.763E+10	.432E+02
240.0	-.681E-02	.246E+05	-.176E+04	.983E-04	.919E+03	.763E+10	.421E+02

246.0	-.617E-02	.148E+05	-.151E+04	.114E-03	.885E+03	.763E+10	.407E+02
252.0	-.545E-02	.633E+04	-.127E+04	.122E-03	.855E+03	.763E+10	.391E+02
258.0	-.470E-02	-.692E+03	-.104E+04	.124E-03	.836E+03	.763E+10	.372E+02
264.0	-.396E-02	-.637E+04	-.827E+03	.122E-03	.855E+03	.763E+10	.351E+02
270.0	-.324E-02	-.108E+05	-.623E+03	.115E-03	.871E+03	.763E+10	.329E+02
276.0	-.258E-02	-.140E+05	-.433E+03	.105E-03	.882E+03	.763E+10	.305E+02
282.0	-.198E-02	-.161E+05	-.258E+03	.931E-04	.889E+03	.763E+10	.279E+02
288.0	-.146E-02	-.172E+05	-.983E+02	.800E-04	.893E+03	.763E+10	.252E+02
294.0	-.102E-02	-.174E+05	.445E+02	.664E-04	.894E+03	.763E+10	.224E+02
300.0	-.665E-03	-.168E+05	.170E+03	.529E-04	.892E+03	.763E+10	.194E+02
306.0	-.387E-03	-.155E+05	.276E+03	.402E-04	.887E+03	.763E+10	.162E+02
312.0	-.182E-03	-.135E+05	.363E+03	.288E-04	.880E+03	.763E+10	.126E+02
318.0	-.407E-04	-.112E+05	.423E+03	.191E-04	.872E+03	.763E+10	.765E+01
324.0	.478E-04	-.849E+04	.422E+03	.114E-04	.863E+03	.763E+10	-.806E+01
330.0	.962E-04	-.611E+04	.367E+03	.567E-05	.855E+03	.763E+10	-.102E+02
336.0	.116E-03	-.409E+04	.304E+03	.166E-05	.848E+03	.763E+10	-.108E+02
342.0	.116E-03	-.246E+04	.239E+03	-.915E-06	.842E+03	.763E+10	-.108E+02
348.0	.105E-03	-.122E+04	.175E+03	-.236E-05	.838E+03	.763E+10	-.105E+02
354.0	.878E-04	-.350E+03	.114E+03	-.297E-05	.835E+03	.763E+10	-.987E+01
360.0	.691E-04	.160E+03	.680E+02	-.305E-05	.834E+03	.763E+10	-.555E+01
366.0	.512E-04	.470E+03	.383E+02	-.280E-05	.835E+03	.763E+10	-.435E+01
372.0	.355E-04	.623E+03	.157E+02	-.237E-05	.835E+03	.763E+10	-.319E+01
378.0	.227E-04	.661E+03	-.365E+00	-.187E-05	.836E+03	.763E+10	-.215E+01
384.0	.131E-04	.622E+03	-.107E+02	-.136E-05	.835E+03	.763E+10	-.130E+01
390.0	.636E-05	.535E+03	-.166E+02	-.908E-06	.835E+03	.763E+10	-.664E+00
396.0	.218E-05	.424E+03	-.193E+02	-.531E-06	.835E+03	.763E+10	-.238E+00
402.0	-.363E-08	.304E+03	-.200E+02	-.245E-06	.834E+03	.763E+10	.166E-03
408.0	-.755E-06	.184E+03	-.198E+02	-.530E-07	.834E+03	.763E+10	.894E-01
414.0	-.640E-06	.667E+02	-.193E+02	.454E-07	.834E+03	.763E+10	.788E-01
420.0	-.211E-06	-.475E+02	-.899E+01	.529E-07	.833E+03	.763E+10	.332E+01
426.0	-.490E-08	-.413E+02	.366E+01	.180E-07	.833E+03	.763E+10	.809E+00
432.0	.596E-08	-.356E+01	.354E+01	.409E-09	.833E+03	.763E+10	-.873E+00
438.0	.140E-10	.126E+01	.297E+00	-.496E-09	.833E+03	.763E+10	-.987E-01
444.0	-.172E-12	.305E-02	-.105E+00	-.117E-11	.833E+03	.763E+10	.241E-01
450.0	-.823E-16	-.365E-04	-.254E-03	.144E-13	.833E+03	.763E+10	.513E-04
456.0	.961E-18	-.179E-07	.304E-05	.686E-17	.833E+03	.763E+10	-.703E-06
462.0	.482E-21	.203E-09	.149E-08	-.801E-19	.833E+03	.763E+10	-.302E-09
468.0	-.536E-23	.104E-12	-.170E-10	-.401E-22	.833E+03	.763E+10	.392E-11
474.0	-.276E-26	-.366E-15	-.872E-14	.749E-24	.833E+03	.763E+10	.174E-14
480.0	.363E-23	-.297E-15	.113E-16	.488E-24	.833E+03	.763E+10	-.772E-19
486.0	.586E-23	-.231E-15	.104E-16	.281E-24	.833E+03	.763E+10	-.128E-18
492.0	.700E-23	-.172E-15	.918E-17	.122E-24	.833E+03	.763E+10	-.156E-18
498.0	.732E-23	-.121E-15	.778E-17	.684E-26	.833E+03	.763E+10	-.167E-18
504.0	.708E-23	-.788E-16	.634E-17	-.718E-25	.833E+03	.763E+10	-.165E-18
510.0	.646E-23	-.449E-16	.496E-17	-.120E-24	.833E+03	.763E+10	-.154E-18
516.0	.563E-23	-.191E-16	.370E-17	-.146E-24	.833E+03	.763E+10	-.138E-18
522.0	.471E-23	-.330E-18	.260E-17	-.153E-24	.833E+03	.763E+10	-.118E-18
528.0	.379E-23	.123E-16	.167E-17	-.148E-24	.833E+03	.763E+10	-.966E-19
534.0	.293E-23	.199E-16	.924E-18	-.136E-24	.833E+03	.763E+10	-.762E-19
540.0	.216E-23	.236E-16	.347E-18	-.119E-24	.833E+03	.763E+10	-.574E-19
546.0	.151E-23	.243E-16	-.767E-19	-.999E-25	.833E+03	.763E+10	-.408E-19
552.0	.966E-24	.228E-16	-.368E-18	-.813E-25	.833E+03	.763E+10	-.266E-19
558.0	.532E-24	.200E-16	-.547E-18	-.645E-25	.833E+03	.763E+10	-.149E-19
564.0	.192E-24	.164E-16	-.635E-18	-.502E-25	.833E+03	.763E+10	-.549E-20
570.0	-.708E-25	.124E-16	-.650E-18	-.389E-25	.833E+03	.763E+10	.206E-20
576.0	-.275E-24	.860E-17	-.606E-18	-.306E-25	.833E+03	.763E+10	.815E-20
582.0	-.439E-24	.520E-17	-.514E-18	-.252E-25	.833E+03	.763E+10	.132E-19
588.0	-.578E-24	.247E-17	-.380E-18	-.222E-25	.833E+03	.763E+10	.177E-19
594.0	-.705E-24	.667E-18	-.209E-18	-.210E-25	.833E+03	.763E+10	.220E-19
600.0	-.829E-24	.000E+00	.000E+00	-.207E-25	.833E+03	.763E+10	.263E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .173E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .170E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .518E+00 IN
COMPUTED SLOPE AT PILE HEAD = .925E-16
MAXIMUM BENDING MOMENT = -.135E+07 LBS-IN
MAXIMUM SHEAR FORCE = .340E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 6

BOUNDARY CONDITION CODE	=	2
LATERAL LOAD AT THE PILE HEAD	=	.350E+05 LBS
SLOPE AT THE PILE HEAD	=	.000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD	=	.120E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.557E+00	-.141E+07	.350E+05	.555E-16	.572E+04	.763E+10	-.319E+03
6.0	.554E+00	-.120E+07	.330E+05	-.103E-02	.501E+04	.763E+10	-.348E+03
12.0	.545E+00	-.101E+07	.308E+05	-.189E-02	.434E+04	.763E+10	-.376E+03
18.0	.531E+00	-.829E+06	.285E+05	-.262E-02	.371E+04	.763E+10	-.403E+03
24.0	.514E+00	-.663E+06	.260E+05	-.320E-02	.314E+04	.763E+10	-.429E+03
30.0	.493E+00	-.512E+06	.233E+05	-.367E-02	.261E+04	.763E+10	-.453E+03
36.0	.470E+00	-.378E+06	.206E+05	-.402E-02	.214E+04	.763E+10	-.476E+03
42.0	.445E+00	-.260E+06	.176E+05	-.427E-02	.174E+04	.763E+10	-.498E+03
48.0	.418E+00	-.160E+06	.146E+05	-.443E-02	.139E+04	.763E+10	-.518E+03
54.0	.391E+00	-.785E+05	.114E+05	-.453E-02	.111E+04	.763E+10	-.536E+03
60.0	.364E+00	-.164E+05	.927E+04	-.456E-02	.890E+03	.763E+10	-.181E+03
66.0	.337E+00	.393E+05	.827E+04	-.455E-02	.970E+03	.763E+10	-.155E+03
72.0	.309E+00	.894E+05	.735E+04	-.450E-02	.114E+04	.763E+10	-.150E+03
78.0	.283E+00	.134E+06	.646E+04	-.442E-02	.130E+04	.763E+10	-.146E+03
84.0	.256E+00	.173E+06	.560E+04	-.429E-02	.143E+04	.763E+10	-.141E+03
90.0	.231E+00	.207E+06	.477E+04	-.415E-02	.155E+04	.763E+10	-.136E+03
96.0	.207E+00	.236E+06	.397E+04	-.397E-02	.165E+04	.763E+10	-.131E+03
102.0	.183E+00	.261E+06	.319E+04	-.377E-02	.174E+04	.763E+10	-.126E+03
108.0	.161E+00	.280E+06	.245E+04	-.356E-02	.181E+04	.763E+10	-.121E+03
114.0	.141E+00	.295E+06	.174E+04	-.334E-02	.186E+04	.763E+10	-.116E+03
120.0	.121E+00	.306E+06	.107E+04	-.310E-02	.190E+04	.763E+10	-.110E+03
126.0	.103E+00	.313E+06	.423E+03	-.286E-02	.192E+04	.763E+10	-.104E+03
132.0	.871E-01	.315E+06	-.185E+03	-.261E-02	.193E+04	.763E+10	-.985E+02
138.0	.722E-01	.314E+06	-.758E+03	-.236E-02	.192E+04	.763E+10	-.925E+02
144.0	.588E-01	.309E+06	-.130E+04	-.212E-02	.191E+04	.763E+10	-.864E+02
150.0	.468E-01	.302E+06	-.179E+04	-.188E-02	.188E+04	.763E+10	-.800E+02
156.0	.362E-01	.291E+06	-.226E+04	-.164E-02	.184E+04	.763E+10	-.735E+02
162.0	.271E-01	.277E+06	-.268E+04	-.142E-02	.179E+04	.763E+10	-.667E+02
168.0	.192E-01	.261E+06	-.305E+04	-.121E-02	.174E+04	.763E+10	-.595E+02
174.0	.125E-01	.242E+06	-.339E+04	-.101E-02	.167E+04	.763E+10	-.516E+02
180.0	.704E-02	.221E+06	-.367E+04	-.830E-03	.160E+04	.763E+10	-.426E+02
186.0	.258E-02	.199E+06	-.389E+04	-.664E-03	.152E+04	.763E+10	-.305E+02
192.0	-.933E-03	.176E+06	-.392E+04	-.517E-03	.144E+04	.763E+10	.217E+02
198.0	-.362E-02	.153E+06	-.375E+04	-.388E-03	.136E+04	.763E+10	.341E+02
204.0	-.559E-02	.131E+06	-.353E+04	-.276E-03	.129E+04	.763E+10	.394E+02
210.0	-.693E-02	.111E+06	-.328E+04	-.181E-03	.122E+04	.763E+10	.424E+02
216.0	-.776E-02	.921E+05	-.302E+04	-.101E-03	.115E+04	.763E+10	.440E+02
222.0	-.815E-02	.748E+05	-.276E+04	-.355E-04	.109E+04	.763E+10	.447E+02
228.0	-.818E-02	.590E+05	-.249E+04	.172E-04	.104E+04	.763E+10	.448E+02
234.0	-.794E-02	.449E+05	-.222E+04	.580E-04	.989E+03	.763E+10	.443E+02
240.0	-.749E-02	.323E+05	-.196E+04	.884E-04	.945E+03	.763E+10	.435E+02
246.0	-.688E-02	.213E+05	-.170E+04	.109E-03	.907E+03	.763E+10	.423E+02
252.0	-.617E-02	.117E+05	-.145E+04	.122E-03	.874E+03	.763E+10	.408E+02
258.0	-.541E-02	.365E+04	-.121E+04	.128E-03	.846E+03	.763E+10	.390E+02
264.0	-.463E-02	-.302E+04	-.985E+03	.129E-03	.844E+03	.763E+10	.370E+02
270.0	-.387E-02	-.835E+04	-.769E+03	.124E-03	.862E+03	.763E+10	.349E+02
276.0	-.314E-02	-.124E+05	-.567E+03	.116E-03	.876E+03	.763E+10	.325E+02
282.0	-.247E-02	-.153E+05	-.379E+03	.105E-03	.887E+03	.763E+10	.301E+02
288.0	-.188E-02	-.171E+05	-.207E+03	.924E-04	.893E+03	.763E+10	.274E+02
294.0	-.137E-02	-.179E+05	-.507E+02	.786E-04	.896E+03	.763E+10	.247E+02
300.0	-.937E-03	-.179E+05	.884E+02	.645E-04	.895E+03	.763E+10	.217E+02
306.0	-.592E-03	-.170E+05	.210E+03	.508E-04	.892E+03	.763E+10	.187E+02
312.0	-.327E-03	-.154E+05	.311E+03	.381E-04	.887E+03	.763E+10	.153E+02
318.0	-.135E-03	-.133E+05	.391E+03	.268E-04	.879E+03	.763E+10	.114E+02
324.0	-.495E-05	-.108E+05	.437E+03	.174E-04	.871E+03	.763E+10	.379E+01
330.0	.739E-04	-.807E+04	.420E+03	.997E-05	.861E+03	.763E+10	-.932E+01
336.0	.115E-03	-.572E+04	.360E+03	.454E-05	.853E+03	.763E+10	-.108E+02
342.0	.128E-03	-.376E+04	.294E+03	.814E-06	.846E+03	.763E+10	-.112E+02
348.0	.124E-03	-.220E+04	.227E+03	-.153E-05	.841E+03	.763E+10	-.111E+02
354.0	.110E-03	-.103E+04	.162E+03	-.279E-05	.837E+03	.763E+10	-.106E+02
360.0	.909E-04	-.249E+03	.108E+03	-.330E-05	.834E+03	.763E+10	-.730E+01
366.0	.705E-04	.271E+03	.682E+02	-.329E-05	.834E+03	.763E+10	-.600E+01
372.0	.514E-04	.574E+03	.363E+02	-.296E-05	.835E+03	.763E+10	-.462E+01

378.0	.350E-04	.710E+03	.125E+02	-.245E-05	.836E+03	.763E+10	-.331E+01
384.0	.220E-04	.727E+03	-.400E+01	-.189E-05	.836E+03	.763E+10	-.219E+01
390.0	.124E-04	.665E+03	-.144E+02	-.134E-05	.836E+03	.763E+10	-.129E+01
396.0	.588E-05	.556E+03	-.202E+02	-.860E-06	.835E+03	.763E+10	-.642E+00
402.0	.204E-05	.424E+03	-.228E+02	-.474E-06	.835E+03	.763E+10	-.232E+00
408.0	.188E-06	.283E+03	-.236E+02	-.197E-06	.834E+03	.763E+10	-.224E-01
414.0	-.325E-06	.141E+03	-.235E+02	-.302E-07	.834E+03	.763E+10	.401E-01
420.0	-.174E-06	.247E+00	-.140E+02	.253E-07	.833E+03	.763E+10	.312E+01
426.0	-.220E-07	-.274E+02	-.441E+00	.146E-07	.833E+03	.763E+10	.136E+01
432.0	.980E-09	-.506E+01	.230E+01	.183E-08	.833E+03	.763E+10	-.492E+00
438.0	.186E-10	.200E+00	.422E+00	-.817E-10	.833E+03	.763E+10	-.120E+00
444.0	-.506E-14	.394E-02	-.167E-01	-.155E-11	.833E+03	.763E+10	.563E-02
450.0	-.104E-15	-.103E-05	-.329E-03	.422E-15	.833E+03	.763E+10	.866E-04
456.0	.260E-19	-.221E-07	.857E-07	.867E-17	.833E+03	.763E+10	-.295E-07
462.0	.582E-21	.525E-11	.184E-08	-.216E-20	.833E+03	.763E+10	-.485E-09
468.0	-.132E-24	.123E-12	-.438E-12	-.485E-22	.833E+03	.763E+10	.154E-12
474.0	-.325E-26	-.876E-17	-.103E-13	.180E-25	.833E+03	.763E+10	.271E-14
480.0	.842E-25	-.710E-17	.269E-18	.118E-25	.833E+03	.763E+10	-.291E-20
486.0	.138E-24	-.554E-17	.248E-18	.681E-26	.833E+03	.763E+10	-.487E-20
492.0	.166E-24	-.413E-17	.219E-18	.300E-26	.833E+03	.763E+10	-.598E-20
498.0	.174E-24	-.291E-17	.186E-18	.231E-27	.833E+03	.763E+10	-.642E-20
504.0	.169E-24	-.190E-17	.152E-18	-.166E-26	.833E+03	.763E+10	-.636E-20
510.0	.154E-24	-.109E-17	.119E-18	-.284E-26	.833E+03	.763E+10	-.594E-20
516.0	.135E-24	-.469E-18	.888E-19	-.345E-26	.833E+03	.763E+10	-.529E-20
522.0	.113E-24	-.187E-19	.625E-19	-.364E-26	.833E+03	.763E+10	-.453E-20
528.0	.909E-25	.286E-18	.403E-19	-.354E-26	.833E+03	.763E+10	-.372E-20
534.0	.703E-25	.470E-18	.224E-19	-.324E-26	.833E+03	.763E+10	-.294E-20
540.0	.520E-25	.560E-18	.858E-20	-.284E-26	.833E+03	.763E+10	-.222E-20
546.0	.363E-25	.577E-18	-.161E-20	-.239E-26	.833E+03	.763E+10	-.158E-20
552.0	.233E-25	.544E-18	-.862E-20	-.195E-26	.833E+03	.763E+10	-.103E-20
558.0	.129E-25	.477E-18	-.130E-19	-.155E-26	.833E+03	.763E+10	-.581E-21
564.0	.474E-26	.390E-18	-.151E-19	-.121E-26	.833E+03	.763E+10	-.216E-21
570.0	-.157E-26	.297E-18	-.155E-19	-.936E-27	.833E+03	.763E+10	.754E-22
576.0	-.649E-26	.206E-18	-.145E-19	-.738E-27	.833E+03	.763E+10	.311E-21
582.0	-.104E-25	.124E-18	-.123E-19	-.608E-27	.833E+03	.763E+10	.507E-21
588.0	-.138E-25	.592E-19	-.910E-20	-.536E-27	.833E+03	.763E+10	.681E-21
594.0	-.169E-25	.160E-19	-.500E-20	-.507E-27	.833E+03	.763E+10	.847E-21
600.0	-.199E-25	.000E+00	.000E+00	-.500E-27	.833E+03	.763E+10	.101E-20

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .207E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .170E-07 LBS

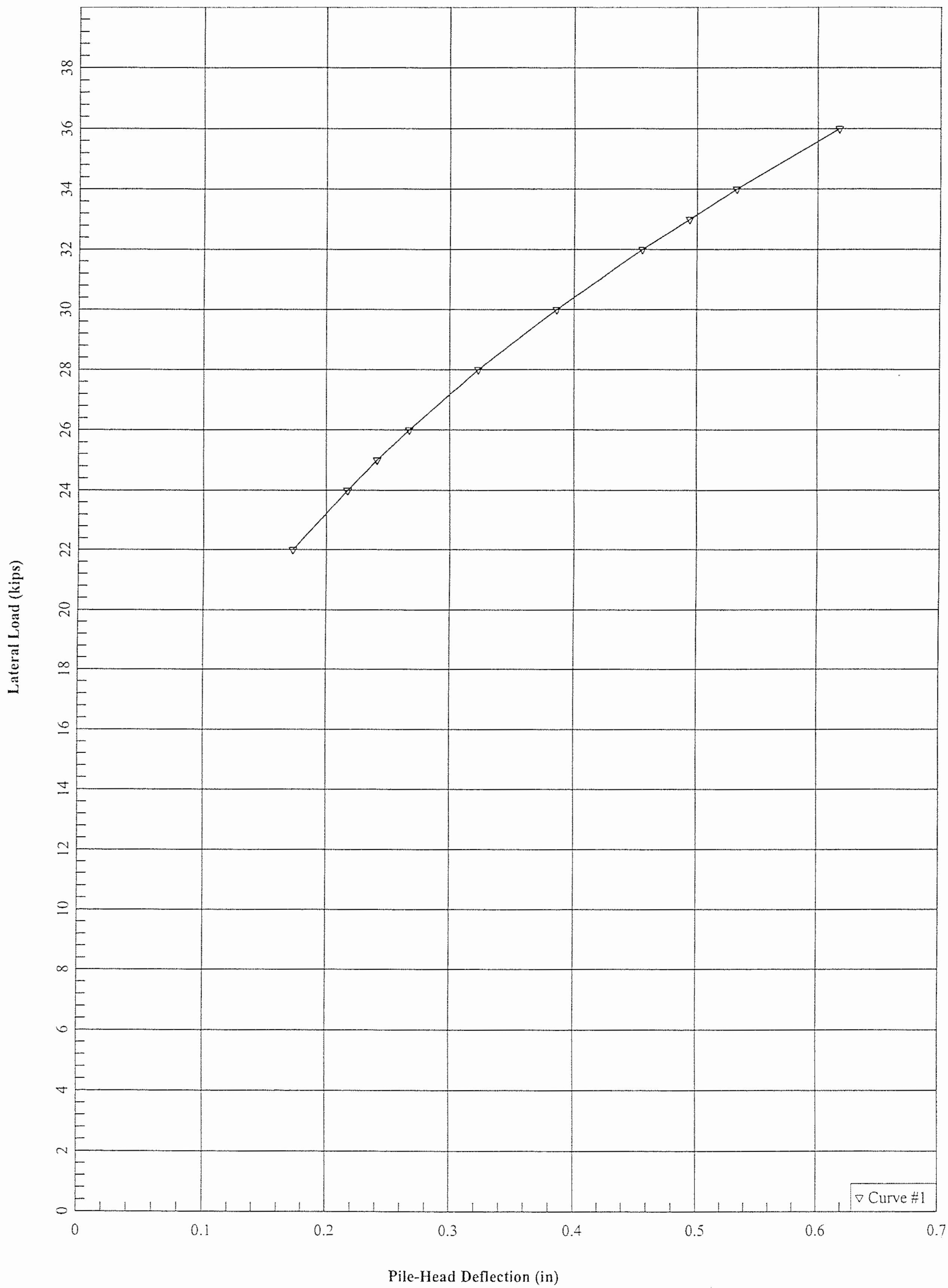
OUTPUT SUMMARY

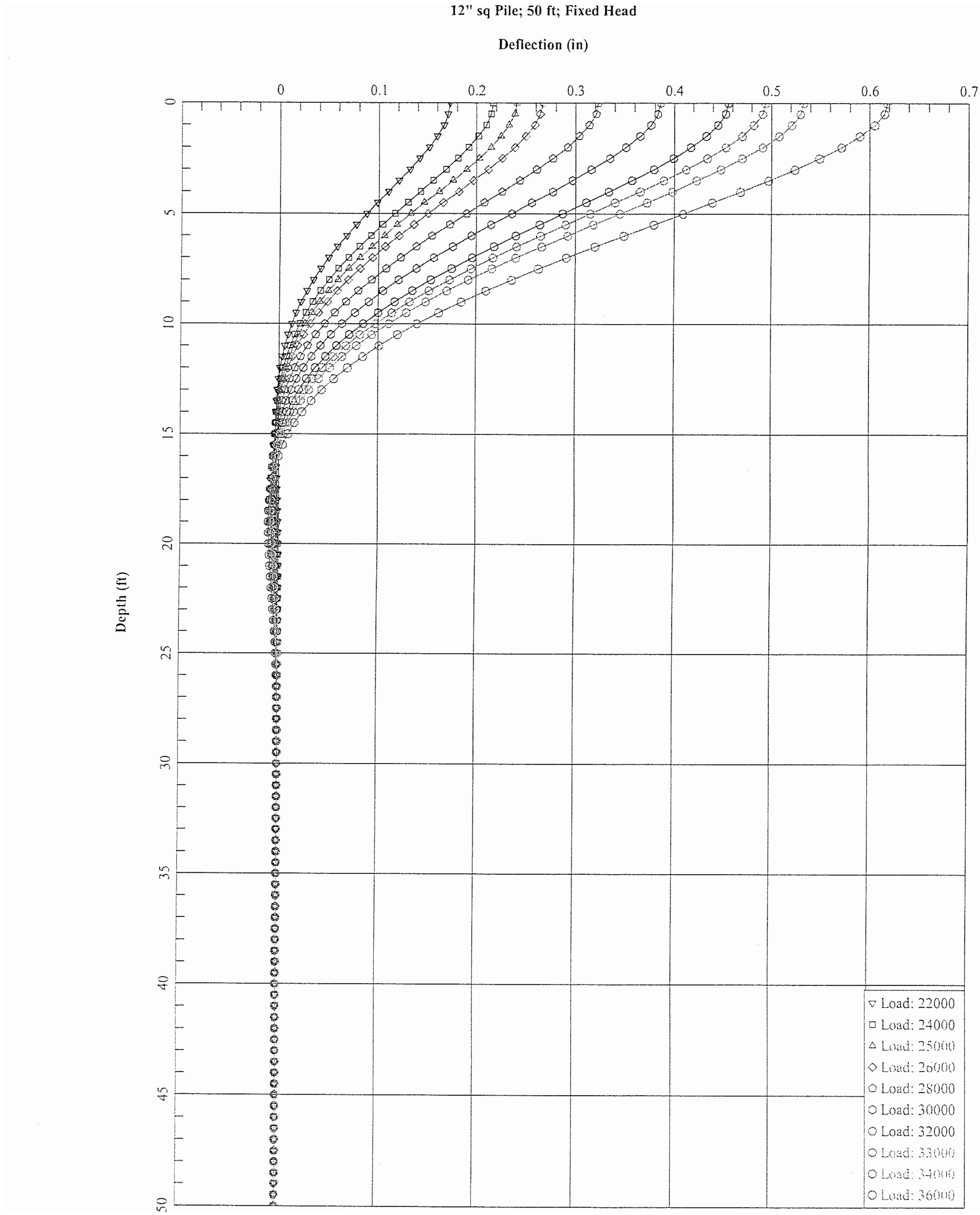
PILE-HEAD DEFLECTION = .557E+00 IN
COMPUTED SLOPE AT PILE HEAD = .555E-16
MAXIMUM BENDING MOMENT = -.141E+07 LBS-IN
MAXIMUM SHEAR FORCE = .350E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 9

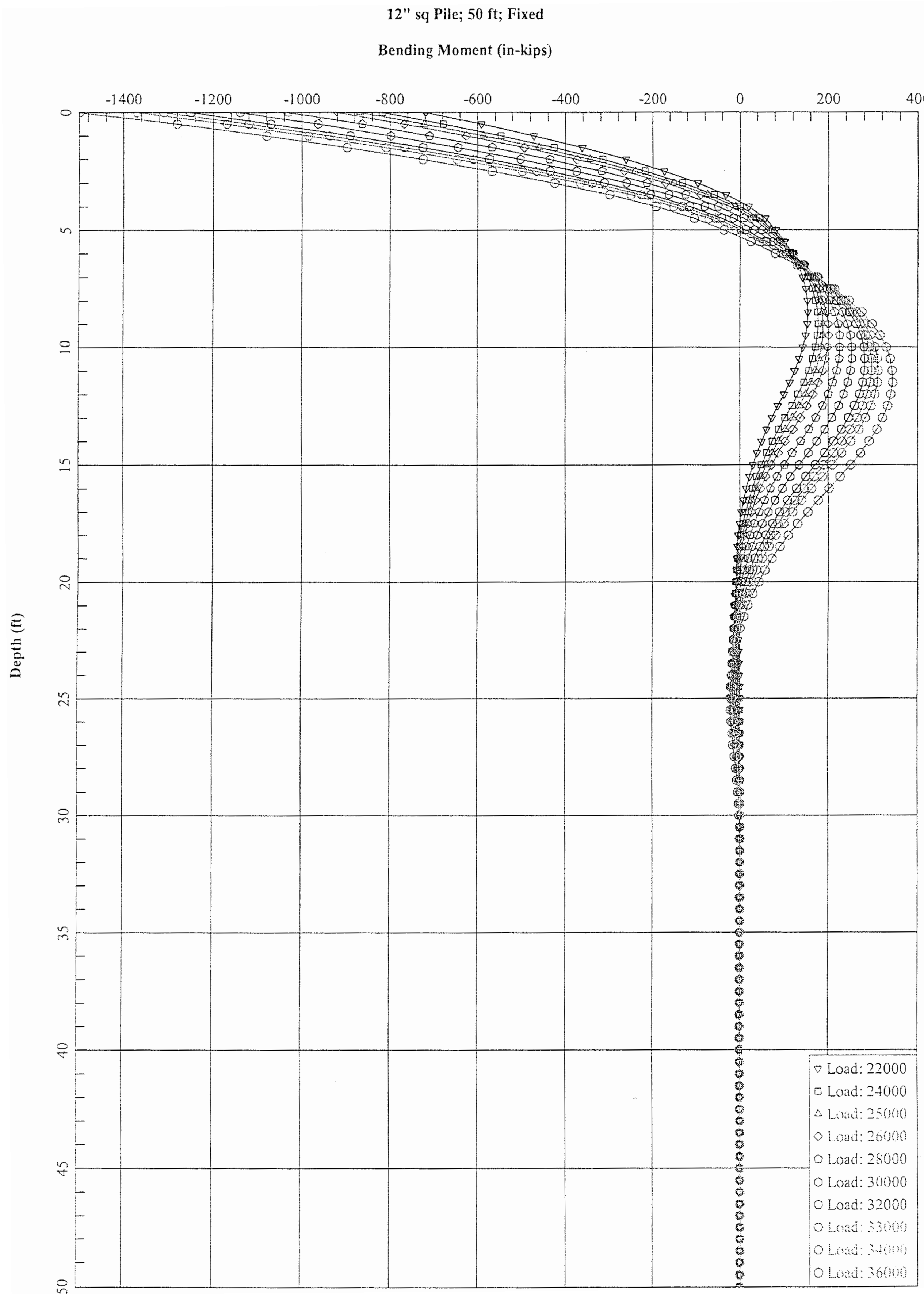
S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.2400E+05	.0000E+00	.1200E+06	.2123E+00	-.8071E+06	.2400E+05
.2500E+05	.0000E+00	.1200E+06	.2358E+00	-.8565E+06	.2500E+05
.2600E+05	.0000E+00	.1200E+06	.2607E+00	-.9073E+06	.2600E+05
.3300E+05	.0000E+00	.1200E+06	.4797E+00	-.1289E+07	.3300E+05
.3400E+05	.0000E+00	.1200E+06	.5175E+00	-.1347E+07	.3400E+05
.3500E+05	.0000E+00	.1200E+06	.5573E+00	-.1406E+07	.3500E+05

12" sq Pile; 50 ft; Fixed Head




12" sq Pile; 50 ft; Fixed Head
Deflection (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 22000
Load: 24000
Load: 25000
Load: 26000
Load: 28000
Load: 30000
Load: 32000
Load: 33000
Load: 34000
Load: 36000



12" sq Pile; 50 ft; Fixed
Bending Moment (in-kips)
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 22000
Load: 24000
Load: 25000
Load: 26000
Load: 28000
Load: 30000
Load: 32000
Load: 33000
Load: 34000
Load: 36000

Licensed to: janet

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PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 12" sq Concrete Pile; Axial L=250kips; Fix Head

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N
****

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	12.000	.173E+04	.144E+03	.442E+07
600.00	12.000	.173E+04	.144E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN
X AT THE BOTTOM OF THE LAYER = 360.00 IN
MODULUS OF SUBGRADE REACTION = .300E+02 LBS/IN**3

LAYER 3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER = 360.00 IN
X AT THE BOTTOM OF THE LAYER = 420.00 IN
MODULUS OF SUBGRADE REACTION = .800E+03 LBS/IN**3

LAYER 4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 420.00 IN
X AT THE BOTTOM OF THE LAYER = 480.00 IN
MODULUS OF SUBGRADE REACTION = .100E+03 LBS/IN**3

LAYER 5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = 480.00 IN

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X AT THE BOTTOM OF THE LAYER        =     720.00 IN
MODULUS OF SUBGRADE REACTION        =   .125E+03 LBS/IN**3
```

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
8 POINTS

X,IN	WEIGHT,LBS/IN**3
.00	.67E-01
60.00	.67E-01
60.00	.22E-01
360.00	.22E-01
360.00	.28E-01
480.00	.28E-01
480.00	.30E-01
720.00	.30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
10 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
.00	.139E+02	.000	.700E-02
60.00	.139E+02	.000	.700E-02
60.00	.347E+01	.000	.200E-01
360.00	.347E+01	.000	.200E-01
360.00	.139E+02	.000	.500E-02
420.00	.139E+02	.000	.500E-02
420.00	.694E+01	.000	.150E-01
480.00	.694E+01	.000	.150E-01
480.00	.000E+00	.260E+02	-----
720.00	.000E+00	.260E+02	-----

BOUNDARY AND LOADING CONDITIONS

```
LOADING NUMBER    1

BOUNDARY CONDITION CODE                 =         2
LATERAL LOAD AT THE PILE HEAD           =   .240E+05 LBS
SLOPE AT THE PILE HEAD                  =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD             =   .250E+06 LBS

LOADING NUMBER    2

BOUNDARY CONDITION CODE                 =         2
LATERAL LOAD AT THE PILE HEAD           =   .250E+05 LBS
SLOPE AT THE PILE HEAD                  =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD             =   .250E+06 LBS

LOADING NUMBER    3

BOUNDARY CONDITION CODE                 =         2
LATERAL LOAD AT THE PILE HEAD           =   .260E+05 LBS
SLOPE AT THE PILE HEAD                  =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD             =   .250E+06 LBS

LOADING NUMBER    4

BOUNDARY CONDITION CODE                 =         2
LATERAL LOAD AT THE PILE HEAD           =   .320E+05 LBS
SLOPE AT THE PILE HEAD                  =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD             =   .250E+06 LBS

LOADING NUMBER    5

BOUNDARY CONDITION CODE                 =         2
LATERAL LOAD AT THE PILE HEAD           =   .330E+05 LBS
SLOPE AT THE PILE HEAD                  =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD             =   .250E+06 LBS

LOADING NUMBER    6

BOUNDARY CONDITION CODE                 =         2
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     LATERAL LOAD AT THE PILE HEAD                  =   .340E+05 LBS
     SLOPE AT THE PILE HEAD                         =   .000E+00 IN/IN
     AXIAL LOAD AT THE PILE HEAD                    =   .250E+06 LBS


 FINITE-DIFFERENCE PARAMETERS
     NUMBER OF PILE INCREMENTS                                =       100
     DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE         =   .100E-04 IN
     MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS =       100
     MAXIMUM ALLOWABLE DEFLECTION                             =    .10E+03 IN


 OUTPUT CODES
     KOUTPT =  1
     KPYOP  =  0
     INC    =  1
```

O U T P U T   I N F O R M A T I O N

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**********************************
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************************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING                    *
************************************************
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```
     LOADING NUMBER   1

     BOUNDARY CONDITION CODE                        =          2
     LATERAL LOAD AT THE PILE HEAD                  =   .240E+05 LBS
     SLOPE AT THE PILE HEAD                         =   .000E+00 IN/IN
     AXIAL LOAD AT THE PILE HEAD                    =   .250E+06 LBS
```

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.217E+00	-.817E+06	.240E+05	-.231E-17	.457E+04	.763E+10	-.252E+03
6.0	.215E+00	-.678E+06	.224E+05	-.588E-03	.409E+04	.763E+10	-.275E+03
12.0	.210E+00	-.547E+06	.207E+05	-.107E-02	.363E+04	.763E+10	-.296E+03
18.0	.202E+00	-.426E+06	.189E+05	-.145E-02	.321E+04	.763E+10	-.317E+03
24.0	.192E+00	-.316E+06	.169E+05	-.174E-02	.283E+04	.763E+10	-.335E+03
30.0	.181E+00	-.218E+06	.148E+05	-.195E-02	.249E+04	.763E+10	-.353E+03
36.0	.169E+00	-.132E+06	.127E+05	-.209E-02	.219E+04	.763E+10	-.369E+03
42.0	.156E+00	-.593E+05	.104E+05	-.217E-02	.194E+04	.763E+10	-.383E+03
48.0	.143E+00	-.326E+03	.809E+04	-.219E-02	.174E+04	.763E+10	-.396E+03
54.0	.130E+00	.444E+05	.568E+04	-.217E-02	.189E+04	.763E+10	-.407E+03
60.0	.117E+00	.743E+05	.408E+04	-.213E-02	.199E+04	.763E+10	-.124E+03
66.0	.104E+00	.997E+05	.340E+04	-.206E-02	.208E+04	.763E+10	-.105E+03
72.0	.922E-01	.121E+06	.278E+04	-.197E-02	.216E+04	.763E+10	-.100E+03
78.0	.807E-01	.139E+06	.220E+04	-.187E-02	.222E+04	.763E+10	-.960E+02
84.0	.698E-01	.153E+06	.163E+04	-.175E-02	.227E+04	.763E+10	-.915E+02
90.0	.596E-01	.164E+06	.110E+04	-.163E-02	.231E+04	.763E+10	-.868E+02
96.0	.503E-01	.171E+06	.592E+03	-.150E-02	.233E+04	.763E+10	-.820E+02
102.0	.417E-01	.176E+06	.115E+03	-.136E-02	.235E+04	.763E+10	-.770E+02
108.0	.339E-01	.177E+06	-.332E+03	-.122E-02	.235E+04	.763E+10	-.719E+02
114.0	.270E-01	.175E+06	-.748E+03	-.108E-02	.234E+04	.763E+10	-.667E+02
120.0	.209E-01	.171E+06	-.113E+04	-.947E-03	.233E+04	.763E+10	-.612E+02
126.0	.157E-01	.164E+06	-.148E+04	-.815E-03	.231E+04	.763E+10	-.556E+02
132.0	.112E-01	.156E+06	-.180E+04	-.689E-03	.228E+04	.763E+10	-.497E+02
138.0	.740E-02	.145E+06	-.208E+04	-.571E-03	.224E+04	.763E+10	-.433E+02
144.0	.432E-02	.132E+06	-.232E+04	-.461E-03	.220E+04	.763E+10	-.362E+02
150.0	.187E-02	.119E+06	-.251E+04	-.363E-03	.215E+04	.763E+10	-.274E+02
156.0	-.292E-04	.103E+06	-.257E+04	-.275E-03	.210E+04	.763E+10	.694E+01
162.0	-.144E-02	.886E+05	-.247E+04	-.200E-03	.204E+04	.763E+10	.251E+02
168.0	-.243E-02	.744E+05	-.231E+04	-.136E-03	.199E+04	.763E+10	.299E+02
174.0	-.307E-02	.613E+05	-.212E+04	-.825E-04	.195E+04	.763E+10	.323E+02
180.0	-.342E-02	.492E+05	-.192E+04	-.390E-04	.191E+04	.763E+10	.335E+02
186.0	-.354E-02	.383E+05	-.172E+04	-.462E-05	.187E+04	.763E+10	.338E+02

192.0	-.347E-02	.285E+05	-.152E+04	.217E-04	.184E+04	.763E+10	.336E+02
198.0	-.328E-02	.200E+05	-.132E+04	.407E-04	.181E+04	.763E+10	.330E+02
204.0	-.298E-02	.126E+05	-.113E+04	.535E-04	.178E+04	.763E+10	.320E+02
210.0	-.263E-02	.631E+04	-.938E+03	.610E-04	.176E+04	.763E+10	.307E+02
216.0	-.225E-02	.114E+04	-.758E+03	.639E-04	.174E+04	.763E+10	.291E+02
222.0	-.187E-02	-.298E+04	-.589E+03	.632E-04	.175E+04	.763E+10	.274E+02
228.0	-.149E-02	-.612E+04	-.430E+03	.596E-04	.176E+04	.763E+10	.254E+02
234.0	-.115E-02	-.833E+04	-.284E+03	.539E-04	.177E+04	.763E+10	.233E+02
240.0	-.848E-03	-.969E+04	-.151E+03	.468E-04	.177E+04	.763E+10	.210E+02
246.0	-.590E-03	-.103E+05	-.324E+02	.390E-04	.177E+04	.763E+10	.186E+02
252.0	-.380E-03	-.102E+05	.718E+02	.309E-04	.177E+04	.763E+10	.161E+02
258.0	-.219E-03	-.952E+04	.160E+03	.232E-04	.177E+04	.763E+10	.134E+02
264.0	-.102E-03	-.834E+04	.232E+03	.161E-04	.177E+04	.763E+10	.104E+02
270.0	-.253E-04	-.679E+04	.283E+03	.102E-04	.176E+04	.763E+10	.651E+01
276.0	.198E-04	-.498E+04	.284E+03	.555E-05	.175E+04	.763E+10	-.602E+01
282.0	.413E-04	-.339E+04	.243E+03	.226E-05	.175E+04	.763E+10	-.769E+01
288.0	.469E-04	-.207E+04	.196E+03	.111E-06	.174E+04	.763E+10	-.801E+01
294.0	.426E-04	-.104E+04	.149E+03	-.111E-05	.174E+04	.763E+10	-.776E+01
300.0	.335E-04	-.282E+03	.104E+03	-.163E-05	.174E+04	.763E+10	-.717E+01
306.0	.231E-04	.217E+03	.637E+02	-.166E-05	.174E+04	.763E+10	-.633E+01
312.0	.137E-04	.488E+03	.288E+02	-.138E-05	.174E+04	.763E+10	-.531E+01
318.0	.654E-05	.567E+03	.453E+00	-.963E-06	.174E+04	.763E+10	-.416E+01
324.0	.210E-05	.497E+03	-.205E+02	-.545E-06	.174E+04	.763E+10	-.284E+01
330.0	.264E-09	.323E+03	-.293E+02	-.223E-06	.174E+04	.763E+10	-.177E+00
336.0	-.575E-06	.145E+03	-.241E+02	-.389E-07	.174E+04	.763E+10	.185E+01
342.0	-.467E-06	.339E+02	-.133E+02	.314E-07	.174E+04	.763E+10	.172E+01
348.0	-.198E-06	-.149E+02	-.421E+01	.389E-07	.174E+04	.763E+10	.129E+01
354.0	-.185E-09	-.167E+02	.189E+00	.264E-07	.174E+04	.763E+10	.112E+00
360.0	.119E-06	-.127E+02	.644E+00	.149E-07	.174E+04	.763E+10	-.945E-02
366.0	.178E-06	-.906E+01	.570E+00	.629E-08	.174E+04	.763E+10	-.150E-01
372.0	.194E-06	-.592E+01	.472E+00	.403E-09	.174E+04	.763E+10	-.173E-01
378.0	.183E-06	-.340E+01	.367E+00	-.326E-08	.174E+04	.763E+10	-.171E-01
384.0	.155E-06	-.150E+01	.269E+00	-.518E-08	.174E+04	.763E+10	-.153E-01
390.0	.121E-06	-.155E+00	.185E+00	-.584E-08	.174E+04	.763E+10	-.125E-01
396.0	.854E-07	.736E+00	.119E+00	-.561E-08	.174E+04	.763E+10	-.921E-02
402.0	.534E-07	.129E+01	.729E-01	-.481E-08	.174E+04	.763E+10	-.602E-02
408.0	.276E-07	.162E+01	.448E-01	-.366E-08	.174E+04	.763E+10	-.324E-02
414.0	.948E-08	.184E+01	.314E-01	-.230E-08	.174E+04	.763E+10	-.116E-02
420.0	.635E-12	.201E+01	-.153E+00	-.790E-09	.174E+04	.763E+10	-.430E-01
426.0	-.740E-12	.448E-03	-.167E+00	-.530E-13	.174E+04	.763E+10	.394E-01
432.0	-.201E-16	-.157E-03	-.373E-04	.616E-13	.174E+04	.763E+10	.150E-04
438.0	.413E-17	-.601E-08	.131E-04	.167E-17	.174E+04	.763E+10	-.308E-05
444.0	.204E-21	.876E-09	.500E-09	-.344E-18	.174E+04	.763E+10	-.152E-09
450.0	-.231E-22	.531E-13	-.730E-10	-.170E-22	.174E+04	.763E+10	.172E-10
456.0	-.166E-26	-.489E-14	-.443E-14	.192E-23	.174E+04	.763E+10	.123E-14
462.0	.129E-27	-.406E-18	.408E-15	.138E-27	.174E+04	.763E+10	-.960E-16
468.0	.121E-31	.273E-19	.338E-19	-.107E-28	.174E+04	.763E+10	-.904E-20
474.0	-.720E-33	.887E-24	-.228E-20	-.180E-32	.174E+04	.763E+10	.536E-21
480.0	-.940E-32	.718E-24	-.277E-25	-.116E-32	.174E+04	.763E+10	.204E-27
486.0	-.147E-31	.559E-24	-.254E-25	-.662E-33	.174E+04	.763E+10	.326E-27
492.0	-.173E-31	.415E-24	-.224E-25	-.280E-33	.174E+04	.763E+10	.395E-27
498.0	-.180E-31	.291E-24	-.189E-25	-.186E-35	.174E+04	.763E+10	.420E-27
504.0	-.174E-31	.188E-24	-.154E-25	.187E-33	.174E+04	.763E+10	.413E-27
510.0	-.158E-31	.106E-24	-.120E-25	.302E-33	.174E+04	.763E+10	.385E-27
516.0	-.137E-31	.437E-25	-.889E-26	.361E-33	.174E+04	.763E+10	.342E-27
522.0	-.115E-31	-.152E-26	-.620E-26	.378E-33	.174E+04	.763E+10	.291E-27
528.0	-.921E-32	-.319E-25	-.395E-26	.365E-33	.174E+04	.763E+10	.239E-27
534.0	-.709E-32	-.501E-25	-.215E-26	.333E-33	.174E+04	.763E+10	.188E-27
540.0	-.521E-32	-.586E-25	-.753E-27	.290E-33	.174E+04	.763E+10	.141E-27
546.0	-.361E-32	-.600E-25	.266E-27	.243E-33	.174E+04	.763E+10	.994E-28
552.0	-.229E-32	-.562E-25	.961E-27	.198E-33	.174E+04	.763E+10	.643E-28
558.0	-.124E-32	-.490E-25	.139E-26	.156E-33	.174E+04	.763E+10	.355E-28
564.0	-.420E-33	-.400E-25	.159E-26	.121E-33	.174E+04	.763E+10	.122E-28
570.0	.213E-33	-.303E-25	.161E-26	.935E-34	.174E+04	.763E+10	-.631E-29
576.0	.703E-33	-.210E-25	.150E-26	.734E-34	.174E+04	.763E+10	-.212E-28
582.0	.109E-32	-.126E-25	.126E-26	.602E-34	.174E+04	.763E+10	-.336E-28
588.0	.142E-32	-.597E-26	.932E-27	.529E-34	.174E+04	.763E+10	-.445E-28
594.0	.173E-32	-.159E-26	.510E-27	.499E-34	.174E+04	.763E+10	-.549E-28
600.0	.202E-32	.000E+00	.000E+00	.493E-34	.174E+04	.763E+10	-.653E-28

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.187E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.250E-08 LBS

OUTPUT SUMMARY

```
PILE-HEAD DEFLECTION            =   .217E+00 IN
COMPUTED SLOPE AT PILE HEAD     =  -.231E-17
MAXIMUM BENDING MOMENT          =  -.817E+06 LBS-IN
MAXIMUM SHEAR FORCE             =   .240E+05 LBS
NO. OF ITERATIONS               =         28
NO. OF ZERO DEFLECTION POINTS   =         10
```

LOADING NUMBER 2

```
BOUNDARY CONDITION CODE                   =         2
LATERAL LOAD AT THE PILE HEAD             =   .250E+05 LBS
SLOPE AT THE PILE HEAD                    =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD               =   .250E+06 LBS
```

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.241E+00	-.868E+06	.250E+05	-.139E-16	.475E+04	.763E+10	-.259E+03
6.0	.239E+00	-.722E+06	.234E+05	-.625E-03	.424E+04	.763E+10	-.282E+03
12.0	.233E+00	-.586E+06	.216E+05	-.114E-02	.377E+04	.763E+10	-.304E+03
18.0	.225E+00	-.460E+06	.197E+05	-.155E-02	.333E+04	.763E+10	-.325E+03
24.0	.215E+00	-.344E+06	.177E+05	-.187E-02	.293E+04	.763E+10	-.345E+03
30.0	.203E+00	-.241E+06	.156E+05	-.210E-02	.257E+04	.763E+10	-.363E+03
36.0	.190E+00	-.151E+06	.134E+05	-.225E-02	.226E+04	.763E+10	-.380E+03
42.0	.176E+00	-.742E+05	.110E+05	-.234E-02	.199E+04	.763E+10	-.395E+03
48.0	.162E+00	-.115E+05	.863E+04	-.237E-02	.178E+04	.763E+10	-.408E+03
54.0	.147E+00	.365E+05	.615E+04	-.236E-02	.186E+04	.763E+10	-.420E+03
60.0	.133E+00	.694E+05	.450E+04	-.232E-02	.198E+04	.763E+10	-.129E+03
66.0	.119E+00	.975E+05	.378E+04	-.226E-02	.207E+04	.763E+10	-.109E+03
72.0	.106E+00	.122E+06	.314E+04	-.217E-02	.216E+04	.763E+10	-.105E+03
78.0	.934E-01	.142E+06	.252E+04	-.207E-02	.223E+04	.763E+10	-.101E+03
84.0	.813E-01	.158E+06	.193E+04	-.195E-02	.228E+04	.763E+10	-.962E+02
90.0	.700E-01	.171E+06	.137E+04	-.182E-02	.233E+04	.763E+10	-.915E+02
96.0	.594E-01	.180E+06	.833E+03	-.168E-02	.236E+04	.763E+10	-.867E+02
102.0	.498E-01	.186E+06	.328E+03	-.154E-02	.238E+04	.763E+10	-.817E+02
108.0	.410E-01	.188E+06	-.147E+03	-.139E-02	.239E+04	.763E+10	-.766E+02
114.0	.331E-01	.188E+06	-.591E+03	-.124E-02	.239E+04	.763E+10	-.713E+02
120.0	.261E-01	.185E+06	-.100E+04	-.110E-02	.238E+04	.763E+10	-.659E+02
126.0	.199E-01	.179E+06	-.138E+04	-.953E-03	.236E+04	.763E+10	-.602E+02
132.0	.146E-01	.171E+06	-.172E+04	-.815E-03	.233E+04	.763E+10	-.543E+02
138.0	.101E-01	.161E+06	-.203E+04	-.685E-03	.230E+04	.763E+10	-.481E+02
144.0	.639E-02	.149E+06	-.230E+04	-.563E-03	.225E+04	.763E+10	-.412E+02
150.0	.337E-02	.135E+06	-.252E+04	-.451E-03	.221E+04	.763E+10	-.333E+02
156.0	.983E-03	.120E+06	-.269E+04	-.351E-03	.215E+04	.763E+10	-.221E+02
162.0	-.837E-03	.104E+06	-.269E+04	-.262E-03	.210E+04	.763E+10	.210E+02
168.0	-.217E-02	.886E+05	-.254E+04	-.187E-03	.204E+04	.763E+10	.288E+02
174.0	-.308E-02	.741E+05	-.236E+04	-.123E-03	.199E+04	.763E+10	.323E+02
180.0	-.364E-02	.606E+05	-.216E+04	-.697E-04	.195E+04	.763E+10	.342E+02
186.0	-.391E-02	.483E+05	-.195E+04	-.269E-04	.190E+04	.763E+10	.350E+02
192.0	-.396E-02	.373E+05	-.174E+04	.677E-05	.187E+04	.763E+10	.352E+02
198.0	-.383E-02	.274E+05	-.153E+04	.322E-04	.183E+04	.763E+10	.348E+02
204.0	-.357E-02	.187E+05	-.133E+04	.503E-04	.180E+04	.763E+10	.340E+02
210.0	-.323E-02	.113E+05	-.113E+04	.621E-04	.178E+04	.763E+10	.328E+02
216.0	-.283E-02	.503E+04	-.935E+03	.686E-04	.175E+04	.763E+10	.314E+02
222.0	-.241E-02	-.122E+03	-.751E+03	.705E-04	.174E+04	.763E+10	.298E+02
228.0	-.198E-02	-.420E+04	-.578E+03	.688E-04	.175E+04	.763E+10	.279E+02
234.0	-.158E-02	-.727E+04	-.417E+03	.643E-04	.176E+04	.763E+10	.259E+02
240.0	-.121E-02	-.940E+04	-.268E+03	.577E-04	.177E+04	.763E+10	.237E+02
246.0	-.887E-03	-.107E+05	-.133E+03	.498E-04	.177E+04	.763E+10	.213E+02
252.0	-.613E-03	-.111E+05	-.127E+02	.413E-04	.177E+04	.763E+10	.189E+02
258.0	-.391E-03	-.109E+05	.927E+02	.326E-04	.177E+04	.763E+10	.163E+02
264.0	-.222E-03	-.101E+05	.182E+03	.243E-04	.177E+04	.763E+10	.134E+02
270.0	-.998E-04	-.883E+04	.253E+03	.168E-04	.177E+04	.763E+10	.103E+02
276.0	-.196E-04	-.715E+04	.302E+03	.106E-04	.176E+04	.763E+10	.598E+01
282.0	.269E-04	-.524E+04	.300E+03	.569E-05	.175E+04	.763E+10	-.667E+01
288.0	.488E-04	-.356E+04	.256E+03	.223E-05	.175E+04	.763E+10	-.812E+01
294.0	.538E-04	-.217E+04	.206E+03	-.214E-07	.174E+04	.763E+10	-.839E+01
300.0	.485E-04	-.109E+04	.157E+03	-.130E-05	.174E+04	.763E+10	-.810E+01
306.0	.381E-04	-.288E+03	.110E+03	-.184E-05	.174E+04	.763E+10	-.748E+01
312.0	.264E-04	.242E+03	.680E+02	-.186E-05	.174E+04	.763E+10	-.661E+01
318.0	.158E-04	.533E+03	.314E+02	-.156E-05	.174E+04	.763E+10	-.557E+01

324.0	.770E-05	.624E+03	.154E+01	-.110E-05	.174E+04	.763E+10	-.439E+01
330.0	.256E-05	.555E+03	-.207E+02	-.638E-06	.174E+04	.763E+10	-.304E+01
336.0	.387E-07	.377E+03	-.319E+02	-.272E-06	.174E+04	.763E+10	-.795E+00
342.0	-.702E-06	.174E+03	-.278E+02	-.552E-07	.174E+04	.763E+10	.196E+01
348.0	-.624E-06	.429E+02	-.159E+02	.300E-07	.174E+04	.763E+10	.186E+01
354.0	-.343E-06	-.168E+02	-.477E+01	.402E-07	.174E+04	.763E+10	.148E+01
360.0	-.141E-06	-.144E+02	.433E+00	.280E-07	.174E+04	.763E+10	.719E-02
366.0	-.698E-08	-.117E+02	.468E+00	.177E-07	.174E+04	.763E+10	-.349E-02
372.0	.720E-07	-.885E+01	.451E+00	.968E-08	.174E+04	.763E+10	-.102E-01
378.0	.109E-06	-.627E+01	.400E+00	.373E-08	.174E+04	.763E+10	-.134E-01
384.0	.117E-06	-.406E+01	.334E+00	-.330E-09	.174E+04	.763E+10	-.140E-01
390.0	.105E-06	-.226E+01	.267E+00	-.281E-08	.174E+04	.763E+10	-.127E-01
396.0	.830E-07	-.852E+00	.206E+00	-.404E-08	.174E+04	.763E+10	-.102E-01
402.0	.568E-07	.231E+00	.160E+00	-.428E-08	.174E+04	.763E+10	-.715E-02
408.0	.316E-07	.108E+01	.129E+00	-.377E-08	.174E+04	.763E+10	-.408E-02
414.0	.116E-07	.179E+01	.114E+00	-.264E-08	.174E+04	.763E+10	-.154E-02
420.0	.337E-11	.245E+01	-.150E+00	-.966E-09	.174E+04	.763E+10	-.828E-01
426.0	-.292E-11	.195E-02	-.204E+00	-.281E-12	.174E+04	.763E+10	.708E-01
432.0	-.840E-16	-.619E-03	-.163E-03	.243E-12	.174E+04	.763E+10	.906E-04
438.0	.163E-16	-.247E-07	.515E-04	.700E-17	.174E+04	.763E+10	-.179E-04
444.0	.834E-21	.346E-08	.206E-08	-.136E-17	.174E+04	.763E+10	-.906E-09
450.0	-.911E-22	.215E-12	-.288E-09	-.695E-22	.174E+04	.763E+10	.100E-09
456.0	-.669E-26	-.193E-13	-.179E-13	.759E-23	.174E+04	.763E+10	.730E-14
462.0	.509E-27	-.163E-17	.161E-14	.558E-27	.174E+04	.763E+10	-.558E-15
468.0	.488E-31	.108E-18	.136E-18	-.424E-28	.174E+04	.763E+10	-.532E-19
474.0	-.284E-32	.356E-23	-.898E-20	-.720E-32	.174E+04	.763E+10	.312E-20
480.0	-.377E-31	.288E-23	-.111E-24	-.467E-32	.174E+04	.763E+10	.120E-26
486.0	-.589E-31	.224E-23	-.102E-24	-.266E-32	.174E+04	.763E+10	.192E-26
492.0	-.696E-31	.166E-23	-.897E-25	-.112E-32	.174E+04	.763E+10	.232E-26
498.0	-.724E-31	.117E-23	-.758E-25	-.844E-35	.174E+04	.763E+10	.247E-26
504.0	-.697E-31	.755E-24	-.616E-25	.748E-33	.174E+04	.763E+10	.243E-26
510.0	-.634E-31	.426E-24	-.480E-25	.121E-32	.174E+04	.763E+10	.226E-26
516.0	-.551E-31	.175E-24	-.357E-25	.145E-32	.174E+04	.763E+10	.201E-26
522.0	-.460E-31	-.592E-26	-.249E-25	.152E-32	.174E+04	.763E+10	.171E-26
528.0	-.369E-31	-.128E-24	-.159E-25	.146E-32	.174E+04	.763E+10	.140E-26
534.0	-.284E-31	-.201E-24	-.861E-26	.133E-32	.174E+04	.763E+10	.110E-26
540.0	-.209E-31	-.235E-24	-.302E-26	.116E-32	.174E+04	.763E+10	.828E-27
546.0	-.145E-31	-.240E-24	.106E-26	.976E-33	.174E+04	.763E+10	.585E-27
552.0	-.921E-32	-.225E-24	.385E-26	.793E-33	.174E+04	.763E+10	.379E-27
558.0	-.498E-32	-.197E-24	.555E-26	.627E-33	.174E+04	.763E+10	.209E-27
564.0	-.169E-32	-.160E-24	.637E-26	.486E-33	.174E+04	.763E+10	.719E-28
570.0	.853E-33	-.122E-24	.647E-26	.375E-33	.174E+04	.763E+10	-.371E-28
576.0	.282E-32	-.840E-25	.600E-26	.294E-33	.174E+04	.763E+10	-.125E-27
582.0	.439E-32	-.506E-25	.507E-26	.241E-33	.174E+04	.763E+10	-.197E-27
588.0	.571E-32	-.240E-25	.374E-26	.212E-33	.174E+04	.763E+10	-.262E-27
594.0	.693E-32	-.638E-26	.205E-26	.200E-33	.174E+04	.763E+10	-.323E-27
600.0	.812E-32	.000E+00	.000E+00	.198E-33	.174E+04	.763E+10	-.384E-27

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.763E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .850E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .241E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.139E-16
MAXIMUM BENDING MOMENT = -.868E+06 LBS-IN
MAXIMUM SHEAR FORCE = .250E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 10

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .260E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X DEFLECTION MOMENT SHEAR SLOPE TOTAL FLEXURAL SOIL

IN	IN	LBS-IN	LBS	RAD.	STRESS LBS/IN**2	RIGIDITY LBS-IN**2	REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.267E+00	-.920E+06	.260E+05	.231E-16	.493E+04	.763E+10	-.265E+03
6.0	.264E+00	-.768E+06	.243E+05	-.664E-03	.440E+04	.763E+10	-.289E+03
12.0	.259E+00	-.626E+06	.225E+05	-.121E-02	.391E+04	.763E+10	-.312E+03
18.0	.250E+00	-.494E+06	.206E+05	-.165E-02	.345E+04	.763E+10	-.334E+03
24.0	.239E+00	-.374E+06	.185E+05	-.199E-02	.304E+04	.763E+10	-.354E+03
30.0	.226E+00	-.266E+06	.163E+05	-.225E-02	.266E+04	.763E+10	-.373E+03
36.0	.212E+00	-.171E+06	.141E+05	-.242E-02	.233E+04	.763E+10	-.390E+03
42.0	.197E+00	-.902E+05	.117E+05	-.252E-02	.205E+04	.763E+10	-.406E+03
48.0	.182E+00	-.236E+05	.919E+04	-.257E-02	.182E+04	.763E+10	-.420E+03
54.0	.166E+00	.278E+05	.663E+04	-.256E-02	.183E+04	.763E+10	-.433E+03
60.0	.151E+00	.636E+05	.492E+04	-.253E-02	.196E+04	.763E+10	-.135E+03
66.0	.136E+00	.945E+05	.418E+04	-.247E-02	.206E+04	.763E+10	-.114E+03
72.0	.121E+00	.121E+06	.350E+04	-.238E-02	.216E+04	.763E+10	-.110E+03
78.0	.107E+00	.144E+06	.286E+04	-.228E-02	.223E+04	.763E+10	-.106E+03
84.0	.939E-01	.162E+06	.224E+04	-.216E-02	.230E+04	.763E+10	-.101E+03
90.0	.814E-01	.177E+06	.165E+04	-.202E-02	.235E+04	.763E+10	-.963E+02
96.0	.696E-01	.188E+06	.108E+04	-.188E-02	.239E+04	.763E+10	-.914E+02
102.0	.588E-01	.196E+06	.550E+03	-.173E-02	.242E+04	.763E+10	-.864E+02
108.0	.489E-01	.200E+06	.472E+02	-.157E-02	.243E+04	.763E+10	-.812E+02
114.0	.399E-01	.201E+06	-.424E+03	-.142E-02	.243E+04	.763E+10	-.759E+02
120.0	.319E-01	.199E+06	-.864E+03	-.126E-02	.243E+04	.763E+10	-.705E+02
126.0	.248E-01	.194E+06	-.127E+04	-.110E-02	.241E+04	.763E+10	-.648E+02
132.0	.187E-01	.187E+06	-.164E+04	-.954E-03	.239E+04	.763E+10	-.589E+02
138.0	.134E-01	.177E+06	-.198E+04	-.811E-03	.235E+04	.763E+10	-.527E+02
144.0	.893E-02	.166E+06	-.227E+04	-.676E-03	.231E+04	.763E+10	-.461E+02
150.0	.527E-02	.152E+06	-.253E+04	-.551E-03	.226E+04	.763E+10	-.387E+02
156.0	.232E-02	.137E+06	-.273E+04	-.437E-03	.221E+04	.763E+10	-.294E+02
162.0	.260E-04	.121E+06	-.284E+04	-.335E-03	.216E+04	.763E+10	-.648E+01
168.0	-.170E-02	.104E+06	-.278E+04	-.247E-03	.210E+04	.763E+10	.265E+02
174.0	-.294E-02	.882E+05	-.261E+04	-.171E-03	.204E+04	.763E+10	.318E+02
180.0	-.376E-02	.733E+05	-.241E+04	-.108E-03	.199E+04	.763E+10	.345E+02
186.0	-.423E-02	.596E+05	-.219E+04	-.555E-04	.194E+04	.763E+10	.359E+02
192.0	-.442E-02	.472E+05	-.198E+04	-.136E-04	.190E+04	.763E+10	.365E+02
198.0	-.439E-02	.359E+05	-.176E+04	.191E-04	.186E+04	.763E+10	.364E+02
204.0	-.419E-02	.260E+05	-.154E+04	.435E-04	.183E+04	.763E+10	.358E+02
210.0	-.387E-02	.173E+05	-.133E+04	.605E-04	.180E+04	.763E+10	.349E+02
216.0	-.347E-02	.984E+04	-.112E+04	.712E-04	.177E+04	.763E+10	.336E+02
222.0	-.302E-02	.359E+04	-.927E+03	.764E-04	.175E+04	.763E+10	.321E+02
228.0	-.255E-02	-.152E+04	-.740E+03	.773E-04	.174E+04	.763E+10	.304E+02
234.0	-.209E-02	-.552E+04	-.564E+03	.745E-04	.176E+04	.763E+10	.284E+02
240.0	-.166E-02	-.850E+04	-.400E+03	.690E-04	.177E+04	.763E+10	.263E+02
246.0	-.126E-02	-.105E+05	-.249E+03	.615E-04	.177E+04	.763E+10	.240E+02
252.0	-.919E-03	-.117E+05	-.112E+03	.528E-04	.178E+04	.763E+10	.216E+02
258.0	-.630E-03	-.120E+05	.101E+02	.434E-04	.178E+04	.763E+10	.190E+02
264.0	-.398E-03	-.117E+05	.116E+03	.341E-04	.178E+04	.763E+10	.163E+02
270.0	-.221E-03	-.107E+05	.206E+03	.253E-04	.177E+04	.763E+10	.134E+02
276.0	-.942E-04	-.929E+04	.276E+03	.174E-04	.177E+04	.763E+10	.101E+02
282.0	-.116E-04	-.747E+04	.322E+03	.108E-04	.176E+04	.763E+10	.500E+01
288.0	.358E-04	-.546E+04	.315E+03	.575E-05	.176E+04	.763E+10	-.733E+01
294.0	.574E-04	-.371E+04	.268E+03	.215E-05	.175E+04	.763E+10	-.858E+01
300.0	.616E-04	-.226E+04	.216E+03	-.198E-06	.174E+04	.763E+10	-.878E+01
306.0	.551E-04	-.112E+04	.164E+03	-.152E-05	.174E+04	.763E+10	-.845E+01
312.0	.433E-04	-.284E+03	.115E+03	-.208E-05	.174E+04	.763E+10	-.780E+01
318.0	.302E-04	.270E+03	.710E+02	-.208E-05	.174E+04	.763E+10	-.692E+01
324.0	.183E-04	.575E+03	.327E+02	-.175E-05	.174E+04	.763E+10	-.586E+01
330.0	.918E-05	.668E+03	.117E+01	-.126E-05	.174E+04	.763E+10	-.465E+01
336.0	.320E-05	.593E+03	-.226E+02	-.764E-06	.174E+04	.763E+10	-.327E+01
342.0	.118E-07	.399E+03	-.336E+02	-.374E-06	.174E+04	.763E+10	-.571E+00
348.0	-.129E-05	.190E+03	-.275E+02	-.143E-06	.174E+04	.763E+10	.241E+01
354.0	-.170E-05	.692E+02	-.122E+02	-.409E-07	.174E+04	.763E+10	.264E+01
360.0	-.178E-05	.443E+02	-.371E+01	.377E-08	.174E+04	.763E+10	.142E+00
366.0	-.166E-05	.246E+02	-.286E+01	.309E-07	.174E+04	.763E+10	.139E+00
372.0	-.141E-05	.990E+01	-.206E+01	.444E-07	.174E+04	.763E+10	.125E+00
378.0	-.112E-05	-.225E+00	-.136E+01	.482E-07	.174E+04	.763E+10	.105E+00
384.0	-.835E-06	-.652E+01	-.788E+00	.456E-07	.174E+04	.763E+10	.820E-01
390.0	-.577E-06	-.982E+01	-.358E+00	.392E-07	.174E+04	.763E+10	.594E-01
396.0	-.365E-06	-.109E+02	-.581E-01	.310E-07	.174E+04	.763E+10	.393E-01
402.0	-.205E-06	-.106E+02	.131E+00	.225E-07	.174E+04	.763E+10	.230E-01
408.0	-.945E-07	-.943E+01	.235E+00	.147E-07	.174E+04	.763E+10	.111E-01
414.0	-.288E-07	-.783E+01	.279E+00	.788E-08	.174E+04	.763E+10	.351E-02
420.0	-.524E-11	-.610E+01	.652E+00	.240E-08	.174E+04	.763E+10	.872E-01
426.0	.166E-10	-.816E-02	.508E+00	.437E-12	.174E+04	.763E+10	-.107E+00
432.0	.401E-15	.352E-02	.679E-03	-.139E-11	.174E+04	.763E+10	-.271E-03
438.0	-.929E-16	.124E-06	-.294E-03	-.334E-16	.174E+04	.763E+10	.622E-04
444.0	-.431E-20	-.197E-07	-.104E-07	.774E-17	.174E+04	.763E+10	.290E-08
450.0	.519E-21	-.113E-11	.164E-08	.359E-21	.174E+04	.763E+10	-.347E-09

456.0	.357E-25	.110E-12	.945E-13	-.432E-22	.174E+04	.763E+10	-.240E-13
462.0	-.290E-26	.879E-17	-.916E-14	-.297E-26	.174E+04	.763E+10	.194E-14
468.0	-.264E-30	-.614E-18	-.733E-18	.241E-27	.174E+04	.763E+10	.177E-18
474.0	.162E-31	-.193E-22	.512E-19	.391E-31	.174E+04	.763E+10	-.108E-19
480.0	.205E-30	-.156E-22	.603E-24	.254E-31	.174E+04	.763E+10	-.401E-26
486.0	.321E-30	-.122E-22	.554E-24	.144E-31	.174E+04	.763E+10	-.642E-26
492.0	.378E-30	-.904E-23	.487E-24	.608E-32	.174E+04	.763E+10	-.776E-26
498.0	.394E-30	-.634E-23	.412E-24	.303E-34	.174E+04	.763E+10	-.826E-26
504.0	.379E-30	-.410E-23	.335E-24	-.408E-32	.174E+04	.763E+10	-.813E-26
510.0	.345E-30	-.231E-23	.261E-24	-.660E-32	.174E+04	.763E+10	-.756E-26
516.0	.300E-30	-.950E-24	.194E-24	-.788E-32	.174E+04	.763E+10	-.671E-26
522.0	.250E-30	.347E-25	.135E-24	-.824E-32	.174E+04	.763E+10	-.572E-26
528.0	.201E-30	.696E-24	.862E-25	-.796E-32	.174E+04	.763E+10	-.469E-26
534.0	.155E-30	.109E-23	.467E-25	-.725E-32	.174E+04	.763E+10	-.369E-26
540.0	.114E-30	.128E-23	.164E-25	-.632E-32	.174E+04	.763E+10	-.276E-26
546.0	.787E-31	.131E-23	-.584E-26	-.530E-32	.174E+04	.763E+10	-.195E-26
552.0	.500E-31	.122E-23	-.210E-25	-.431E-32	.174E+04	.763E+10	-.126E-26
558.0	.270E-31	.107E-23	-.302E-25	-.340E-32	.174E+04	.763E+10	-.696E-27
564.0	.913E-32	.872E-24	-.346E-25	-.264E-32	.174E+04	.763E+10	-.239E-27
570.0	-.466E-32	.661E-24	-.352E-25	-.204E-32	.174E+04	.763E+10	.125E-27
576.0	-.153E-31	.457E-24	-.326E-25	-.160E-32	.174E+04	.763E+10	.417E-27
582.0	-.238E-31	.275E-24	-.275E-25	-.131E-32	.174E+04	.763E+10	.660E-27
588.0	-.311E-31	.130E-24	-.203E-25	-.115E-32	.174E+04	.763E+10	.874E-27
594.0	-.377E-31	.347E-25	-.111E-25	-.109E-32	.174E+04	.763E+10	.108E-26
600.0	-.441E-31	.000E+00	.000E+00	-.107E-32	.174E+04	.763E+10	.128E-26

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .157E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.156E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .267E+00 IN
COMPUTED SLOPE AT PILE HEAD = .231E-16
MAXIMUM BENDING MOMENT = -.920E+06 LBS-IN
MAXIMUM SHEAR FORCE = .260E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .320E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.456E+00	-.125E+07	.320E+05	.231E-16	.609E+04	.763E+10	-.304E+03
6.0	.453E+00	-.107E+07	.301E+05	-.912E-03	.544E+04	.763E+10	-.331E+03
12.0	.445E+00	-.890E+06	.280E+05	-.168E-02	.482E+04	.763E+10	-.358E+03
18.0	.433E+00	-.725E+06	.258E+05	-.232E-02	.425E+04	.763E+10	-.383E+03
24.0	.417E+00	-.573E+06	.234E+05	-.283E-02	.373E+04	.763E+10	-.407E+03
30.0	.399E+00	-.435E+06	.209E+05	-.322E-02	.325E+04	.763E+10	-.430E+03
36.0	.379E+00	-.312E+06	.183E+05	-.352E-02	.282E+04	.763E+10	-.451E+03
42.0	.357E+00	-.205E+06	.155E+05	-.372E-02	.245E+04	.763E+10	-.471E+03
48.0	.334E+00	-.115E+06	.126E+05	-.385E-02	.213E+04	.763E+10	-.489E+03
54.0	.311E+00	-.420E+05	.964E+04	-.391E-02	.188E+04	.763E+10	-.506E+03
60.0	.287E+00	.127E+05	.762E+04	-.392E-02	.178E+04	.763E+10	-.167E+03
66.0	.264E+00	.613E+05	.670E+04	-.389E-02	.195E+04	.763E+10	-.142E+03
72.0	.240E+00	.105E+06	.585E+04	-.382E-02	.210E+04	.763E+10	-.138E+03
78.0	.218E+00	.143E+06	.504E+04	-.373E-02	.223E+04	.763E+10	-.134E+03
84.0	.196E+00	.176E+06	.425E+04	-.360E-02	.235E+04	.763E+10	-.129E+03
90.0	.175E+00	.205E+06	.349E+04	-.345E-02	.245E+04	.763E+10	-.124E+03
96.0	.154E+00	.229E+06	.276E+04	-.328E-02	.253E+04	.763E+10	-.119E+03
102.0	.135E+00	.248E+06	.206E+04	-.309E-02	.260E+04	.763E+10	-.114E+03
108.0	.117E+00	.263E+06	.139E+04	-.289E-02	.265E+04	.763E+10	-.109E+03

114.0	.100E+00	.273E+06	.757E+03	-.268E-02	.268E+04	.763E+10	-.103E+03
120.0	.850E-01	.280E+06	.154E+03	-.246E-02	.271E+04	.763E+10	-.977E+02
126.0	.709E-01	.282E+06	-.415E+03	-.224E-02	.272E+04	.763E+10	-.919E+02
132.0	.581E-01	.281E+06	-.949E+03	-.202E-02	.271E+04	.763E+10	-.860E+02
138.0	.466E-01	.277E+06	-.145E+04	-.180E-02	.270E+04	.763E+10	-.800E+02
144.0	.365E-01	.270E+06	-.191E+04	-.159E-02	.267E+04	.763E+10	-.737E+02
150.0	.276E-01	.259E+06	-.233E+04	-.138E-02	.264E+04	.763E+10	-.671E+02
156.0	.199E-01	.246E+06	-.271E+04	-.118E-02	.259E+04	.763E+10	-.602E+02
162.0	.134E-01	.230E+06	-.305E+04	-.994E-03	.253E+04	.763E+10	-.528E+02
168.0	.797E-02	.212E+06	-.334E+04	-.821E-03	.247E+04	.763E+10	-.444E+02
174.0	.355E-02	.192E+06	-.358E+04	-.662E-03	.240E+04	.763E+10	-.339E+02
180.0	.353E-04	.171E+06	-.370E+04	-.519E-03	.233E+04	.763E+10	-.724E+01
186.0	-.267E-02	.149E+06	-.363E+04	-.393E-03	.225E+04	.763E+10	.308E+02
192.0	-.468E-02	.129E+06	-.343E+04	-.283E-03	.218E+04	.763E+10	.372E+02
198.0	-.607E-02	.109E+06	-.319E+04	-.190E-03	.212E+04	.763E+10	.405E+02
204.0	-.695E-02	.909E+05	-.295E+04	-.111E-03	.205E+04	.763E+10	.424E+02
210.0	-.741E-02	.741E+05	-.269E+04	-.462E-04	.199E+04	.763E+10	.433E+02
216.0	-.751E-02	.588E+05	-.243E+04	.613E-05	.194E+04	.763E+10	.435E+02
222.0	-.733E-02	.450E+05	-.217E+04	.470E-04	.189E+04	.763E+10	.432E+02
228.0	-.694E-02	.327E+05	-.191E+04	.775E-04	.185E+04	.763E+10	.424E+02
234.0	-.640E-02	.218E+05	-.166E+04	.989E-04	.181E+04	.763E+10	.413E+02
240.0	-.576E-02	.124E+05	-.142E+04	.112E-03	.178E+04	.763E+10	.398E+02
246.0	-.505E-02	.449E+04	-.118E+04	.119E-03	.175E+04	.763E+10	.381E+02
252.0	-.433E-02	-.211E+04	-.960E+03	.120E-03	.174E+04	.763E+10	.362E+02
258.0	-.361E-02	-.739E+04	-.749E+03	.116E-03	.176E+04	.763E+10	.341E+02
264.0	-.293E-02	-.114E+05	-.552E+03	.109E-03	.178E+04	.763E+10	.318E+02
270.0	-.231E-02	-.143E+05	-.368E+03	.987E-04	.179E+04	.763E+10	.294E+02
276.0	-.175E-02	-.162E+05	-.200E+03	.867E-04	.179E+04	.763E+10	.268E+02
282.0	-.127E-02	-.170E+05	-.474E+02	.737E-04	.180E+04	.763E+10	.240E+02
288.0	-.865E-03	-.170E+05	.883E+02	.603E-04	.179E+04	.763E+10	.212E+02
294.0	-.543E-03	-.161E+05	.206E+03	.473E-04	.179E+04	.763E+10	.181E+02
300.0	-.297E-03	-.146E+05	.305E+03	.352E-04	.179E+04	.763E+10	.148E+02
306.0	-.120E-03	-.126E+05	.382E+03	.245E-04	.178E+04	.763E+10	.110E+02
312.0	-.221E-05	-.101E+05	.424E+03	.156E-04	.177E+04	.763E+10	.291E+01
318.0	.678E-04	-.753E+04	.405E+03	.870E-05	.176E+04	.763E+10	-.905E+01
324.0	.102E-03	-.527E+04	.347E+03	.367E-05	.175E+04	.763E+10	-.104E+02
330.0	.112E-03	-.338E+04	.283E+03	.266E-06	.175E+04	.763E+10	-.107E+02
336.0	.105E-03	-.187E+04	.220E+03	-.180E-05	.174E+04	.763E+10	-.105E+02
342.0	.902E-04	-.737E+03	.158E+03	-.282E-05	.174E+04	.763E+10	-.996E+01
348.0	.715E-04	.383E+02	.101E+03	-.310E-05	.174E+04	.763E+10	-.922E+01
354.0	.530E-04	.482E+03	.481E+02	-.289E-05	.174E+04	.763E+10	-.834E+01
360.0	.368E-04	.624E+03	.142E+02	-.246E-05	.174E+04	.763E+10	-.295E+01
366.0	.235E-04	.659E+03	-.689E+00	-.196E-05	.174E+04	.763E+10	-.199E+01
372.0	.133E-04	.621E+03	-.103E+02	-.145E-05	.174E+04	.763E+10	-.119E+01
378.0	.603E-05	.540E+03	-.156E+02	-.996E-06	.174E+04	.763E+10	-.569E+00
384.0	.132E-05	.438E+03	-.177E+02	-.612E-06	.174E+04	.763E+10	-.131E+00
390.0	-.131E-05	.330E+03	-.176E+02	-.310E-06	.174E+04	.763E+10	.137E+00
396.0	-.239E-05	.227E+03	-.165E+02	-.910E-07	.174E+04	.763E+10	.261E+00
402.0	-.241E-05	.133E+03	-.148E+02	.503E-07	.174E+04	.763E+10	.274E+00
408.0	-.179E-05	.485E+02	-.134E+02	.122E-06	.174E+04	.763E+10	.212E+00
414.0	-.947E-06	-.282E+02	-.124E+02	.130E-06	.174E+04	.763E+10	.117E+00
420.0	-.236E-06	-.101E+03	-.163E+01	.789E-07	.174E+04	.763E+10	.345E+01
426.0	.207E-09	-.481E+02	.807E+01	.204E-07	.174E+04	.763E+10	-.321E+00
432.0	.927E-08	-.388E+01	.417E+01	-.146E-10	.174E+04	.763E+10	-.101E+01
438.0	.325E-10	.195E+01	.324E+00	-.772E-09	.174E+04	.763E+10	-.133E+00
444.0	-.550E-12	.713E-02	-.163E+00	-.271E-11	.174E+04	.763E+10	.346E-01
450.0	-.194E-15	-.116E-03	-.594E-03	.458E-13	.174E+04	.763E+10	.126E-03
456.0	.307E-17	-.424E-07	.970E-05	.162E-16	.174E+04	.763E+10	-.208E-05
462.0	.115E-20	.649E-09	.354E-08	-.256E-18	.174E+04	.763E+10	-.751E-09
468.0	-.171E-22	.252E-12	-.541E-10	-.961E-22	.174E+04	.763E+10	.116E-10
474.0	-.667E-26	-.117E-14	-.210E-13	.239E-23	.174E+04	.763E+10	.435E-14
480.0	.116E-22	-.947E-15	.361E-16	.156E-23	.174E+04	.763E+10	-.229E-18
486.0	.187E-22	-.738E-15	.332E-16	.898E-24	.174E+04	.763E+10	-.378E-18
492.0	.224E-22	-.550E-15	.293E-16	.391E-24	.174E+04	.763E+10	-.463E-18
498.0	.234E-22	-.388E-15	.248E-16	.225E-25	.174E+04	.763E+10	-.496E-18
504.0	.226E-22	-.252E-15	.202E-16	-.229E-24	.174E+04	.763E+10	-.490E-18
510.0	.207E-22	-.144E-15	.158E-16	-.385E-24	.174E+04	.763E+10	-.457E-18
516.0	.180E-22	-.613E-16	.118E-16	-.466E-24	.174E+04	.763E+10	-.407E-18
522.0	.151E-22	-.124E-17	.826E-17	-.490E-24	.174E+04	.763E+10	-.348E-18
528.0	.121E-22	.393E-16	.530E-17	-.475E-24	.174E+04	.763E+10	-.286E-18
534.0	.937E-23	.638E-16	.291E-17	-.435E-24	.174E+04	.763E+10	-.226E-18
540.0	.691E-23	.756E-16	.107E-17	-.380E-24	.174E+04	.763E+10	-.170E-18
546.0	.481E-23	.778E-16	-.283E-18	-.320E-24	.174E+04	.763E+10	-.120E-18
552.0	.308E-23	.731E-16	-.121E-17	-.260E-24	.174E+04	.763E+10	-.785E-19
558.0	.169E-23	.640E-16	-.178E-17	-.207E-24	.174E+04	.763E+10	-.438E-19
564.0	.597E-24	.524E-16	-.206E-17	-.161E-24	.174E+04	.763E+10	-.158E-19
570.0	-.244E-24	.398E-16	-.210E-17	-.125E-24	.174E+04	.763E+10	.656E-20
576.0	-.897E-24	.275E-16	-.196E-17	-.980E-25	.174E+04	.763E+10	.246E-19
582.0	-.142E-23	.166E-16	-.166E-17	-.807E-25	.174E+04	.763E+10	.396E-19

588.0	-.186E-23	.787E-17	-.123E-17	-.711E-25	.174E+04	.763E+10	.530E-19
594.0	-.227E-23	.210E-17	-.672E-18	-.672E-25	.174E+04	.763E+10	.656E-19
600.0	-.267E-23	.000E+00	.000E+00	-.663E-25	.174E+04	.763E+10	.784E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .809E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.732E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .456E+00 IN
COMPUTED SLOPE AT PILE HEAD = .231E-16
MAXIMUM BENDING MOMENT = -.125E+07 LBS-IN
MAXIMUM SHEAR FORCE = .320E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.494E+00	-.131E+07	.330E+05	-.370E-16	.629E+04	.763E+10	-.310E+03
6.0	.491E+00	-.112E+07	.311E+05	-.956E-03	.562E+04	.763E+10	-.338E+03
12.0	.482E+00	-.937E+06	.289E+05	-.176E-02	.499E+04	.763E+10	-.365E+03
18.0	.470E+00	-.767E+06	.267E+05	-.243E-02	.440E+04	.763E+10	-.391E+03
24.0	.453E+00	-.609E+06	.243E+05	-.298E-02	.385E+04	.763E+10	-.416E+03
30.0	.434E+00	-.466E+06	.217E+05	-.340E-02	.336E+04	.763E+10	-.439E+03
36.0	.412E+00	-.339E+06	.190E+05	-.372E-02	.291E+04	.763E+10	-.461E+03
42.0	.389E+00	-.227E+06	.162E+05	-.394E-02	.253E+04	.763E+10	-.481E+03
48.0	.365E+00	-.133E+06	.132E+05	-.408E-02	.220E+04	.763E+10	-.500E+03
54.0	.340E+00	-.564E+05	.102E+05	-.415E-02	.193E+04	.763E+10	-.518E+03
60.0	.315E+00	.151E+04	.810E+04	-.418E-02	.174E+04	.763E+10	-.172E+03
66.0	.290E+00	.533E+05	.714E+04	-.415E-02	.192E+04	.763E+10	-.147E+03
72.0	.265E+00	.996E+05	.627E+04	-.409E-02	.208E+04	.763E+10	-.143E+03
78.0	.241E+00	.141E+06	.543E+04	-.400E-02	.222E+04	.763E+10	-.138E+03
84.0	.217E+00	.177E+06	.461E+04	-.387E-02	.235E+04	.763E+10	-.134E+03
90.0	.195E+00	.208E+06	.382E+04	-.372E-02	.246E+04	.763E+10	-.129E+03
96.0	.173E+00	.234E+06	.307E+04	-.355E-02	.255E+04	.763E+10	-.124E+03
102.0	.152E+00	.255E+06	.234E+04	-.336E-02	.262E+04	.763E+10	-.119E+03
108.0	.132E+00	.272E+06	.164E+04	-.315E-02	.268E+04	.763E+10	-.113E+03
114.0	.114E+00	.284E+06	.981E+03	-.293E-02	.272E+04	.763E+10	-.108E+03
120.0	.973E-01	.293E+06	.351E+03	-.270E-02	.275E+04	.763E+10	-.102E+03
126.0	.817E-01	.297E+06	-.244E+03	-.247E-02	.277E+04	.763E+10	-.964E+02
132.0	.676E-01	.297E+06	-.805E+03	-.224E-02	.277E+04	.763E+10	-.905E+02
138.0	.548E-01	.294E+06	-.133E+04	-.201E-02	.276E+04	.763E+10	-.844E+02
144.0	.435E-01	.287E+06	-.182E+04	-.178E-02	.273E+04	.763E+10	-.781E+02
150.0	.335E-01	.277E+06	-.227E+04	-.156E-02	.270E+04	.763E+10	-.716E+02
156.0	.248E-01	.265E+06	-.268E+04	-.134E-02	.265E+04	.763E+10	-.648E+02
162.0	.174E-01	.249E+06	-.304E+04	-.114E-02	.260E+04	.763E+10	-.575E+02
168.0	.111E-01	.231E+06	-.336E+04	-.953E-03	.254E+04	.763E+10	-.496E+02
174.0	.594E-02	.212E+06	-.363E+04	-.779E-03	.247E+04	.763E+10	-.402E+02
180.0	.177E-02	.190E+06	-.384E+04	-.621E-03	.240E+04	.763E+10	-.268E+02
186.0	-.151E-02	.168E+06	-.384E+04	-.480E-03	.232E+04	.763E+10	.255E+02
192.0	-.399E-02	.146E+06	-.366E+04	-.357E-03	.224E+04	.763E+10	.352E+02
198.0	-.579E-02	.125E+06	-.343E+04	-.251E-03	.217E+04	.763E+10	.399E+02
204.0	-.700E-02	.105E+06	-.319E+04	-.160E-03	.210E+04	.763E+10	.425E+02
210.0	-.771E-02	.870E+05	-.293E+04	-.847E-04	.204E+04	.763E+10	.439E+02
216.0	-.802E-02	.703E+05	-.266E+04	-.229E-04	.198E+04	.763E+10	.445E+02
222.0	-.799E-02	.551E+05	-.239E+04	.264E-04	.193E+04	.763E+10	.444E+02
228.0	-.770E-02	.415E+05	-.213E+04	.644E-04	.188E+04	.763E+10	.439E+02
234.0	-.721E-02	.293E+05	-.187E+04	.922E-04	.184E+04	.763E+10	.429E+02
240.0	-.659E-02	.187E+05	-.162E+04	.111E-03	.180E+04	.763E+10	.417E+02

246.0	-.588E-02	.963E+04	-.137E+04	.122E-03	.177E+04	.763E+10	.401E+02
252.0	-.512E-02	.194E+04	-.113E+04	.127E-03	.174E+04	.763E+10	.383E+02
258.0	-.436E-02	-.437E+04	-.911E+03	.126E-03	.175E+04	.763E+10	.363E+02
264.0	-.361E-02	-.937E+04	-.700E+03	.120E-03	.177E+04	.763E+10	.341E+02
270.0	-.291E-02	-.131E+05	-.502E+03	.112E-03	.178E+04	.763E+10	.317E+02
276.0	-.227E-02	-.157E+05	-.320E+03	.100E-03	.179E+04	.763E+10	.292E+02
282.0	-.171E-02	-.173E+05	-.152E+03	.873E-04	.180E+04	.763E+10	.266E+02
288.0	-.123E-02	-.178E+05	-.131E+01	.735E-04	.180E+04	.763E+10	.238E+02
294.0	-.828E-03	-.175E+05	.133E+03	.596E-04	.180E+04	.763E+10	.209E+02
300.0	-.511E-03	-.164E+05	.248E+03	.463E-04	.179E+04	.763E+10	.178E+02
306.0	-.272E-03	-.147E+05	.345E+03	.341E-04	.179E+04	.763E+10	.144E+02
312.0	-.102E-03	-.124E+05	.419E+03	.234E-04	.178E+04	.763E+10	.104E+02
318.0	.892E-05	-.970E+04	.437E+03	.147E-04	.177E+04	.763E+10	-.460E+01
324.0	.745E-04	-.718E+04	.395E+03	.811E-05	.176E+04	.763E+10	-.935E+01
330.0	.106E-03	-.499E+04	.335E+03	.332E-05	.175E+04	.763E+10	-.105E+02
336.0	.114E-03	-.317E+04	.271E+03	.116E-06	.175E+04	.763E+10	-.108E+02
342.0	.108E-03	-.174E+04	.207E+03	-.181E-05	.174E+04	.763E+10	-.106E+02
348.0	.927E-04	-.679E+03	.145E+03	-.276E-05	.174E+04	.763E+10	-.101E+02
354.0	.745E-04	.156E+02	.870E+02	-.302E-05	.174E+04	.763E+10	-.935E+01
360.0	.564E-04	.374E+03	.454E+02	-.287E-05	.174E+04	.763E+10	-.453E+01
366.0	.400E-04	.569E+03	.216E+02	-.250E-05	.174E+04	.763E+10	-.341E+01
372.0	.264E-04	.640E+03	.423E+01	-.202E-05	.174E+04	.763E+10	-.237E+01
378.0	.158E-04	.626E+03	-.737E+01	-.153E-05	.174E+04	.763E+10	-.149E+01
384.0	.809E-05	.556E+03	-.143E+02	-.106E-05	.174E+04	.763E+10	-.805E+00
390.0	.303E-05	.458E+03	-.176E+02	-.662E-06	.174E+04	.763E+10	-.317E+00
396.0	.140E-06	.347E+03	-.186E+02	-.346E-06	.174E+04	.763E+10	-.154E-01
402.0	-.112E-05	.235E+03	-.183E+02	-.117E-06	.174E+04	.763E+10	.127E+00
408.0	-.127E-05	.128E+03	-.175E+02	.256E-07	.174E+04	.763E+10	.150E+00
414.0	-.810E-06	.257E+02	-.167E+02	.860E-07	.174E+04	.763E+10	.100E+00
420.0	-.233E-06	-.729E+02	-.605E+01	.674E-07	.174E+04	.763E+10	.345E+01
426.0	-.897E-09	-.472E+02	.574E+01	.202E-07	.174E+04	.763E+10	.467E+00
432.0	.910E-08	-.404E+01	.409E+01	.790E-10	.174E+04	.763E+10	-.102E+01
438.0	.517E-10	.191E+01	.337E+00	-.759E-09	.174E+04	.763E+10	-.167E+00
444.0	-.775E-12	.113E-01	-.159E+00	-.431E-11	.174E+04	.763E+10	.416E-01
450.0	-.306E-15	-.164E-03	-.940E-03	.646E-13	.174E+04	.763E+10	.247E-03
456.0	.433E-17	-.667E-07	.137E-04	.255E-16	.174E+04	.763E+10	-.362E-05
462.0	.181E-20	.916E-09	.556E-08	-.360E-18	.174E+04	.763E+10	-.146E-08
468.0	-.241E-22	.393E-12	-.763E-10	-.151E-21	.174E+04	.763E+10	.202E-10
474.0	-.104E-25	-.164E-14	-.329E-13	.337E-23	.174E+04	.763E+10	.844E-14
480.0	.163E-22	-.133E-14	.509E-16	.220E-23	.174E+04	.763E+10	-.399E-18
486.0	.264E-22	-.104E-14	.469E-16	.127E-23	.174E+04	.763E+10	-.660E-18
492.0	.315E-22	-.776E-15	.413E-16	.552E-24	.174E+04	.763E+10	-.807E-18
498.0	.330E-22	-.547E-15	.350E-16	.317E-25	.174E+04	.763E+10	-.865E-18
504.0	.319E-22	-.356E-15	.285E-16	-.323E-24	.174E+04	.763E+10	-.855E-18
510.0	.291E-22	-.203E-15	.223E-16	-.543E-24	.174E+04	.763E+10	-.798E-18
516.0	.254E-22	-.864E-16	.166E-16	-.657E-24	.174E+04	.763E+10	-.711E-18
522.0	.213E-22	-.176E-17	.116E-16	-.692E-24	.174E+04	.763E+10	-.607E-18
528.0	.171E-22	.554E-16	.748E-17	-.670E-24	.174E+04	.763E+10	-.499E-18
534.0	.132E-22	.900E-16	.411E-17	-.613E-24	.174E+04	.763E+10	-.393E-18
540.0	.975E-23	.107E-15	.151E-17	-.536E-24	.174E+04	.763E+10	-.296E-18
546.0	.678E-23	.110E-15	-.399E-18	-.451E-24	.174E+04	.763E+10	-.210E-18
552.0	.434E-23	.103E-15	-.171E-17	-.367E-24	.174E+04	.763E+10	-.137E-18
558.0	.238E-23	.903E-16	-.251E-17	-.291E-24	.174E+04	.763E+10	-.764E-19
564.0	.842E-24	.739E-16	-.290E-17	-.227E-24	.174E+04	.763E+10	-.276E-19
570.0	-.343E-24	.561E-16	-.297E-17	-.176E-24	.174E+04	.763E+10	.114E-19
576.0	-.126E-23	.388E-16	-.276E-17	-.138E-24	.174E+04	.763E+10	.429E-19
582.0	-.200E-23	.234E-16	-.234E-17	-.114E-24	.174E+04	.763E+10	.691E-19
588.0	-.263E-23	.111E-16	-.173E-17	-.100E-24	.174E+04	.763E+10	.924E-19
594.0	-.320E-23	.296E-17	-.948E-18	-.947E-25	.174E+04	.763E+10	.114E-18
600.0	-.377E-23	.000E+00	.000E+00	-.935E-25	.174E+04	.763E+10	.137E-18

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .162E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .288E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .494E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.370E-16
MAXIMUM BENDING MOMENT = -.131E+07 LBS-IN
MAXIMUM SHEAR FORCE = .330E+05 LBS
NO. OF ITERATIONS = 31
NO. OF ZERO DEFLECTION POINTS = 9

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .340E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .250E+06 LBS

X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.533E+00	-.137E+07	.340E+05	-.139E-15	.650E+04	.763E+10	-.316E+03
6.0	.530E+00	-.117E+07	.320E+05	-.100E-02	.581E+04	.763E+10	-.344E+03
12.0	.521E+00	-.985E+06	.299E+05	-.185E-02	.516E+04	.763E+10	-.372E+03
18.0	.508E+00	-.809E+06	.276E+05	-.256E-02	.455E+04	.763E+10	-.399E+03
24.0	.491E+00	-.647E+06	.251E+05	-.313E-02	.398E+04	.763E+10	-.424E+03
30.0	.470E+00	-.499E+06	.225E+05	-.358E-02	.347E+04	.763E+10	-.448E+03
36.0	.448E+00	-.366E+06	.197E+05	-.392E-02	.301E+04	.763E+10	-.471E+03
42.0	.423E+00	-.251E+06	.168E+05	-.416E-02	.261E+04	.763E+10	-.492E+03
48.0	.398E+00	-.152E+06	.138E+05	-.432E-02	.226E+04	.763E+10	-.511E+03
54.0	.372E+00	-.717E+05	.107E+05	-.441E-02	.199E+04	.763E+10	-.530E+03
60.0	.345E+00	-.104E+05	.858E+04	-.444E-02	.177E+04	.763E+10	-.178E+03
66.0	.318E+00	.445E+05	.759E+04	-.443E-02	.189E+04	.763E+10	-.152E+03
72.0	.292E+00	.939E+05	.669E+04	-.437E-02	.206E+04	.763E+10	-.147E+03
78.0	.266E+00	.138E+06	.582E+04	-.428E-02	.222E+04	.763E+10	-.143E+03
84.0	.240E+00	.177E+06	.498E+04	-.416E-02	.235E+04	.763E+10	-.138E+03
90.0	.216E+00	.210E+06	.416E+04	-.401E-02	.247E+04	.763E+10	-.133E+03
96.0	.192E+00	.239E+06	.338E+04	-.383E-02	.256E+04	.763E+10	-.128E+03
102.0	.170E+00	.262E+06	.262E+04	-.363E-02	.265E+04	.763E+10	-.123E+03
108.0	.149E+00	.281E+06	.190E+04	-.342E-02	.271E+04	.763E+10	-.118E+03
114.0	.129E+00	.295E+06	.121E+04	-.319E-02	.276E+04	.763E+10	-.112E+03
120.0	.111E+00	.305E+06	.556E+03	-.296E-02	.280E+04	.763E+10	-.107E+03
126.0	.935E-01	.311E+06	-.666E+02	-.271E-02	.282E+04	.763E+10	-.101E+03
132.0	.780E-01	.312E+06	-.654E+03	-.247E-02	.282E+04	.763E+10	-.949E+02
138.0	.639E-01	.310E+06	-.121E+04	-.222E-02	.281E+04	.763E+10	-.888E+02
144.0	.513E-01	.305E+06	-.172E+04	-.198E-02	.279E+04	.763E+10	-.825E+02
150.0	.401E-01	.296E+06	-.220E+04	-.175E-02	.276E+04	.763E+10	-.761E+02
156.0	.304E-01	.284E+06	-.263E+04	-.152E-02	.272E+04	.763E+10	-.693E+02
162.0	.219E-01	.269E+06	-.303E+04	-.130E-02	.267E+04	.763E+10	-.622E+02
168.0	.147E-01	.251E+06	-.338E+04	-.110E-02	.261E+04	.763E+10	-.545E+02
174.0	.876E-02	.231E+06	-.368E+04	-.907E-03	.254E+04	.763E+10	-.458E+02
180.0	.387E-02	.210E+06	-.392E+04	-.733E-03	.246E+04	.763E+10	-.349E+02
186.0	-.337E-04	.187E+06	-.400E+04	-.577E-03	.238E+04	.763E+10	.725E+01
192.0	-.306E-02	.163E+06	-.388E+04	-.440E-03	.230E+04	.763E+10	.322E+02
198.0	-.531E-02	.141E+06	-.367E+04	-.320E-03	.223E+04	.763E+10	.388E+02
204.0	-.689E-02	.120E+06	-.343E+04	-.217E-03	.215E+04	.763E+10	.423E+02
210.0	-.791E-02	.101E+06	-.317E+04	-.130E-03	.209E+04	.763E+10	.443E+02
216.0	-.845E-02	.827E+05	-.290E+04	-.577E-04	.202E+04	.763E+10	.453E+02
222.0	-.860E-02	.662E+05	-.263E+04	.900E-06	.197E+04	.763E+10	.455E+02
228.0	-.844E-02	.512E+05	-.236E+04	.471E-04	.191E+04	.763E+10	.452E+02
234.0	-.804E-02	.378E+05	-.209E+04	.820E-04	.187E+04	.763E+10	.445E+02
240.0	-.746E-02	.259E+05	-.182E+04	.107E-03	.183E+04	.763E+10	.434E+02
246.0	-.675E-02	.156E+05	-.157E+04	.123E-03	.179E+04	.763E+10	.420E+02
252.0	-.597E-02	.674E+04	-.132E+04	.132E-03	.176E+04	.763E+10	.403E+02
258.0	-.517E-02	-.655E+03	-.108E+04	.135E-03	.174E+04	.763E+10	.384E+02
264.0	-.436E-02	-.667E+04	-.860E+03	.132E-03	.176E+04	.763E+10	.363E+02
270.0	-.359E-02	-.114E+05	-.649E+03	.125E-03	.178E+04	.763E+10	.340E+02
276.0	-.287E-02	-.148E+05	-.452E+03	.114E-03	.179E+04	.763E+10	.316E+02
282.0	-.221E-02	-.171E+05	-.270E+03	.102E-03	.180E+04	.763E+10	.290E+02
288.0	-.164E-02	-.184E+05	-.105E+03	.878E-04	.180E+04	.763E+10	.262E+02
294.0	-.116E-02	-.187E+05	.438E+02	.732E-04	.180E+04	.763E+10	.234E+02
300.0	-.766E-03	-.181E+05	.175E+03	.588E-04	.180E+04	.763E+10	.203E+02
306.0	-.456E-03	-.167E+05	.287E+03	.451E-04	.179E+04	.763E+10	.171E+02
312.0	-.225E-03	-.148E+05	.379E+03	.327E-04	.179E+04	.763E+10	.135E+02
318.0	-.634E-04	-.123E+05	.446E+03	.221E-04	.178E+04	.763E+10	.886E+01
324.0	.401E-04	-.947E+04	.450E+03	.135E-04	.177E+04	.763E+10	-.760E+01
330.0	.989E-04	-.693E+04	.396E+03	.707E-05	.176E+04	.763E+10	-.103E+02
336.0	.125E-03	-.474E+04	.332E+03	.248E-05	.175E+04	.763E+10	-.111E+02
342.0	.129E-03	-.295E+04	.265E+03	-.545E-06	.175E+04	.763E+10	-.112E+02
348.0	.118E-03	-.156E+04	.198E+03	-.232E-05	.174E+04	.763E+10	-.109E+02
354.0	.101E-03	-.567E+03	.135E+03	-.316E-05	.174E+04	.763E+10	-.103E+02
360.0	.805E-04	.587E+02	.841E+02	-.336E-05	.174E+04	.763E+10	-.646E+01
366.0	.605E-04	.452E+03	.492E+02	-.316E-05	.174E+04	.763E+10	-.514E+01
372.0	.426E-04	.659E+03	.223E+02	-.272E-05	.174E+04	.763E+10	-.383E+01

378.0	.278E-04	.728E+03	.292E+01	-.218E-05	.174E+04	.763E+10	-.263E+01
384.0	.165E-04	.701E+03	-.991E+01	-.161E-05	.174E+04	.763E+10	-.164E+01
390.0	.845E-05	.614E+03	-.175E+02	-.110E-05	.174E+04	.763E+10	-.881E+00
396.0	.331E-05	.494E+03	-.212E+02	-.662E-06	.174E+04	.763E+10	-.361E+00
402.0	.504E-06	.361E+03	-.225E+02	-.326E-06	.174E+04	.763E+10	-.577E-01
408.0	-.598E-06	.226E+03	-.224E+02	-.949E-07	.174E+04	.763E+10	.706E-01
414.0	-.635E-06	.926E+02	-.220E+02	.303E-07	.174E+04	.763E+10	.780E-01
420.0	-.234E-06	-.379E+02	-.113E+02	.519E-07	.174E+04	.763E+10	.344E+01
426.0	-.123E-07	-.432E+02	.274E+01	.200E-07	.174E+04	.763E+10	.109E+01
432.0	.569E-08	-.502E+01	.370E+01	.103E-08	.174E+04	.763E+10	-.865E+00
438.0	.229E-10	.120E+01	.418E+00	-.474E-09	.174E+04	.763E+10	-.114E+00
444.0	-.157E-12	.492E-02	-.996E-01	-.191E-11	.174E+04	.763E+10	.236E-01
450.0	-.131E-15	-.333E-04	-.410E-03	.131E-13	.174E+04	.763E+10	.775E-04
456.0	.876E-18	-.282E-07	.277E-05	.110E-16	.174E+04	.763E+10	-.663E-06
462.0	.754E-21	.185E-09	.235E-08	-.730E-19	.174E+04	.763E+10	-.448E-09
468.0	-.488E-23	.162E-12	-.154E-10	-.628E-22	.174E+04	.763E+10	.369E-11
474.0	-.428E-26	-.332E-15	-.135E-13	.681E-24	.174E+04	.763E+10	.255E-14
480.0	.330E-23	-.270E-15	.103E-16	.445E-24	.174E+04	.763E+10	-.728E-19
486.0	.533E-23	-.210E-15	.947E-17	.256E-24	.174E+04	.763E+10	-.121E-18
492.0	.637E-23	-.157E-15	.835E-17	.112E-24	.174E+04	.763E+10	-.147E-18
498.0	.667E-23	-.110E-15	.708E-17	.646E-26	.174E+04	.763E+10	-.158E-18
504.0	.645E-23	-.719E-16	.577E-17	-.653E-25	.174E+04	.763E+10	-.156E-18
510.0	.589E-23	-.411E-16	.451E-17	-.110E-24	.174E+04	.763E+10	-.146E-18
516.0	.513E-23	-.175E-16	.336E-17	-.133E-24	.174E+04	.763E+10	-.130E-18
522.0	.430E-23	-.363E-18	.235E-17	-.140E-24	.174E+04	.763E+10	-.111E-18
528.0	.346E-23	.112E-16	.151E-17	-.135E-24	.174E+04	.763E+10	-.912E-19
534.0	.267E-23	.182E-16	.830E-18	-.124E-24	.174E+04	.763E+10	-.719E-19
540.0	.197E-23	.215E-16	.305E-18	-.108E-24	.174E+04	.763E+10	-.541E-19
546.0	.137E-23	.222E-16	-.806E-19	-.911E-25	.174E+04	.763E+10	-.384E-19
552.0	.876E-24	.208E-16	-.345E-18	-.742E-25	.174E+04	.763E+10	-.250E-19
558.0	.480E-24	.182E-16	-.507E-18	-.588E-25	.174E+04	.763E+10	-.140E-19
564.0	.170E-24	.149E-16	-.587E-18	-.458E-25	.174E+04	.763E+10	-.504E-20
570.0	-.693E-25	.113E-16	-.599E-18	-.355E-25	.174E+04	.763E+10	.209E-20
576.0	-.255E-24	.784E-17	-.558E-18	-.279E-25	.174E+04	.763E+10	.784E-20
582.0	-.404E-24	.473E-17	-.472E-18	-.230E-25	.174E+04	.763E+10	.126E-19
588.0	-.531E-24	.224E-17	-.349E-18	-.203E-25	.174E+04	.763E+10	.169E-19
594.0	-.647E-24	.597E-18	-.192E-18	-.191E-25	.174E+04	.763E+10	.209E-19
600.0	-.761E-24	.000E+00	.000E+00	-.189E-25	.174E+04	.763E+10	.250E-19

OUTPUT VERIFICATION

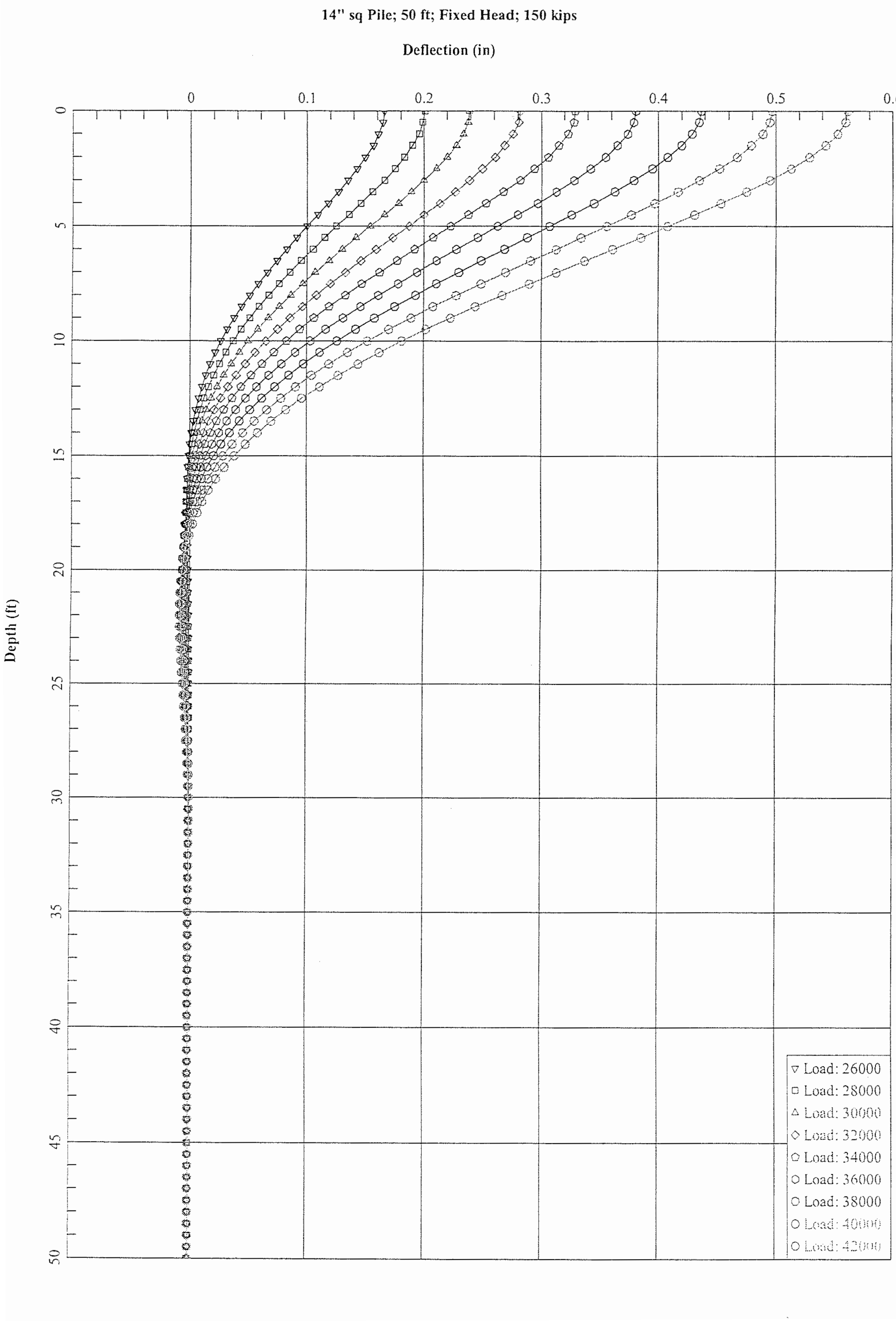
THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.260E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .242E-07 LBS

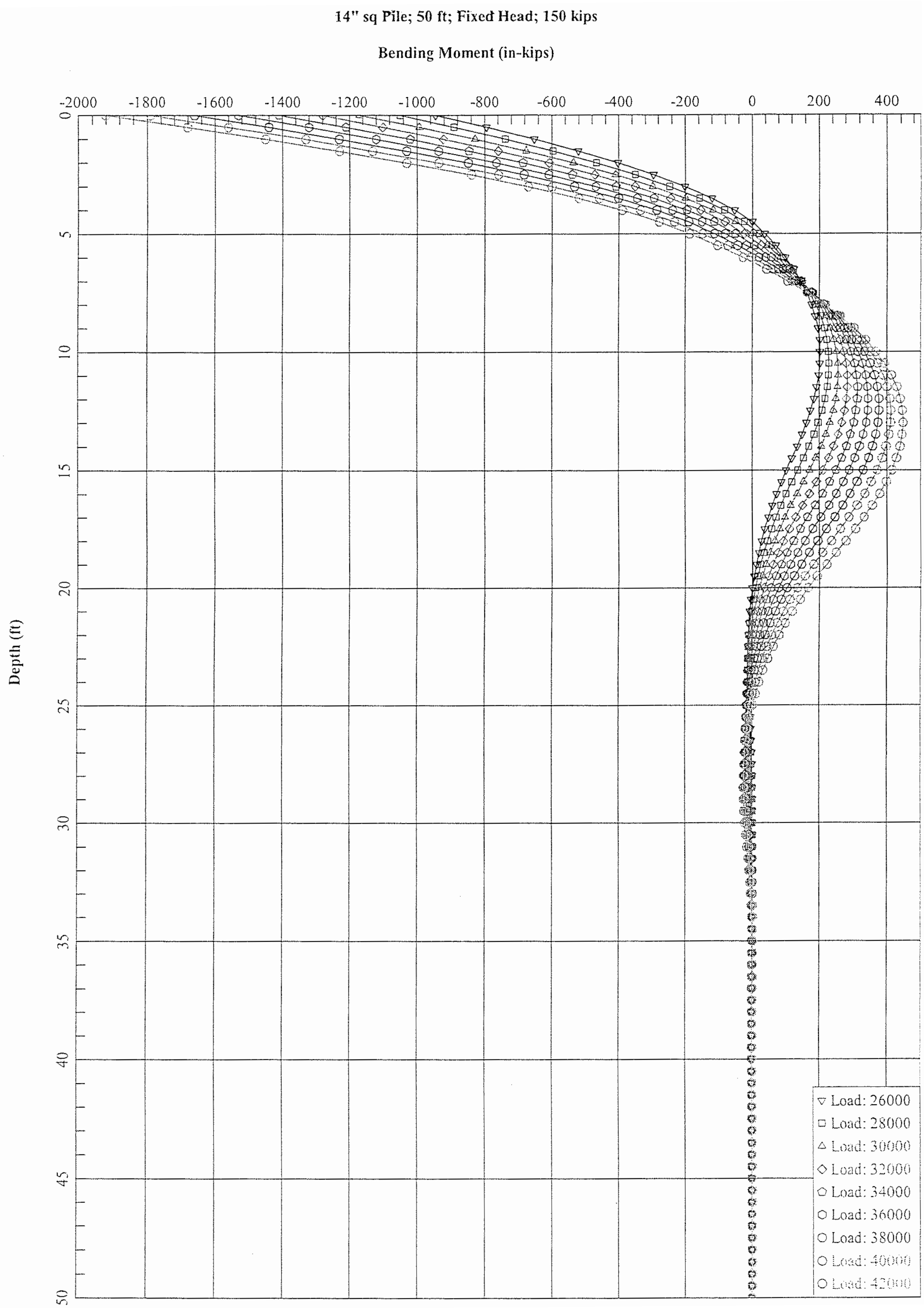
OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .533E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.139E-15
MAXIMUM BENDING MOMENT = -.137E+07 LBS-IN
MAXIMUM SHEAR FORCE = .340E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 9

S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.2400E+05	.0000E+00	.2500E+06	.2168E+00	-.8174E+06	.2400E+05
.2500E+05	.0000E+00	.2500E+06	.2409E+00	-.8683E+06	.2500E+05
.2600E+05	.0000E+00	.2500E+06	.2666E+00	-.9202E+06	.2600E+05
.3200E+05	.0000E+00	.2500E+06	.4561E+00	-.1253E+07	.3200E+05
.3300E+05	.0000E+00	.2500E+06	.4938E+00	-.1312E+07	.3300E+05
.3400E+05	.0000E+00	.2500E+06	.5334E+00	-.1372E+07	.3400E+05


14" sq Pile; 50 ft; Fixed Head; 150 kips
Deflection (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 26000
Load: 28000
Load: 30000
Load: 32000
Load: 34000
Load: 36000
Load: 38000
Load: 40000
Load: 42000


14" sq Pile; 50 ft; Fixed Head; 150 kips
Bending Moment (in-kips)
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 26000
Load: 28000
Load: 30000
Load: 32000
Load: 34000
Load: 36000
Load: 38000
Load: 40000
Load: 42000

Licensed to: janet

engeo

PROGRAM LPILE plus Version 3.0

Sutter Medical Center - 14"sq. Concrete Pile; Axial L=150kips; 50'deep;

UNITS--ENGLISH UNITS

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                   I N P U T   I N F O R M A T I O N
                   *********************************

THE LOADING IS STATIC
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PILE GEOMETRY AND PROPERTIES
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    PILE LENGTH                        =      600.00 IN
     2 POINTS

       X           DIAMETER      MOMENT OF        AREA        MODULUS OF
                                  INERTIA                     ELASTICITY
      IN              IN           IN**4          IN**2        LBS/IN**2
      .00           14.000       .320E+04       .196E+03      .442E+07
    600.00          14.000       .320E+04       .196E+03      .442E+07


SOILS INFORMATION
-----------------

    X AT THE GROUND SURFACE            =         .00 IN

    SLOPE ANGLE AT THE GROUND SURFACE      =         .00 DEG.

    5 LAYER(S) OF SOIL

    LAYER  1
    THE SOIL IS A STIFF CLAY WITH NO FREE WATER
    X AT THE TOP OF THE LAYER          =         .00 IN
    X AT THE BOTTOM OF THE LAYER       =       60.00 IN
    MODULUS OF SUBGRADE REACTION       =    .500E+03 LBS/IN**3

    LAYER  2
    THE SOIL IS A SOFT CLAY
    X AT THE TOP OF THE LAYER          =       60.00 IN
    X AT THE BOTTOM OF THE LAYER       =      360.00 IN
    MODULUS OF SUBGRADE REACTION       =    .300E+02 LBS/IN**3

    LAYER  3
    THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
    X AT THE TOP OF THE LAYER          =      360.00 IN
    X AT THE BOTTOM OF THE LAYER       =      420.00 IN
    MODULUS OF SUBGRADE REACTION       =    .800E+03 LBS/IN**3

    LAYER  4
    THE SOIL IS A SOFT CLAY
    X AT THE TOP OF THE LAYER          =      420.00 IN
    X AT THE BOTTOM OF THE LAYER       =      480.00 IN
    MODULUS OF SUBGRADE REACTION       =    .100E+03 LBS/IN**3

    LAYER  5
    THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
    X AT THE TOP OF THE LAYER          =      480.00 IN
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X AT THE BOTTOM OF THE LAYER = 720.00 IN
MODULUS OF SUBGRADE REACTION = .125E+03 LBS/IN**3

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
8 POINTS

X,IN	WEIGHT,LBS/IN**3
.00	.67E-01
60.00	.67E-01
60.00	.22E-01
360.00	.22E-01
360.00	.28E-01
480.00	.28E-01
480.00	.30E-01
720.00	.30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
10 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
.00	.139E+02	.000	.700E-02
60.00	.139E+02	.000	.700E-02
60.00	.347E+01	.000	.200E-01
360.00	.347E+01	.000	.200E-01
360.00	.139E+02	.000	.500E-02
420.00	.139E+02	.000	.500E-02
420.00	.694E+01	.000	.150E-01
480.00	.694E+01	.000	.150E-01
480.00	.000E+00	.260E+02	-----
720.00	.000E+00	.260E+02	-----

BOUNDARY AND LOADING CONDITIONS

LOADING NUMBER 1

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .300E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .320E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .340E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .380E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 2

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      LATERAL LOAD AT THE PILE HEAD            =    .400E+05 LBS
      SLOPE AT THE PILE HEAD                   =    .000E+00 IN/IN
      AXIAL LOAD AT THE PILE HEAD              =    .150E+06 LBS


      LOADING NUMBER   7

      BOUNDARY CONDITION CODE                  =          2
      LATERAL LOAD AT THE PILE HEAD            =    .420E+05 LBS
      SLOPE AT THE PILE HEAD                   =    .000E+00 IN/IN
      AXIAL LOAD AT THE PILE HEAD              =    .150E+06 LBS


  FINITE-DIFFERENCE PARAMETERS
      NUMBER OF PILE INCREMENTS                                =        100
      DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE         =   .100E-04 IN
      MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS =        100
      MAXIMUM ALLOWABLE DEFLECTION                             =    .10E+03 IN


  OUTPUT CODES
      KOUTPT =  1
      KPYOP  =  0
      INC    =  1



                   O U T P U T   I N F O R M A T I O N
                   ***********************************


          ****************************************************
          * COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
          * CURVES FOR LATERAL LOADING                      *
          ****************************************************



      LOADING NUMBER   1

      BOUNDARY CONDITION CODE                  =          2
      LATERAL LOAD AT THE PILE HEAD            =    .300E+05 LBS
      SLOPE AT THE PILE HEAD                   =    .000E+00 IN/IN
      AXIAL LOAD AT THE PILE HEAD              =    .150E+06 LBS
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X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.239E+00	-.117E+07	.300E+05	.231E-16	.332E+04	.141E+11	-.290E+03
6.0	.238E+00	-.992E+06	.282E+05	-.458E-03	.293E+04	.141E+11	-.313E+03
12.0	.234E+00	-.828E+06	.262E+05	-.845E-03	.258E+04	.141E+11	-.335E+03
18.0	.228E+00	-.676E+06	.242E+05	-.116E-02	.224E+04	.141E+11	-.356E+03
24.0	.220E+00	-.536E+06	.220E+05	-.142E-02	.194E+04	.141E+11	-.376E+03
30.0	.211E+00	-.409E+06	.197E+05	-.162E-02	.166E+04	.141E+11	-.395E+03
36.0	.200E+00	-.297E+06	.172E+05	-.177E-02	.141E+04	.141E+11	-.412E+03
42.0	.189E+00	-.199E+06	.147E+05	-.188E-02	.120E+04	.141E+11	-.429E+03
48.0	.178E+00	-.117E+06	.121E+05	-.194E-02	.102E+04	.141E+11	-.444E+03
54.0	.166E+00	-.505E+05	.940E+04	-.198E-02	.876E+03	.141E+11	-.458E+03
60.0	.154E+00	-.517E+03	.758E+04	-.199E-02	.766E+03	.141E+11	-.150E+03
66.0	.142E+00	.440E+05	.674E+04	-.198E-02	.862E+03	.141E+11	-.129E+03
72.0	.130E+00	.839E+05	.598E+04	-.195E-02	.949E+03	.141E+11	-.125E+03
78.0	.119E+00	.119E+06	.524E+04	-.191E-02	.103E+04	.141E+11	-.121E+03
84.0	.107E+00	.150E+06	.453E+04	-.185E-02	.109E+04	.141E+11	-.117E+03
90.0	.965E-01	.177E+06	.384E+04	-.178E-02	.115E+04	.141E+11	-.113E+03
96.0	.861E-01	.199E+06	.317E+04	-.170E-02	.120E+04	.141E+11	-.109E+03
102.0	.761E-01	.218E+06	.253E+04	-.162E-02	.124E+04	.141E+11	-.104E+03
108.0	.667E-01	.233E+06	.192E+04	-.152E-02	.127E+04	.141E+11	-.998E+02
114.0	.578E-01	.244E+06	.133E+04	-.142E-02	.130E+04	.141E+11	-.952E+02
120.0	.496E-01	.251E+06	.778E+03	-.131E-02	.132E+04	.141E+11	-.905E+02
126.0	.421E-01	.256E+06	.249E+03	-.121E-02	.132E+04	.141E+11	-.856E+02
132.0	.352E-01	.257E+06	-.250E+03	-.110E-02	.133E+04	.141E+11	-.807E+02
138.0	.289E-01	.255E+06	-.718E+03	-.989E-03	.132E+04	.141E+11	-.756E+02

144.0	.233E-01	.250E+06	-.116E+04	-.882E-03	.131E+04	.141E+11	-.703E+02
150.0	.183E-01	.242E+06	-.156E+04	-.777E-03	.130E+04	.141E+11	-.649E+02
156.0	.140E-01	.232E+06	-.193E+04	-.677E-03	.127E+04	.141E+11	-.593E+02
162.0	.102E-01	.220E+06	-.227E+04	-.581E-03	.125E+04	.141E+11	-.534E+02
168.0	.701E-02	.206E+06	-.257E+04	-.490E-03	.122E+04	.141E+11	-.471E+02
174.0	.433E-02	.190E+06	-.284E+04	-.406E-03	.118E+04	.141E+11	-.401E+02
180.0	.214E-02	.173E+06	-.305E+04	-.329E-03	.114E+04	.141E+11	-.317E+02
186.0	.384E-03	.154E+06	-.320E+04	-.260E-03	.110E+04	.141E+11	-.179E+02
192.0	-.977E-03	.135E+06	-.318E+04	-.198E-03	.106E+04	.141E+11	.244E+02
198.0	-.199E-02	.116E+06	-.302E+04	-.145E-03	.102E+04	.141E+11	.310E+02
204.0	-.271E-02	.989E+05	-.282E+04	-.991E-04	.982E+03	.141E+11	.344E+02
210.0	-.318E-02	.827E+05	-.261E+04	-.606E-04	.946E+03	.141E+11	.362E+02
216.0	-.344E-02	.677E+05	-.239E+04	-.286E-04	.913E+03	.141E+11	.372E+02
222.0	-.353E-02	.541E+05	-.216E+04	-.276E-05	.884E+03	.141E+11	.375E+02
228.0	-.347E-02	.418E+05	-.194E+04	.176E-04	.857E+03	.141E+11	.373E+02
234.0	-.332E-02	.308E+05	-.172E+04	.330E-04	.833E+03	.141E+11	.367E+02
240.0	-.308E-02	.211E+05	-.150E+04	.440E-04	.811E+03	.141E+11	.358E+02
246.0	-.279E-02	.127E+05	-.129E+04	.512E-04	.793E+03	.141E+11	.347E+02
252.0	-.246E-02	.555E+04	-.109E+04	.551E-04	.777E+03	.141E+11	.333E+02
258.0	-.213E-02	-.414E+03	-.891E+03	.562E-04	.766E+03	.141E+11	.317E+02
264.0	-.179E-02	-.524E+04	-.706E+03	.550E-04	.777E+03	.141E+11	.299E+02
270.0	-.147E-02	-.898E+04	-.532E+03	.519E-04	.785E+03	.141E+11	.280E+02
276.0	-.117E-02	-.117E+05	-.371E+03	.475E-04	.791E+03	.141E+11	.259E+02
282.0	-.897E-03	-.135E+05	-.222E+03	.422E-04	.795E+03	.141E+11	.237E+02
288.0	-.661E-03	-.145E+05	-.860E+02	.363E-04	.797E+03	.141E+11	.214E+02
294.0	-.462E-03	-.146E+05	.354E+02	.301E-04	.797E+03	.141E+11	.190E+02
300.0	-.300E-03	-.141E+05	.142E+03	.240E-04	.796E+03	.141E+11	.165E+02
306.0	-.174E-03	-.130E+05	.233E+03	.183E-04	.794E+03	.141E+11	.137E+02
312.0	-.808E-04	-.113E+05	.306E+03	.131E-04	.790E+03	.141E+11	.106E+02
318.0	-.166E-04	-.931E+04	.357E+03	.872E-05	.786E+03	.141E+11	.627E+01
324.0	.239E-04	-.706E+04	.354E+03	.525E-05	.781E+03	.141E+11	-.710E+01
330.0	.464E-04	-.506E+04	.307E+03	.267E-05	.776E+03	.141E+11	-.885E+01
336.0	.560E-04	-.338E+04	.252E+03	.881E-06	.773E+03	.141E+11	-.942E+01
342.0	.569E-04	-.204E+04	.195E+03	-.272E-06	.770E+03	.141E+11	-.948E+01
348.0	.527E-04	-.104E+04	.139E+03	-.927E-06	.768E+03	.141E+11	-.923E+01
354.0	.458E-04	-.373E+03	.850E+02	-.123E-05	.766E+03	.141E+11	-.881E+01
360.0	.380E-04	-.198E+02	.493E+02	-.131E-05	.765E+03	.141E+11	-.310E+01
366.0	.301E-04	.221E+03	.322E+02	-.127E-05	.766E+03	.141E+11	-.260E+01
372.0	.228E-04	.369E+03	.182E+02	-.114E-05	.766E+03	.141E+11	-.208E+01
378.0	.164E-04	.442E+03	.725E+01	-.970E-06	.766E+03	.141E+11	-.157E+01
384.0	.111E-04	.458E+03	-.834E+00	-.779E-06	.766E+03	.141E+11	-.112E+01
390.0	.704E-05	.433E+03	-.643E+01	-.590E-06	.766E+03	.141E+11	-.744E+00
396.0	.406E-05	.382E+03	-.100E+02	-.417E-06	.766E+03	.141E+11	-.448E+00
402.0	.204E-05	.314E+03	-.120E+02	-.269E-06	.766E+03	.141E+11	-.235E+00
408.0	.822E-06	.238E+03	-.130E+02	-.152E-06	.766E+03	.141E+11	-.985E-01
414.0	.210E-06	.158E+03	-.134E+02	-.685E-07	.766E+03	.141E+11	-.262E-01
420.0	-.396E-09	.767E+02	-.122E+02	-.188E-07	.765E+03	.141E+11	.464E+00
426.0	-.154E-07	.115E+02	-.682E+01	-.618E-10	.765E+03	.141E+11	.135E+01
432.0	-.114E-08	-.513E+01	-.992E+00	.128E-08	.765E+03	.141E+11	.554E+00
438.0	.105E-10	-.455E+00	.428E+00	.948E-10	.765E+03	.141E+11	-.120E+00
444.0	.113E-13	.412E-02	.379E-01	-.877E-12	.765E+03	.141E+11	-.118E-01
450.0	-.979E-16	.451E-05	-.344E-03	-.940E-15	.765E+03	.141E+11	.117E-03
456.0	-.109E-18	-.383E-07	-.376E-06	.816E-17	.765E+03	.141E+11	.117E-06
462.0	.910E-21	-.435E-10	.319E-08	.909E-20	.765E+03	.141E+11	-.109E-08
468.0	.105E-23	.356E-12	.363E-11	-.758E-22	.765E+03	.141E+11	-.114E-11
474.0	-.848E-26	.120E-15	-.297E-13	-.151E-24	.765E+03	.141E+11	.101E-13
480.0	-.764E-24	.999E-16	-.326E-17	-.105E-24	.765E+03	.141E+11	.233E-19
486.0	-.127E-23	.809E-16	-.306E-17	-.663E-25	.765E+03	.141E+11	.394E-19
492.0	-.156E-23	.634E-16	-.277E-17	-.357E-25	.765E+03	.141E+11	.496E-19
498.0	-.169E-23	.477E-16	-.243E-17	-.121E-25	.765E+03	.141E+11	.550E-19
504.0	-.171E-23	.342E-16	-.207E-17	.528E-26	.765E+03	.141E+11	.566E-19
510.0	-.163E-23	.229E-16	-.171E-17	.174E-25	.765E+03	.141E+11	.552E-19
516.0	-.150E-23	.137E-16	-.136E-17	.252E-25	.765E+03	.141E+11	.517E-19
522.0	-.133E-23	.658E-17	-.104E-17	.295E-25	.765E+03	.141E+11	.468E-19
528.0	-.114E-23	.122E-17	-.754E-18	.312E-25	.765E+03	.141E+11	.411E-19
534.0	-.954E-24	-.253E-17	-.508E-18	.309E-25	.765E+03	.141E+11	.350E-19
540.0	-.772E-24	-.493E-17	-.301E-18	.293E-25	.765E+03	.141E+11	.288E-19
546.0	-.602E-24	-.620E-17	-.134E-18	.269E-25	.765E+03	.141E+11	.229E-19
552.0	-.448E-24	-.658E-17	-.338E-20	.242E-25	.765E+03	.141E+11	.174E-19
558.0	-.311E-24	-.629E-17	.927E-19	.215E-25	.765E+03	.141E+11	.123E-19
564.0	-.190E-24	-.551E-17	.157E-18	.190E-25	.765E+03	.141E+11	.764E-20
570.0	-.834E-25	-.443E-17	.193E-18	.169E-25	.765E+03	.141E+11	.340E-20
576.0	.123E-25	-.323E-17	.202E-18	.153E-25	.765E+03	.141E+11	-.511E-21
582.0	.997E-25	-.203E-17	.187E-18	.141E-25	.765E+03	.141E+11	-.421E-20
588.0	.182E-24	-.101E-17	.148E-18	.135E-25	.765E+03	.141E+11	-.781E-20
594.0	.262E-24	-.281E-18	.858E-19	.132E-25	.765E+03	.141E+11	-.114E-19
600.0	.341E-24	.000E+00	.000E+00	.132E-25	.765E+03	.141E+11	-.151E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .227E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .211E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .239E+00 IN
COMPUTED SLOPE AT PILE HEAD = .231E-16
MAXIMUM BENDING MOMENT = -.117E+07 LBS-IN
MAXIMUM SHEAR FORCE = .300E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.305E+00	-.134E+07	.330E+05	-.324E-16	.370E+04	.141E+11	-.308E+03
6.0	.304E+00	-.115E+07	.311E+05	-.530E-03	.328E+04	.141E+11	-.333E+03
12.0	.299E+00	-.970E+06	.290E+05	-.980E-03	.289E+04	.141E+11	-.356E+03
18.0	.292E+00	-.801E+06	.268E+05	-.136E-02	.252E+04	.141E+11	-.379E+03
24.0	.283E+00	-.646E+06	.245E+05	-.166E-02	.218E+04	.141E+11	-.400E+03
30.0	.272E+00	-.505E+06	.220E+05	-.191E-02	.187E+04	.141E+11	-.421E+03
36.0	.260E+00	-.379E+06	.194E+05	-.210E-02	.159E+04	.141E+11	-.440E+03
42.0	.247E+00	-.268E+06	.167E+05	-.223E-02	.135E+04	.141E+11	-.458E+03
48.0	.233E+00	-.174E+06	.139E+05	-.233E-02	.115E+04	.141E+11	-.475E+03
54.0	.219E+00	-.966E+05	.110E+05	-.238E-02	.977E+03	.141E+11	-.490E+03
60.0	.204E+00	-.371E+05	.907E+04	-.241E-02	.846E+03	.141E+11	-.165E+03
66.0	.190E+00	.166E+05	.815E+04	-.242E-02	.802E+03	.141E+11	-.142E+03
72.0	.175E+00	.651E+05	.731E+04	-.240E-02	.908E+03	.141E+11	-.138E+03
78.0	.161E+00	.109E+06	.649E+04	-.236E-02	.100E+04	.141E+11	-.134E+03
84.0	.147E+00	.147E+06	.570E+04	-.231E-02	.109E+04	.141E+11	-.130E+03
90.0	.133E+00	.181E+06	.494E+04	-.224E-02	.116E+04	.141E+11	-.126E+03
96.0	.120E+00	.211E+06	.419E+04	-.215E-02	.123E+04	.141E+11	-.122E+03
102.0	.108E+00	.235E+06	.348E+04	-.206E-02	.128E+04	.141E+11	-.117E+03
108.0	.955E-01	.256E+06	.279E+04	-.196E-02	.133E+04	.141E+11	-.113E+03
114.0	.841E-01	.272E+06	.213E+04	-.184E-02	.136E+04	.141E+11	-.108E+03
120.0	.734E-01	.285E+06	.149E+04	-.173E-02	.139E+04	.141E+11	-.103E+03
126.0	.634E-01	.293E+06	.890E+03	-.160E-02	.141E+04	.141E+11	-.982E+02
132.0	.542E-01	.298E+06	.316E+03	-.148E-02	.142E+04	.141E+11	-.932E+02
138.0	.457E-01	.300E+06	-.227E+03	-.135E-02	.142E+04	.141E+11	-.880E+02
144.0	.380E-01	.298E+06	-.740E+03	-.122E-02	.142E+04	.141E+11	-.827E+02
150.0	.310E-01	.293E+06	-.122E+04	-.110E-02	.141E+04	.141E+11	-.773E+02
156.0	.248E-01	.285E+06	-.167E+04	-.975E-03	.139E+04	.141E+11	-.718E+02
162.0	.193E-01	.275E+06	-.208E+04	-.856E-03	.137E+04	.141E+11	-.660E+02
168.0	.145E-01	.262E+06	-.246E+04	-.742E-03	.134E+04	.141E+11	-.601E+02
174.0	.104E-01	.247E+06	-.280E+04	-.634E-03	.130E+04	.141E+11	-.537E+02
180.0	.691E-02	.229E+06	-.310E+04	-.533E-03	.127E+04	.141E+11	-.469E+02
186.0	.400E-02	.210E+06	-.336E+04	-.440E-03	.123E+04	.141E+11	-.391E+02
192.0	.163E-02	.190E+06	-.357E+04	-.355E-03	.118E+04	.141E+11	-.290E+02
198.0	-.252E-03	.168E+06	-.361E+04	-.279E-03	.113E+04	.141E+11	.156E+02
204.0	-.171E-02	.147E+06	-.347E+04	-.212E-03	.109E+04	.141E+11	.294E+02
210.0	-.279E-02	.127E+06	-.328E+04	-.153E-03	.104E+04	.141E+11	.347E+02
216.0	-.355E-02	.108E+06	-.306E+04	-.104E-03	.100E+04	.141E+11	.376E+02
222.0	-.403E-02	.905E+05	-.283E+04	-.614E-04	.963E+03	.141E+11	.392E+02
228.0	-.429E-02	.742E+05	-.260E+04	-.265E-04	.928E+03	.141E+11	.400E+02
234.0	-.435E-02	.594E+05	-.235E+04	.188E-05	.895E+03	.141E+11	.402E+02
240.0	-.427E-02	.460E+05	-.211E+04	.242E-04	.866E+03	.141E+11	.399E+02
246.0	-.406E-02	.340E+05	-.188E+04	.412E-04	.840E+03	.141E+11	.393E+02
252.0	-.377E-02	.234E+05	-.164E+04	.534E-04	.816E+03	.141E+11	.383E+02
258.0	-.342E-02	.141E+05	-.142E+04	.613E-04	.796E+03	.141E+11	.371E+02
264.0	-.304E-02	.624E+04	-.120E+04	.657E-04	.779E+03	.141E+11	.356E+02
270.0	-.263E-02	-.373E+03	-.990E+03	.669E-04	.766E+03	.141E+11	.340E+02

276.0	-.223E-02	-.576E+04	-.792E+03	.656E-04	.778E+03	.141E+11	.322E+02
282.0	-.185E-02	-.999E+04	-.605E+03	.623E-04	.787E+03	.141E+11	.302E+02
288.0	-.149E-02	-.131E+05	-.430E+03	.573E-04	.794E+03	.141E+11	.281E+02
294.0	-.116E-02	-.153E+05	-.268E+03	.513E-04	.799E+03	.141E+11	.259E+02
300.0	-.870E-03	-.164E+05	-.120E+03	.446E-04	.801E+03	.141E+11	.235E+02
306.0	-.623E-03	-.168E+05	.137E+02	.375E-04	.802E+03	.141E+11	.210E+02
312.0	-.419E-03	-.163E+05	.132E+03	.305E-04	.801E+03	.141E+11	.184E+02
318.0	-.257E-03	-.152E+05	.234E+03	.238E-04	.799E+03	.141E+11	.156E+02
324.0	-.133E-03	-.136E+05	.319E+03	.177E-04	.795E+03	.141E+11	.126E+02
330.0	-.446E-04	-.114E+05	.383E+03	.124E-04	.790E+03	.141E+11	.873E+01
336.0	.151E-04	-.900E+04	.391E+03	.804E-05	.785E+03	.141E+11	-.610E+01
342.0	.519E-04	-.676E+04	.345E+03	.470E-05	.780E+03	.141E+11	-.919E+01
348.0	.714E-04	-.486E+04	.287E+03	.223E-05	.776E+03	.141E+11	-.102E+02
354.0	.786E-04	-.332E+04	.225E+03	.492E-06	.773E+03	.141E+11	-.105E+02
360.0	.773E-04	-.216E+04	.175E+03	-.672E-06	.770E+03	.141E+11	-.631E+01
366.0	.706E-04	-.122E+04	.137E+03	-.139E-05	.768E+03	.141E+11	-.609E+01
372.0	.607E-04	-.509E+03	.103E+03	-.176E-05	.766E+03	.141E+11	-.553E+01
378.0	.495E-04	.827E+01	.717E+02	-.186E-05	.765E+03	.141E+11	-.475E+01
384.0	.383E-04	.355E+03	.459E+02	-.179E-05	.766E+03	.141E+11	-.386E+01
390.0	.280E-04	.562E+03	.255E+02	-.159E-05	.767E+03	.141E+11	-.296E+01
396.0	.192E-04	.663E+03	.102E+02	-.133E-05	.767E+03	.141E+11	-.211E+01
402.0	.120E-04	.688E+03	-.244E+00	-.105E-05	.767E+03	.141E+11	-.138E+01
408.0	.661E-05	.662E+03	-.677E+01	-.760E-06	.767E+03	.141E+11	-.793E+00
414.0	.290E-05	.608E+03	-.102E+02	-.490E-06	.767E+03	.141E+11	-.362E+00
420.0	.733E-06	.540E+03	-.281E+02	-.246E-06	.766E+03	.141E+11	-.559E+01
426.0	-.575E-07	.271E+03	-.387E+02	-.743E-07	.766E+03	.141E+11	.209E+01
432.0	-.158E-06	.763E+02	-.236E+02	-.623E-09	.765E+03	.141E+11	.293E+01
438.0	-.649E-07	-.125E+02	-.824E+01	.129E-07	.765E+03	.141E+11	.217E+01
444.0	-.327E-08	-.226E+02	.884E+00	.548E-08	.765E+03	.141E+11	.780E+00
450.0	.773E-09	-.189E+01	.191E+01	.273E-09	.765E+03	.141E+11	-.489E+00
456.0	.700E-12	.303E+00	.158E+00	-.644E-10	.765E+03	.141E+11	-.401E-01
462.0	-.719E-14	.280E-03	-.252E-01	-.583E-13	.765E+03	.141E+11	.799E-02
468.0	-.680E-17	-.282E-05	-.234E-04	.599E-15	.765E+03	.141E+11	.471E-05
474.0	.670E-19	-.776E-09	.235E-06	.980E-18	.765E+03	.141E+11	-.745E-07
480.0	.496E-17	-.647E-09	.211E-10	.678E-18	.765E+03	.141E+11	-.978E-13
486.0	.820E-17	-.524E-09	.198E-10	.429E-18	.765E+03	.141E+11	-.165E-12
492.0	.101E-16	-.411E-09	.179E-10	.231E-18	.765E+03	.141E+11	-.208E-12
498.0	.110E-16	-.309E-09	.157E-10	.783E-19	.765E+03	.141E+11	-.230E-12
504.0	.111E-16	-.222E-09	.134E-10	-.344E-19	.765E+03	.141E+11	-.237E-12
510.0	.106E-16	-.148E-09	.110E-10	-.113E-18	.765E+03	.141E+11	-.231E-12
516.0	.970E-17	-.890E-10	.880E-11	-.163E-18	.765E+03	.141E+11	-.216E-12
522.0	.860E-17	-.425E-10	.673E-11	-.191E-18	.765E+03	.141E+11	-.196E-12
528.0	.740E-17	-.787E-11	.489E-11	-.202E-18	.765E+03	.141E+11	-.171E-12
534.0	.618E-17	.165E-10	.329E-11	-.200E-18	.765E+03	.141E+11	-.146E-12
540.0	.500E-17	.320E-10	.195E-11	-.190E-18	.765E+03	.141E+11	-.120E-12
546.0	.390E-17	.402E-10	.866E-12	-.175E-18	.765E+03	.141E+11	-.955E-13
552.0	.290E-17	.427E-10	.207E-13	-.157E-18	.765E+03	.141E+11	-.724E-13
558.0	.202E-17	.408E-10	-.601E-12	-.139E-18	.765E+03	.141E+11	-.512E-13
564.0	.123E-17	.357E-10	-.102E-11	-.123E-18	.765E+03	.141E+11	-.318E-13
570.0	.540E-18	.287E-10	-.125E-11	-.109E-18	.765E+03	.141E+11	-.141E-13
576.0	-.801E-19	.209E-10	-.131E-11	-.988E-19	.765E+03	.141E+11	.220E-14
582.0	-.647E-18	.132E-10	-.121E-11	-.916E-19	.765E+03	.141E+11	.176E-13
588.0	-.118E-17	.652E-11	-.960E-12	-.874E-19	.765E+03	.141E+11	.326E-13
594.0	-.170E-17	.182E-11	-.556E-12	-.857E-19	.765E+03	.141E+11	.477E-13
600.0	-.221E-17	.000E+00	.000E+00	-.853E-19	.765E+03	.141E+11	.630E-13

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.951E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .662E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .305E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.324E-16
MAXIMUM BENDING MOMENT = -.134E+07 LBS-IN
MAXIMUM SHEAR FORCE = .330E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 7

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .320E+05 LBS

SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.282E+00	-.128E+07	.320E+05	.925E-17	.357E+04	.141E+11	-.302E+03
6.0	.281E+00	-.110E+07	.301E+05	-.506E-03	.317E+04	.141E+11	-.326E+03
12.0	.276E+00	-.922E+06	.281E+05	-.934E-03	.278E+04	.141E+11	-.349E+03
18.0	.269E+00	-.759E+06	.259E+05	-.129E-02	.242E+04	.141E+11	-.371E+03
24.0	.261E+00	-.608E+06	.236E+05	-.158E-02	.210E+04	.141E+11	-.392E+03
30.0	.250E+00	-.472E+06	.212E+05	-.181E-02	.180E+04	.141E+11	-.412E+03
36.0	.239E+00	-.351E+06	.187E+05	-.199E-02	.153E+04	.141E+11	-.431E+03
42.0	.227E+00	-.244E+06	.161E+05	-.211E-02	.130E+04	.141E+11	-.448E+03
48.0	.214E+00	-.154E+06	.133E+05	-.220E-02	.110E+04	.141E+11	-.465E+03
54.0	.200E+00	-.805E+05	.105E+05	-.225E-02	.941E+03	.141E+11	-.480E+03
60.0	.187E+00	-.242E+05	.857E+04	-.227E-02	.818E+03	.141E+11	-.160E+03
66.0	.173E+00	.263E+05	.767E+04	-.227E-02	.823E+03	.141E+11	-.137E+03
72.0	.159E+00	.719E+05	.686E+04	-.225E-02	.923E+03	.141E+11	-.134E+03
78.0	.146E+00	.113E+06	.607E+04	-.221E-02	.101E+04	.141E+11	-.130E+03
84.0	.133E+00	.149E+06	.531E+04	-.215E-02	.109E+04	.141E+11	-.126E+03
90.0	.120E+00	.180E+06	.456E+04	-.208E-02	.116E+04	.141E+11	-.122E+03
96.0	.108E+00	.207E+06	.385E+04	-.200E-02	.122E+04	.141E+11	-.117E+03
102.0	.963E-01	.230E+06	.316E+04	-.191E-02	.127E+04	.141E+11	-.113E+03
108.0	.851E-01	.249E+06	.249E+04	-.181E-02	.131E+04	.141E+11	-.108E+03
114.0	.746E-01	.263E+06	.186E+04	-.170E-02	.134E+04	.141E+11	-.104E+03
120.0	.648E-01	.274E+06	.125E+04	-.158E-02	.136E+04	.141E+11	-.989E+02
126.0	.556E-01	.281E+06	.671E+03	-.147E-02	.138E+04	.141E+11	-.940E+02
132.0	.472E-01	.285E+06	.123E+03	-.134E-02	.139E+04	.141E+11	-.890E+02
138.0	.395E-01	.285E+06	-.396E+03	-.122E-02	.139E+04	.141E+11	-.838E+02
144.0	.325E-01	.282E+06	-.883E+03	-.110E-02	.138E+04	.141E+11	-.786E+02
150.0	.262E-01	.276E+06	-.134E+04	-.985E-03	.137E+04	.141E+11	-.731E+02
156.0	.207E-01	.268E+06	-.176E+04	-.870E-03	.135E+04	.141E+11	-.676E+02
162.0	.158E-01	.257E+06	-.215E+04	-.758E-03	.133E+04	.141E+11	-.618E+02
168.0	.116E-01	.243E+06	-.250E+04	-.652E-03	.130E+04	.141E+11	-.557E+02
174.0	.796E-02	.228E+06	-.282E+04	-.552E-03	.126E+04	.141E+11	-.491E+02
180.0	.494E-02	.211E+06	-.309E+04	-.459E-03	.123E+04	.141E+11	-.419E+02
186.0	.245E-02	.192E+06	-.331E+04	-.374E-03	.118E+04	.141E+11	-.332E+02
192.0	.452E-03	.172E+06	-.347E+04	-.297E-03	.114E+04	.141E+11	-.189E+02
198.0	-.111E-02	.151E+06	-.345E+04	-.228E-03	.109E+04	.141E+11	.255E+02
204.0	-.229E-02	.131E+06	-.328E+04	-.169E-03	.105E+04	.141E+11	.324E+02
210.0	-.313E-02	.112E+06	-.307E+04	-.117E-03	.101E+04	.141E+11	.360E+02
216.0	-.369E-02	.939E+05	-.285E+04	-.735E-04	.971E+03	.141E+11	.381E+02
222.0	-.401E-02	.775E+05	-.262E+04	-.371E-04	.935E+03	.141E+11	.391E+02
228.0	-.414E-02	.625E+05	-.238E+04	-.743E-05	.902E+03	.141E+11	.395E+02
234.0	-.410E-02	.489E+05	-.215E+04	.162E-04	.872E+03	.141E+11	.394E+02
240.0	-.394E-02	.367E+05	-.191E+04	.344E-04	.846E+03	.141E+11	.389E+02
246.0	-.369E-02	.259E+05	-.168E+04	.477E-04	.822E+03	.141E+11	.380E+02
252.0	-.337E-02	.165E+05	-.146E+04	.567E-04	.801E+03	.141E+11	.369E+02
258.0	-.301E-02	.836E+04	-.124E+04	.620E-04	.784E+03	.141E+11	.355E+02
264.0	-.263E-02	.152E+04	-.103E+04	.641E-04	.769E+03	.141E+11	.340E+02
270.0	-.224E-02	-.411E+04	-.831E+03	.635E-04	.774E+03	.141E+11	.322E+02
276.0	-.186E-02	-.857E+04	-.643E+03	.608E-04	.784E+03	.141E+11	.303E+02
282.0	-.151E-02	-.119E+05	-.467E+03	.565E-04	.791E+03	.141E+11	.283E+02
288.0	-.119E-02	-.143E+05	-.304E+03	.509E-04	.797E+03	.141E+11	.261E+02
294.0	-.900E-03	-.157E+05	-.155E+03	.446E-04	.800E+03	.141E+11	.238E+02
300.0	-.653E-03	-.162E+05	-.195E+02	.378E-04	.801E+03	.141E+11	.214E+02
306.0	-.447E-03	-.160E+05	.101E+03	.309E-04	.800E+03	.141E+11	.188E+02
312.0	-.281E-03	-.151E+05	.206E+03	.244E-04	.798E+03	.141E+11	.161E+02
318.0	-.154E-03	-.136E+05	.294E+03	.183E-04	.795E+03	.141E+11	.132E+02
324.0	-.620E-04	-.116E+05	.363E+03	.130E-04	.791E+03	.141E+11	.974E+01
330.0	.100E-05	-.922E+04	.385E+03	.854E-05	.785E+03	.141E+11	-.250E+01
336.0	.405E-04	-.696E+04	.352E+03	.510E-05	.781E+03	.141E+11	-.846E+01
342.0	.622E-04	-.501E+04	.298E+03	.256E-05	.776E+03	.141E+11	-.976E+01
348.0	.712E-04	-.340E+04	.238E+03	.778E-06	.773E+03	.141E+11	-.102E+02
354.0	.716E-04	-.215E+04	.177E+03	-.399E-06	.770E+03	.141E+11	-.102E+02
360.0	.664E-04	-.128E+04	.130E+03	-.113E-05	.768E+03	.141E+11	-.542E+01
366.0	.580E-04	-.595E+03	.984E+02	-.152E-05	.767E+03	.141E+11	-.501E+01
372.0	.481E-04	-.933E+02	.702E+02	-.167E-05	.766E+03	.141E+11	-.439E+01
378.0	.380E-04	.250E+03	.461E+02	-.164E-05	.766E+03	.141E+11	-.365E+01
384.0	.285E-04	.463E+03	.266E+02	-.149E-05	.766E+03	.141E+11	-.287E+01
390.0	.202E-04	.572E+03	.116E+02	-.127E-05	.767E+03	.141E+11	-.213E+01
396.0	.133E-04	.604E+03	.781E+00	-.102E-05	.767E+03	.141E+11	-.147E+01
402.0	.796E-05	.583E+03	-.636E+01	-.765E-06	.767E+03	.141E+11	-.916E+00

408.0	.411E-05	.529E+03	-.106E+02	-.529E-06	.766E+03	.141E+11	-.493E+00
414.0	.161E-05	.457E+03	-.127E+02	-.320E-06	.766E+03	.141E+11	-.200E+00
420.0	.269E-06	.377E+03	-.253E+02	-.143E-06	.766E+03	.141E+11	-.401E+01
426.0	-.107E-06	.154E+03	-.296E+02	-.302E-07	.766E+03	.141E+11	.257E+01
432.0	-.927E-07	.225E+02	-.145E+02	.720E-08	.765E+03	.141E+11	.245E+01
438.0	-.209E-07	-.200E+02	-.255E+01	.773E-08	.765E+03	.141E+11	.148E+01
444.0	.169E-10	-.819E+01	.167E+01	.174E-08	.765E+03	.141E+11	-.163E+00
450.0	.383E-10	-.235E-01	.684E+00	-.141E-11	.765E+03	.141E+11	-.164E+00
456.0	.127E-14	.151E-01	.195E-02	-.320E-11	.765E+03	.141E+11	-.923E-03
462.0	-.358E-15	.781E-06	-.125E-02	-.106E-15	.765E+03	.141E+11	.305E-03
468.0	-.253E-19	-.141E-06	-.651E-07	.298E-16	.765E+03	.141E+11	.200E-07
474.0	.334E-20	-.329E-11	.117E-07	.407E-20	.765E+03	.141E+11	-.284E-08
480.0	.236E-19	-.273E-11	.908E-13	.279E-20	.765E+03	.141E+11	-.534E-15
486.0	.368E-19	-.221E-11	.848E-13	.174E-20	.765E+03	.141E+11	-.850E-15
492.0	.445E-19	-.172E-11	.765E-13	.909E-21	.765E+03	.141E+11	-.105E-14
498.0	.478E-19	-.129E-11	.669E-13	.271E-21	.765E+03	.141E+11	-.115E-14
504.0	.477E-19	-.918E-12	.567E-13	-.198E-21	.765E+03	.141E+11	-.117E-14
510.0	.454E-19	-.608E-12	.466E-13	-.522E-21	.765E+03	.141E+11	-.114E-14
516.0	.415E-19	-.358E-12	.370E-13	-.727E-21	.765E+03	.141E+11	-.106E-14
522.0	.367E-19	-.163E-12	.282E-13	-.838E-21	.765E+03	.141E+11	-.956E-15
528.0	.314E-19	-.184E-13	.203E-13	-.876E-21	.765E+03	.141E+11	-.835E-15
534.0	.261E-19	.823E-13	.135E-13	-.863E-21	.765E+03	.141E+11	-.708E-15
540.0	.211E-19	.146E-12	.789E-14	-.814E-21	.765E+03	.141E+11	-.581E-15
546.0	.164E-19	.179E-12	.333E-14	-.745E-21	.765E+03	.141E+11	-.460E-15
552.0	.121E-19	.187E-12	-.212E-15	-.668E-21	.765E+03	.141E+11	-.347E-15
558.0	.836E-20	.177E-12	-.280E-14	-.590E-21	.765E+03	.141E+11	-.243E-15
564.0	.504E-20	.154E-12	-.452E-14	-.520E-21	.765E+03	.141E+11	-.149E-15
570.0	.212E-20	.124E-12	-.546E-14	-.461E-21	.765E+03	.141E+11	-.635E-16
576.0	-.490E-21	.898E-13	-.567E-14	-.416E-21	.765E+03	.141E+11	.154E-16
582.0	-.287E-20	.565E-13	-.522E-14	-.385E-21	.765E+03	.141E+11	.898E-16
588.0	-.510E-20	.279E-13	-.411E-14	-.367E-21	.765E+03	.141E+11	.162E-15
594.0	-.727E-20	.778E-14	-.238E-14	-.359E-21	.765E+03	.141E+11	.234E-15
600.0	-.941E-20	.000E+00	.000E+00	-.357E-21	.765E+03	.141E+11	.308E-15

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .187E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .157E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .282E+00 IN
COMPUTED SLOPE AT PILE HEAD = .925E-17
MAXIMUM BENDING MOMENT = -.128E+07 LBS-IN
MAXIMUM SHEAR FORCE = .320E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 7

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .340E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.329E+00	-.141E+07	.340E+05	.463E-17	.384E+04	.141E+11	-.314E+03
6.0	.328E+00	-.121E+07	.320E+05	-.554E-03	.340E+04	.141E+11	-.339E+03
12.0	.323E+00	-.102E+07	.299E+05	-.103E-02	.300E+04	.141E+11	-.363E+03
18.0	.315E+00	-.846E+06	.277E+05	-.142E-02	.261E+04	.141E+11	-.386E+03
24.0	.306E+00	-.685E+06	.253E+05	-.175E-02	.226E+04	.141E+11	-.408E+03
30.0	.294E+00	-.539E+06	.228E+05	-.201E-02	.194E+04	.141E+11	-.429E+03
36.0	.282E+00	-.408E+06	.202E+05	-.221E-02	.166E+04	.141E+11	-.449E+03
42.0	.268E+00	-.293E+06	.174E+05	-.236E-02	.141E+04	.141E+11	-.467E+03
48.0	.253E+00	-.195E+06	.146E+05	-.246E-02	.119E+04	.141E+11	-.485E+03
54.0	.238E+00	-.114E+06	.116E+05	-.253E-02	.101E+04	.141E+11	-.501E+03
60.0	.223E+00	-.509E+05	.958E+04	-.256E-02	.877E+03	.141E+11	-.170E+03

66.0	.208E+00	.580E+04	.863E+04	-.257E-02	.778E+03	.141E+11	-.146E+03
72.0	.192E+00	.573E+05	.777E+04	-.256E-02	.891E+03	.141E+11	-.142E+03
78.0	.177E+00	.104E+06	.693E+04	-.252E-02	.992E+03	.141E+11	-.138E+03
84.0	.162E+00	.145E+06	.611E+04	-.247E-02	.108E+04	.141E+11	-.134E+03
90.0	.147E+00	.181E+06	.532E+04	-.240E-02	.116E+04	.141E+11	-.130E+03
96.0	.133E+00	.213E+06	.455E+04	-.232E-02	.123E+04	.141E+11	-.126E+03
102.0	.119E+00	.240E+06	.381E+04	-.222E-02	.129E+04	.141E+11	-.121E+03
108.0	.106E+00	.263E+06	.310E+04	-.211E-02	.134E+04	.141E+11	-.117E+03
114.0	.940E-01	.281E+06	.241E+04	-.200E-02	.138E+04	.141E+11	-.112E+03
120.0	.824E-01	.295E+06	.176E+04	-.188E-02	.141E+04	.141E+11	-.107E+03
126.0	.715E-01	.306E+06	.113E+04	-.175E-02	.143E+04	.141E+11	-.102E+03
132.0	.614E-01	.312E+06	.529E+03	-.162E-02	.145E+04	.141E+11	-.971E+02
138.0	.521E-01	.315E+06	-.379E+02	-.148E-02	.145E+04	.141E+11	-.920E+02
144.0	.436E-01	.314E+06	-.574E+03	-.135E-02	.145E+04	.141E+11	-.867E+02
150.0	.359E-01	.310E+06	-.108E+04	-.122E-02	.144E+04	.141E+11	-.812E+02
156.0	.290E-01	.304E+06	-.155E+04	-.109E-02	.143E+04	.141E+11	-.756E+02
162.0	.228E-01	.294E+06	-.198E+04	-.961E-03	.141E+04	.141E+11	-.699E+02
168.0	.174E-01	.282E+06	-.239E+04	-.839E-03	.138E+04	.141E+11	-.639E+02
174.0	.128E-01	.267E+06	-.275E+04	-.722E-03	.135E+04	.141E+11	-.575E+02
180.0	.878E-02	.250E+06	-.308E+04	-.613E-03	.131E+04	.141E+11	-.508E+02
186.0	.542E-02	.231E+06	-.336E+04	-.511E-03	.127E+04	.141E+11	-.432E+02
192.0	.265E-02	.210E+06	-.359E+04	-.417E-03	.123E+04	.141E+11	-.341E+02
198.0	.415E-03	.189E+06	-.375E+04	-.332E-03	.118E+04	.141E+11	-.183E+02
204.0	-.134E-02	.166E+06	-.372E+04	-.257E-03	.113E+04	.141E+11	.271E+02
210.0	-.267E-02	.144E+06	-.354E+04	-.191E-03	.108E+04	.141E+11	.342E+02
216.0	-.363E-02	.124E+06	-.332E+04	-.134E-03	.104E+04	.141E+11	.379E+02
222.0	-.428E-02	.105E+06	-.309E+04	-.856E-04	.995E+03	.141E+11	.400E+02
228.0	-.466E-02	.871E+05	-.284E+04	-.448E-04	.956E+03	.141E+11	.411E+02
234.0	-.482E-02	.708E+05	-.260E+04	-.113E-04	.920E+03	.141E+11	.416E+02
240.0	-.479E-02	.559E+05	-.235E+04	.156E-04	.888E+03	.141E+11	.415E+02
246.0	-.463E-02	.426E+05	-.210E+04	.365E-04	.858E+03	.141E+11	.410E+02
252.0	-.436E-02	.307E+05	-.186E+04	.521E-04	.832E+03	.141E+11	.402E+02
258.0	-.400E-02	.202E+05	-.162E+04	.629E-04	.810E+03	.141E+11	.391E+02
264.0	-.360E-02	.112E+05	-.139E+04	.695E-04	.790E+03	.141E+11	.377E+02
270.0	-.317E-02	.344E+04	-.117E+04	.726E-04	.773E+03	.141E+11	.362E+02
276.0	-.273E-02	-.297E+04	-.954E+03	.727E-04	.772E+03	.141E+11	.344E+02
282.0	-.230E-02	-.814E+04	-.754E+03	.704E-04	.783E+03	.141E+11	.325E+02
288.0	-.189E-02	-.121E+05	-.565E+03	.661E-04	.792E+03	.141E+11	.304E+02
294.0	-.150E-02	-.150E+05	-.389E+03	.603E-04	.798E+03	.141E+11	.282E+02
300.0	-.116E-02	-.169E+05	-.227E+03	.535E-04	.802E+03	.141E+11	.259E+02
306.0	-.862E-03	-.179E+05	-.787E+02	.461E-04	.804E+03	.141E+11	.234E+02
312.0	-.608E-03	-.179E+05	.542E+02	.385E-04	.805E+03	.141E+11	.209E+02
318.0	-.400E-03	-.173E+05	.171E+03	.311E-04	.803E+03	.141E+11	.181E+02
324.0	-.236E-03	-.159E+05	.271E+03	.240E-04	.800E+03	.141E+11	.152E+02
330.0	-.112E-03	-.141E+05	.353E+03	.176E-04	.796E+03	.141E+11	.119E+02
336.0	-.238E-04	-.117E+05	.409E+03	.122E-04	.791E+03	.141E+11	.707E+01
342.0	.342E-04	-.917E+04	.407E+03	.773E-05	.785E+03	.141E+11	-.800E+01
348.0	.689E-04	-.688E+04	.353E+03	.432E-05	.780E+03	.141E+11	-.101E+02
354.0	.861E-04	-.494E+04	.290E+03	.181E-05	.776E+03	.141E+11	-.109E+02
360.0	.907E-04	-.340E+04	.235E+03	.423E-07	.773E+03	.141E+11	-.740E+01
366.0	.866E-04	-.212E+04	.190E+03	-.113E-05	.770E+03	.141E+11	-.748E+01
372.0	.771E-04	-.111E+04	.147E+03	-.182E-05	.768E+03	.141E+11	-.703E+01
378.0	.648E-04	-.356E+03	.107E+03	-.213E-05	.766E+03	.141E+11	-.622E+01
384.0	.515E-04	.178E+03	.730E+02	-.217E-05	.766E+03	.141E+11	-.519E+01
390.0	.388E-04	.524E+03	.452E+02	-.202E-05	.766E+03	.141E+11	-.409E+01
396.0	.273E-04	.724E+03	.239E+02	-.175E-05	.767E+03	.141E+11	-.302E+01
402.0	.177E-04	.814E+03	.870E+01	-.143E-05	.767E+03	.141E+11	-.204E+01
408.0	.102E-04	.831E+03	-.110E+01	-.108E-05	.767E+03	.141E+11	-.122E+01
414.0	.481E-05	.803E+03	-.658E+01	-.731E-06	.767E+03	.141E+11	-.599E+00
420.0	.144E-05	.753E+03	-.294E+02	-.401E-06	.767E+03	.141E+11	-.701E+01
426.0	-.529E-09	.450E+03	-.491E+02	-.145E-06	.766E+03	.141E+11	.435E+00
432.0	-.298E-06	.164E+03	-.369E+02	-.148E-07	.766E+03	.141E+11	.362E+01
438.0	-.179E-06	.740E+01	-.168E+02	.215E-07	.765E+03	.141E+11	.304E+01
444.0	-.404E-07	-.384E+02	-.194E+01	.149E-07	.765E+03	.141E+11	.184E+01
450.0	.123E-09	-.159E+02	.319E+01	.338E-08	.765E+03	.141E+11	-.323E+00
456.0	.216E-09	-.121E+00	.133E+01	-.103E-10	.765E+03	.141E+11	-.282E+00
462.0	.691E-14	.847E-01	.101E-01	-.180E-10	.765E+03	.141E+11	-.383E-02
468.0	-.201E-14	.429E-05	-.706E-02	-.575E-15	.765E+03	.141E+11	.154E-02
474.0	-.108E-18	-.227E-06	-.373E-06	.287E-15	.765E+03	.141E+11	.692E-07
480.0	.144E-14	-.189E-06	.617E-08	.199E-15	.765E+03	.141E+11	-.308E-10
486.0	.239E-14	-.153E-06	.579E-08	.126E-15	.765E+03	.141E+11	-.524E-10
492.0	.295E-14	-.120E-06	.525E-08	.681E-16	.765E+03	.141E+11	-.662E-10
498.0	.320E-14	-.906E-07	.460E-08	.233E-16	.765E+03	.141E+11	-.735E-10
504.0	.323E-14	-.650E-07	.392E-08	-.973E-17	.765E+03	.141E+11	-.756E-10
510.0	.309E-14	-.436E-07	.323E-08	-.328E-16	.765E+03	.141E+11	-.738E-10
516.0	.284E-14	-.262E-07	.258E-08	-.476E-16	.765E+03	.141E+11	-.692E-10
522.0	.252E-14	-.126E-07	.197E-08	-.558E-16	.765E+03	.141E+11	-.626E-10
528.0	.217E-14	-.240E-08	.143E-08	-.590E-16	.765E+03	.141E+11	-.549E-10
534.0	.181E-14	.473E-08	.965E-09	-.585E-16	.765E+03	.141E+11	-.468E-10

540.0	.146E-14	.929E-08	.574E-09	-.555E-16	.765E+03	.141E+11	-.386E-10
546.0	.114E-14	.117E-07	.256E-09	-.511E-16	.765E+03	.141E+11	-.307E-10
552.0	.851E-15	.124E-07	.800E-11	-.459E-16	.765E+03	.141E+11	-.233E-10
558.0	.591E-15	.119E-07	-.174E-09	-.408E-16	.765E+03	.141E+11	-.165E-10
564.0	.362E-15	.104E-07	-.297E-09	-.360E-16	.765E+03	.141E+11	-.102E-10
570.0	.159E-15	.840E-08	-.365E-09	-.320E-16	.765E+03	.141E+11	-.458E-11
576.0	-.225E-16	.611E-08	-.383E-09	-.289E-16	.765E+03	.141E+11	.658E-12
582.0	-.188E-15	.385E-08	-.354E-09	-.268E-16	.765E+03	.141E+11	.561E-11
588.0	-.344E-15	.191E-08	-.281E-09	-.256E-16	.765E+03	.141E+11	.104E-10
594.0	-.496E-15	.533E-09	-.163E-09	-.251E-16	.765E+03	.141E+11	.152E-10
600.0	-.646E-15	.000E+00	.000E+00	-.250E-16	.765E+03	.141E+11	.202E-10

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .859E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = -.619E-08 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .329E+00 IN
COMPUTED SLOPE AT PILE HEAD = .463E-17
MAXIMUM BENDING MOMENT = -.141E+07 LBS-IN
MAXIMUM SHEAR FORCE = .340E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 7

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .380E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.437E+00	-.166E+07	.380E+05	.925E-17	.439E+04	.141E+11	-.337E+03
6.0	.435E+00	-.144E+07	.359E+05	-.657E-03	.391E+04	.141E+11	-.364E+03
12.0	.429E+00	-.123E+07	.336E+05	-.122E-02	.345E+04	.141E+11	-.390E+03
18.0	.420E+00	-.103E+07	.312E+05	-.170E-02	.302E+04	.141E+11	-.415E+03
24.0	.408E+00	-.848E+06	.287E+05	-.210E-02	.262E+04	.141E+11	-.439E+03
30.0	.395E+00	-.682E+06	.260E+05	-.242E-02	.226E+04	.141E+11	-.462E+03
36.0	.379E+00	-.533E+06	.231E+05	-.268E-02	.193E+04	.141E+11	-.484E+03
42.0	.363E+00	-.400E+06	.202E+05	-.288E-02	.164E+04	.141E+11	-.504E+03
48.0	.345E+00	-.285E+06	.171E+05	-.303E-02	.139E+04	.141E+11	-.524E+03
54.0	.326E+00	-.190E+06	.139E+05	-.313E-02	.118E+04	.141E+11	-.542E+03
60.0	.307E+00	-.113E+06	.117E+05	-.319E-02	.101E+04	.141E+11	-.189E+03
66.0	.288E+00	-.437E+05	.106E+05	-.322E-02	.861E+03	.141E+11	-.163E+03
72.0	.269E+00	.201E+05	.967E+04	-.323E-02	.809E+03	.141E+11	-.159E+03
78.0	.249E+00	.781E+05	.872E+04	-.321E-02	.936E+03	.141E+11	-.155E+03
84.0	.230E+00	.131E+06	.781E+04	-.316E-02	.105E+04	.141E+11	-.151E+03
90.0	.211E+00	.177E+06	.691E+04	-.310E-02	.115E+04	.141E+11	-.147E+03
96.0	.193E+00	.219E+06	.605E+04	-.301E-02	.124E+04	.141E+11	-.142E+03
102.0	.175E+00	.255E+06	.521E+04	-.291E-02	.132E+04	.141E+11	-.138E+03
108.0	.158E+00	.287E+06	.439E+04	-.280E-02	.139E+04	.141E+11	-.133E+03
114.0	.142E+00	.313E+06	.361E+04	-.267E-02	.145E+04	.141E+11	-.128E+03
120.0	.126E+00	.335E+06	.285E+04	-.253E-02	.150E+04	.141E+11	-.123E+03
126.0	.111E+00	.352E+06	.213E+04	-.239E-02	.154E+04	.141E+11	-.118E+03
132.0	.973E-01	.365E+06	.143E+04	-.224E-02	.156E+04	.141E+11	-.113E+03
138.0	.843E-01	.373E+06	.771E+03	-.208E-02	.158E+04	.141E+11	-.108E+03
144.0	.723E-01	.378E+06	.139E+03	-.192E-02	.159E+04	.141E+11	-.103E+03
150.0	.613E-01	.378E+06	-.459E+03	-.176E-02	.159E+04	.141E+11	-.971E+02
156.0	.512E-01	.375E+06	-.102E+04	-.160E-02	.159E+04	.141E+11	-.914E+02
162.0	.421E-01	.369E+06	-.156E+04	-.144E-02	.157E+04	.141E+11	-.856E+02
168.0	.339E-01	.359E+06	-.205E+04	-.129E-02	.155E+04	.141E+11	-.797E+02
174.0	.266E-01	.347E+06	-.251E+04	-.114E-02	.152E+04	.141E+11	-.735E+02
180.0	.203E-01	.331E+06	-.293E+04	-.993E-03	.149E+04	.141E+11	-.671E+02
186.0	.147E-01	.313E+06	-.332E+04	-.856E-03	.145E+04	.141E+11	-.604E+02
192.0	.100E-01	.293E+06	-.366E+04	-.727E-03	.141E+04	.141E+11	-.530E+02

198.0	.601E-02	.271E+06	-.395E+04	-.608E-03	.136E+04	.141E+11	-.448E+02
204.0	.271E-02	.247E+06	-.419E+04	-.498E-03	.130E+04	.141E+11	-.343E+02
210.0	.348E-04	.221E+06	-.431E+04	-.398E-03	.125E+04	.141E+11	-.795E+01
216.0	-.207E-02	.196E+06	-.425E+04	-.310E-03	.119E+04	.141E+11	.314E+02
222.0	-.368E-02	.171E+06	-.404E+04	-.232E-03	.114E+04	.141E+11	.380E+02
228.0	-.486E-02	.148E+06	-.380E+04	-.164E-03	.109E+04	.141E+11	.417E+02
234.0	-.566E-02	.126E+06	-.354E+04	-.106E-03	.104E+04	.141E+11	.439E+02
240.0	-.613E-02	.105E+06	-.327E+04	-.574E-04	.996E+03	.141E+11	.451E+02
246.0	-.634E-02	.865E+05	-.300E+04	-.167E-04	.954E+03	.141E+11	.456E+02
252.0	-.633E-02	.693E+05	-.273E+04	.164E-04	.917E+03	.141E+11	.456E+02
258.0	-.615E-02	.537E+05	-.246E+04	.425E-04	.883E+03	.141E+11	.451E+02
264.0	-.582E-02	.397E+05	-.219E+04	.623E-04	.852E+03	.141E+11	.443E+02
270.0	-.540E-02	.273E+05	-.193E+04	.766E-04	.825E+03	.141E+11	.432E+02
276.0	-.491E-02	.165E+05	-.167E+04	.859E-04	.801E+03	.141E+11	.418E+02
282.0	-.437E-02	.711E+04	-.143E+04	.909E-04	.781E+03	.141E+11	.403E+02
288.0	-.382E-02	-.804E+03	-.119E+04	.922E-04	.767E+03	.141E+11	.385E+02
294.0	-.326E-02	-.733E+04	-.964E+03	.905E-04	.781E+03	.141E+11	.365E+02
300.0	-.273E-02	-.125E+05	-.751E+03	.863E-04	.793E+03	.141E+11	.344E+02
306.0	-.223E-02	-.165E+05	-.552E+03	.801E-04	.801E+03	.141E+11	.322E+02
312.0	-.177E-02	-.193E+05	-.366E+03	.725E-04	.808E+03	.141E+11	.298E+02
318.0	-.136E-02	-.210E+05	-.195E+03	.639E-04	.811E+03	.141E+11	.273E+02
324.0	-.100E-02	-.218E+05	-.389E+02	.549E-04	.813E+03	.141E+11	.246E+02
330.0	-.700E-03	-.216E+05	.101E+03	.457E-04	.813E+03	.141E+11	.219E+02
336.0	-.454E-03	-.206E+05	.223E+03	.367E-04	.810E+03	.141E+11	.189E+02
342.0	-.260E-03	-.190E+05	.327E+03	.283E-04	.807E+03	.141E+11	.157E+02
348.0	-.114E-03	-.168E+05	.410E+03	.207E-04	.802E+03	.141E+11	.119E+02
354.0	-.113E-04	-.141E+05	.462E+03	.142E-04	.796E+03	.141E+11	.550E+01
360.0	.557E-04	-.112E+05	.466E+03	.878E-05	.790E+03	.141E+11	-.455E+01
366.0	.941E-04	-.852E+04	.428E+03	.459E-05	.784E+03	.141E+11	-.813E+01
372.0	.111E-03	-.611E+04	.373E+03	.149E-05	.779E+03	.141E+11	-.101E+02
378.0	.112E-03	-.405E+04	.310E+03	-.671E-06	.774E+03	.141E+11	-.107E+02
384.0	.103E-03	-.238E+04	.247E+03	-.204E-05	.771E+03	.141E+11	-.104E+02
390.0	.875E-04	-.108E+04	.188E+03	-.277E-05	.768E+03	.141E+11	-.924E+01
396.0	.695E-04	-.117E+03	.138E+03	-.303E-05	.766E+03	.141E+11	-.767E+01
402.0	.512E-04	.574E+03	.969E+02	-.293E-05	.767E+03	.141E+11	-.589E+01
408.0	.343E-04	.105E+04	.669E+02	-.258E-05	.768E+03	.141E+11	-.412E+01
414.0	.202E-04	.138E+04	.470E+02	-.207E-05	.768E+03	.141E+11	-.252E+01
420.0	.952E-05	.162E+04	-.136E-01	-.143E-05	.769E+03	.141E+11	-.131E+02
426.0	.300E-05	.138E+04	-.629E+02	-.794E-06	.768E+03	.141E+11	-.781E+01
432.0	-.484E-08	.866E+03	-.836E+02	-.316E-06	.767E+03	.141E+11	.913E+00
438.0	-.801E-06	.381E+03	-.657E+02	-.518E-07	.766E+03	.141E+11	.503E+01
444.0	-.627E-06	.773E+02	-.367E+02	.455E-07	.765E+03	.141E+11	.463E+01
450.0	-.255E-06	-.590E+02	-.123E+02	.493E-07	.765E+03	.141E+11	.343E+01
456.0	-.346E-07	-.709E+02	.344E+01	.218E-07	.765E+03	.141E+11	.175E+01
462.0	.559E-08	-.177E+02	.606E+01	.293E-08	.765E+03	.141E+11	-.974E+00
468.0	.595E-09	.173E+01	.148E+01	-.466E-09	.765E+03	.141E+11	-.402E+00
474.0	-.660E-12	.672E-01	-.139E+00	-.850E-10	.765E+03	.141E+11	.479E-01
480.0	-.425E-09	.561E-01	-.183E-02	-.589E-10	.765E+03	.141E+11	.958E-05
486.0	-.707E-09	.454E-01	-.171E-02	-.373E-10	.765E+03	.141E+11	.163E-04
492.0	-.873E-09	.356E-01	-.155E-02	-.201E-10	.765E+03	.141E+11	.206E-04
498.0	-.949E-09	.268E-01	-.136E-02	-.688E-11	.765E+03	.141E+11	.228E-04
504.0	-.956E-09	.192E-01	-.116E-02	.289E-11	.765E+03	.141E+11	.235E-04
510.0	-.914E-09	.129E-01	-.957E-03	.971E-11	.765E+03	.141E+11	.229E-04
516.0	-.839E-09	.774E-02	-.763E-03	.141E-10	.765E+03	.141E+11	.215E-04
522.0	-.745E-09	.371E-02	-.584E-03	.165E-10	.765E+03	.141E+11	.194E-04
528.0	-.641E-09	.707E-03	-.424E-03	.175E-10	.765E+03	.141E+11	.171E-04
534.0	-.535E-09	-.140E-02	-.286E-03	.173E-10	.765E+03	.141E+11	.145E-04
540.0	-.433E-09	-.275E-02	-.170E-03	.164E-10	.765E+03	.141E+11	.120E-04
546.0	-.338E-09	-.347E-02	-.756E-04	.151E-10	.765E+03	.141E+11	.952E-05
552.0	-.252E-09	-.369E-02	-.230E-05	.136E-10	.765E+03	.141E+11	.722E-05
558.0	-.175E-09	-.352E-02	.516E-04	.121E-10	.765E+03	.141E+11	.511E-05
564.0	-.107E-09	-.309E-02	.879E-04	.107E-10	.765E+03	.141E+11	.318E-05
570.0	-.470E-10	-.249E-02	.108E-03	.948E-11	.765E+03	.141E+11	.142E-05
576.0	.668E-11	-.181E-02	.113E-03	.856E-11	.765E+03	.141E+11	-.206E-06
582.0	.558E-10	-.114E-02	.105E-03	.794E-11	.765E+03	.141E+11	-.174E-05
588.0	.102E-09	-.564E-03	.830E-04	.758E-11	.765E+03	.141E+11	-.324E-05
594.0	.147E-09	-.158E-03	.481E-04	.742E-11	.765E+03	.141E+11	-.474E-05
600.0	.191E-09	.000E+00	.000E+00	.739E-11	.765E+03	.141E+11	-.626E-05

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.112E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .109E-07 LBS

OUTPUT SUMMARY

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PILE-HEAD DEFLECTION            =  .437E+00 IN
COMPUTED SLOPE AT PILE HEAD     =  .925E-17
MAXIMUM BENDING MOMENT          = -.166E+07 LBS-IN
MAXIMUM SHEAR FORCE             =  .380E+05 LBS
NO. OF ITERATIONS               =        29
NO. OF ZERO DEFLECTION POINTS   =         6
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LOADING NUMBER   6

BOUNDARY CONDITION CODE               =          2
LATERAL LOAD AT THE PILE HEAD         =   .400E+05 LBS
SLOPE AT THE PILE HEAD                =   .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD           =   .150E+06 LBS
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X IN *****	DEFLECTION IN *********	MOMENT LBS-IN *********	SHEAR LBS *********	SLOPE RAD. *********	TOTAL STRESS LBS/IN**2 *********	FLEXURAL RIGIDITY LBS-IN**2 *********	SOIL REACTION LBS/IN *********
.0	.497E+00	-.179E+07	.400E+05	-.370E-16	.468E+04	.141E+11	-.348E+03
6.0	.495E+00	-.156E+07	.378E+05	-.710E-03	.417E+04	.141E+11	-.376E+03
12.0	.489E+00	-.133E+07	.355E+05	-.132E-02	.368E+04	.141E+11	-.403E+03
18.0	.479E+00	-.113E+07	.330E+05	-.185E-02	.323E+04	.141E+11	-.429E+03
24.0	.467E+00	-.935E+06	.303E+05	-.228E-02	.281E+04	.141E+11	-.454E+03
30.0	.452E+00	-.759E+06	.276E+05	-.264E-02	.243E+04	.141E+11	-.478E+03
36.0	.435E+00	-.600E+06	.246E+05	-.293E-02	.208E+04	.141E+11	-.500E+03
42.0	.417E+00	-.458E+06	.216E+05	-.316E-02	.177E+04	.141E+11	-.522E+03
48.0	.397E+00	-.335E+06	.184E+05	-.332E-02	.150E+04	.141E+11	-.542E+03
54.0	.377E+00	-.232E+06	.150E+05	-.345E-02	.127E+04	.141E+11	-.562E+03
60.0	.356E+00	-.149E+06	.128E+05	-.353E-02	.109E+04	.141E+11	-.199E+03
66.0	.334E+00	-.724E+05	.117E+05	-.357E-02	.924E+03	.141E+11	-.171E+03
72.0	.313E+00	-.229E+04	.106E+05	-.359E-02	.770E+03	.141E+11	-.167E+03
78.0	.291E+00	.618E+05	.965E+04	-.358E-02	.900E+03	.141E+11	-.163E+03
84.0	.270E+00	.120E+06	.869E+04	-.354E-02	.103E+04	.141E+11	-.159E+03
90.0	.249E+00	.172E+06	.774E+04	-.348E-02	.114E+04	.141E+11	-.155E+03
96.0	.228E+00	.219E+06	.683E+04	-.339E-02	.124E+04	.141E+11	-.150E+03
102.0	.208E+00	.260E+06	.594E+04	-.329E-02	.133E+04	.141E+11	-.146E+03
108.0	.189E+00	.296E+06	.508E+04	-.317E-02	.141E+04	.141E+11	-.141E+03
114.0	.170E+00	.327E+06	.424E+04	-.304E-02	.148E+04	.141E+11	-.136E+03
120.0	.152E+00	.353E+06	.344E+04	-.290E-02	.154E+04	.141E+11	-.131E+03
126.0	.135E+00	.374E+06	.267E+04	-.274E-02	.158E+04	.141E+11	-.126E+03
132.0	.119E+00	.390E+06	.192E+04	-.258E-02	.162E+04	.141E+11	-.121E+03
138.0	.104E+00	.401E+06	.121E+04	-.241E-02	.164E+04	.141E+11	-.116E+03
144.0	.904E-01	.409E+06	.534E+03	-.224E-02	.166E+04	.141E+11	-.110E+03
150.0	.775E-01	.412E+06	-.112E+03	-.207E-02	.167E+04	.141E+11	-.105E+03
156.0	.656E-01	.411E+06	-.725E+03	-.189E-02	.166E+04	.141E+11	-.993E+02
162.0	.548E-01	.406E+06	-.130E+04	-.172E-02	.165E+04	.141E+11	-.935E+02
168.0	.450E-01	.398E+06	-.185E+04	-.155E-02	.164E+04	.141E+11	-.876E+02
174.0	.362E-01	.387E+06	-.235E+04	-.138E-02	.161E+04	.141E+11	-.815E+02
180.0	.284E-01	.373E+06	-.282E+04	-.122E-02	.158E+04	.141E+11	-.751E+02
186.0	.216E-01	.355E+06	-.325E+04	-.106E-02	.154E+04	.141E+11	-.686E+02
192.0	.157E-01	.336E+06	-.365E+04	-.917E-03	.150E+04	.141E+11	-.616E+02
198.0	.106E-01	.313E+06	-.399E+04	-.780E-03	.145E+04	.141E+11	-.541E+02
204.0	.630E-02	.289E+06	-.429E+04	-.652E-03	.140E+04	.141E+11	-.455E+02
210.0	.276E-02	.263E+06	-.453E+04	-.535E-03	.134E+04	.141E+11	-.345E+02
216.0	-.111E-03	.236E+06	-.460E+04	-.429E-03	.128E+04	.141E+11	.119E+02
222.0	-.238E-02	.209E+06	-.447E+04	-.334E-03	.122E+04	.141E+11	.329E+02
228.0	-.412E-02	.183E+06	-.425E+04	-.251E-03	.116E+04	.141E+11	.395E+02
234.0	-.540E-02	.158E+06	-.400E+04	-.179E-03	.111E+04	.141E+11	.432E+02
240.0	-.627E-02	.135E+06	-.373E+04	-.117E-03	.106E+04	.141E+11	.454E+02
246.0	-.680E-02	.113E+06	-.346E+04	-.641E-04	.101E+04	.141E+11	.467E+02
252.0	-.704E-02	.936E+05	-.318E+04	-.201E-04	.970E+03	.141E+11	.472E+02
258.0	-.704E-02	.754E+05	-.289E+04	.157E-04	.930E+03	.141E+11	.472E+02
264.0	-.685E-02	.588E+05	-.261E+04	.442E-04	.894E+03	.141E+11	.468E+02
270.0	-.651E-02	.440E+05	-.233E+04	.661E-04	.861E+03	.141E+11	.460E+02
276.0	-.606E-02	.307E+05	-.206E+04	.819E-04	.832E+03	.141E+11	.449E+02
282.0	-.553E-02	.191E+05	-.180E+04	.925E-04	.807E+03	.141E+11	.435E+02
288.0	-.495E-02	.900E+04	-.154E+04	.984E-04	.785E+03	.141E+11	.420E+02
294.0	-.435E-02	.425E+03	-.129E+04	.100E-03	.766E+03	.141E+11	.402E+02
300.0	-.375E-02	-.670E+04	-.106E+04	.991E-04	.780E+03	.141E+11	.382E+02
306.0	-.316E-02	-.124E+05	-.835E+03	.950E-04	.793E+03	.141E+11	.361E+02
312.0	-.260E-02	-.169E+05	-.625E+03	.888E-04	.802E+03	.141E+11	.339E+02
318.0	-.209E-02	-.201E+05	-.429E+03	.810E-04	.809E+03	.141E+11	.315E+02
324.0	-.163E-02	-.222E+05	-.247E+03	.720E-04	.814E+03	.141E+11	.290E+02

330.0	-.123E-02	-.232E+05	-.810E+02	.624E-04	.816E+03	.141E+11	.264E+02
336.0	-.885E-03	-.233E+05	.690E+02	.525E-04	.816E+03	.141E+11	.236E+02
342.0	-.600E-03	-.225E+05	.202E+03	.428E-04	.814E+03	.141E+11	.208E+02
348.0	-.372E-03	-.209E+05	.318E+03	.336E-04	.811E+03	.141E+11	.177E+02
354.0	-.197E-03	-.187E+05	.414E+03	.252E-04	.806E+03	.141E+11	.143E+02
360.0	-.695E-04	-.160E+05	.474E+03	.178E-04	.800E+03	.141E+11	.567E+01
366.0	.169E-04	-.131E+05	.486E+03	.116E-04	.794E+03	.141E+11	-.146E+01
372.0	.700E-04	-.102E+05	.463E+03	.670E-05	.788E+03	.141E+11	-.638E+01
378.0	.973E-04	-.752E+04	.416E+03	.294E-05	.782E+03	.141E+11	-.933E+01
384.0	.105E-03	-.520E+04	.356E+03	.242E-06	.777E+03	.141E+11	-.106E+02
390.0	.100E-03	-.325E+04	.292E+03	-.155E-05	.772E+03	.141E+11	-.106E+02
396.0	.867E-04	-.169E+04	.232E+03	-.260E-05	.769E+03	.141E+11	-.957E+01
402.0	.690E-04	-.465E+03	.179E+03	-.306E-05	.766E+03	.141E+11	-.794E+01
408.0	.501E-04	.470E+03	.137E+03	-.305E-05	.766E+03	.141E+11	-.600E+01
414.0	.323E-04	.119E+04	.107E+03	-.270E-05	.768E+03	.141E+11	-.403E+01
420.0	.176E-04	.176E+04	.468E+02	-.208E-05	.769E+03	.141E+11	-.161E+02
426.0	.742E-05	.175E+04	-.334E+02	-.133E-05	.769E+03	.141E+11	-.106E+02
432.0	.168E-05	.136E+04	-.844E+02	-.667E-06	.768E+03	.141E+11	-.644E+01
438.0	-.588E-06	.743E+03	-.900E+02	-.220E-06	.767E+03	.141E+11	.454E+01
444.0	-.959E-06	.285E+03	-.604E+02	-.143E-08	.766E+03	.141E+11	.534E+01
450.0	-.605E-06	.188E+02	-.306E+02	.630E-07	.765E+03	.141E+11	.458E+01
456.0	-.203E-06	-.820E+02	-.722E+01	.496E-07	.765E+03	.141E+11	.318E+01
462.0	-.945E-08	-.680E+02	.585E+01	.178E-07	.765E+03	.141E+11	.114E+01
468.0	.105E-07	-.119E+02	.576E+01	.799E-09	.765E+03	.141E+11	-.118E+01
474.0	.141E-09	.116E+01	.107E+01	-.148E-08	.765E+03	.141E+11	-.247E+00
480.0	-.724E-08	.972E+00	-.316E-01	-.102E-08	.765E+03	.141E+11	.238E-03
486.0	-.121E-07	.788E+00	-.296E-01	-.651E-09	.765E+03	.141E+11	.406E-03
492.0	-.150E-07	.617E+00	-.269E-01	-.352E-09	.765E+03	.141E+11	.514E-03
498.0	-.164E-07	.466E+00	-.236E-01	-.122E-09	.765E+03	.141E+11	.572E-03
504.0	-.165E-07	.334E+00	-.201E-01	.475E-10	.765E+03	.141E+11	.589E-03
510.0	-.158E-07	.224E+00	-.166E-01	.166E-09	.765E+03	.141E+11	.575E-03
516.0	-.145E-07	.135E+00	-.132E-01	.242E-09	.765E+03	.141E+11	.539E-03
522.0	-.129E-07	.652E-01	-.101E-01	.285E-09	.765E+03	.141E+11	.488E-03
528.0	-.111E-07	.130E-01	-.736E-02	.302E-09	.765E+03	.141E+11	.428E-03
534.0	-.928E-08	-.237E-01	-.497E-02	.299E-09	.765E+03	.141E+11	.365E-03
540.0	-.751E-08	-.472E-01	-.296E-02	.284E-09	.765E+03	.141E+11	.301E-03
546.0	-.587E-08	-.597E-01	-.133E-02	.262E-09	.765E+03	.141E+11	.239E-03
552.0	-.437E-08	-.636E-01	-.548E-04	.235E-09	.765E+03	.141E+11	.182E-03
558.0	-.304E-08	-.608E-01	.882E-03	.209E-09	.765E+03	.141E+11	.129E-03
564.0	-.186E-08	-.533E-01	.151E-02	.185E-09	.765E+03	.141E+11	.801E-04
570.0	-.823E-09	-.430E-01	.186E-02	.164E-09	.765E+03	.141E+11	.359E-04
576.0	.108E-09	-.313E-01	.196E-02	.149E-09	.765E+03	.141E+11	-.493E-05
582.0	.960E-09	-.197E-01	.181E-02	.138E-09	.765E+03	.141E+11	-.436E-04
588.0	.176E-08	-.977E-02	.144E-02	.131E-09	.765E+03	.141E+11	-.812E-04
594.0	.254E-08	-.273E-02	.833E-03	.129E-09	.765E+03	.141E+11	-.119E-03
600.0	.331E-08	.000E+00	.000E+00	.128E-09	.765E+03	.141E+11	-.157E-03

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.350E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .285E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .497E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.370E-16
MAXIMUM BENDING MOMENT = -.179E+07 LBS-IN
MAXIMUM SHEAR FORCE = .400E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 6

LOADING NUMBER 7

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .420E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .150E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION

IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.562E+00	-.192E+07	.420E+05	.111E-15	.497E+04	.141E+11	-.359E+03
6.0	.560E+00	-.168E+07	.398E+05	-.765E-03	.444E+04	.141E+11	-.388E+03
12.0	.553E+00	-.145E+07	.374E+05	-.143E-02	.393E+04	.141E+11	-.415E+03
18.0	.543E+00	-.123E+07	.348E+05	-.200E-02	.345E+04	.141E+11	-.442E+03
24.0	.529E+00	-.103E+07	.320E+05	-.247E-02	.301E+04	.141E+11	-.468E+03
30.0	.513E+00	-.839E+06	.292E+05	-.287E-02	.260E+04	.141E+11	-.493E+03
36.0	.495E+00	-.670E+06	.261E+05	-.319E-02	.223E+04	.141E+11	-.517E+03
42.0	.475E+00	-.520E+06	.230E+05	-.344E-02	.190E+04	.141E+11	-.539E+03
48.0	.453E+00	-.389E+06	.197E+05	-.364E-02	.162E+04	.141E+11	-.561E+03
54.0	.431E+00	-.277E+06	.162E+05	-.378E-02	.137E+04	.141E+11	-.581E+03
60.0	.408E+00	-.187E+06	.139E+05	-.388E-02	.117E+04	.141E+11	-.208E+03
66.0	.385E+00	-.104E+06	.127E+05	-.394E-02	.993E+03	.141E+11	-.179E+03
72.0	.361E+00	-.273E+05	.116E+05	-.397E-02	.825E+03	.141E+11	-.175E+03
78.0	.337E+00	.430E+05	.106E+05	-.396E-02	.859E+03	.141E+11	-.171E+03
84.0	.313E+00	.107E+06	.959E+04	-.393E-02	.999E+03	.141E+11	-.167E+03
90.0	.290E+00	.165E+06	.860E+04	-.387E-02	.113E+04	.141E+11	-.163E+03
96.0	.267E+00	.217E+06	.764E+04	-.379E-02	.124E+04	.141E+11	-.159E+03
102.0	.244E+00	.264E+06	.670E+04	-.369E-02	.134E+04	.141E+11	-.154E+03
108.0	.223E+00	.304E+06	.579E+04	-.357E-02	.143E+04	.141E+11	-.149E+03
114.0	.202E+00	.339E+06	.491E+04	-.343E-02	.151E+04	.141E+11	-.144E+03
120.0	.181E+00	.369E+06	.406E+04	-.328E-02	.157E+04	.141E+11	-.139E+03
126.0	.162E+00	.394E+06	.324E+04	-.312E-02	.163E+04	.141E+11	-.134E+03
132.0	.144E+00	.414E+06	.245E+04	-.295E-02	.167E+04	.141E+11	-.129E+03
138.0	.127E+00	.429E+06	.169E+04	-.277E-02	.170E+04	.141E+11	-.124E+03
144.0	.111E+00	.439E+06	.963E+03	-.259E-02	.173E+04	.141E+11	-.118E+03
150.0	.957E-01	.445E+06	.270E+03	-.240E-02	.174E+04	.141E+11	-.113E+03
156.0	.819E-01	.447E+06	-.388E+03	-.221E-02	.174E+04	.141E+11	-.107E+03
162.0	.692E-01	.444E+06	-.101E+04	-.202E-02	.174E+04	.141E+11	-.101E+03
168.0	.577E-01	.438E+06	-.160E+04	-.183E-02	.172E+04	.141E+11	-.951E+02
174.0	.473E-01	.428E+06	-.215E+04	-.165E-02	.170E+04	.141E+11	-.890E+02
180.0	.379E-01	.415E+06	-.267E+04	-.147E-02	.167E+04	.141E+11	-.827E+02
186.0	.296E-01	.399E+06	-.315E+04	-.130E-02	.164E+04	.141E+11	-.762E+02
192.0	.224E-01	.380E+06	-.358E+04	-.113E-02	.160E+04	.141E+11	-.694E+02
198.0	.160E-01	.358E+06	-.398E+04	-.974E-03	.155E+04	.141E+11	-.621E+02
204.0	.107E-01	.334E+06	-.433E+04	-.827E-03	.150E+04	.141E+11	-.542E+02
210.0	.612E-02	.308E+06	-.462E+04	-.691E-03	.144E+04	.141E+11	-.450E+02
216.0	.236E-02	.280E+06	-.486E+04	-.567E-03	.138E+04	.141E+11	-.328E+02
222.0	-.681E-03	.250E+06	-.489E+04	-.454E-03	.131E+04	.141E+11	.217E+02
228.0	-.309E-02	.222E+06	-.472E+04	-.354E-03	.125E+04	.141E+11	.359E+02
234.0	-.493E-02	.194E+06	-.448E+04	-.266E-03	.119E+04	.141E+11	.419E+02
240.0	-.627E-02	.168E+06	-.422E+04	-.189E-03	.113E+04	.141E+11	.454E+02
246.0	-.719E-02	.144E+06	-.394E+04	-.122E-03	.108E+04	.141E+11	.475E+02
252.0	-.774E-02	.121E+06	-.366E+04	-.660E-04	.103E+04	.141E+11	.487E+02
258.0	-.798E-02	.100E+06	-.336E+04	-.189E-04	.985E+03	.141E+11	.492E+02
264.0	-.797E-02	.810E+05	-.307E+04	.196E-04	.942E+03	.141E+11	.492E+02
270.0	-.775E-02	.635E+05	-.277E+04	.502E-04	.904E+03	.141E+11	.487E+02
276.0	-.737E-02	.476E+05	-.248E+04	.738E-04	.869E+03	.141E+11	.479E+02
282.0	-.686E-02	.335E+05	-.220E+04	.910E-04	.839E+03	.141E+11	.468E+02
288.0	-.627E-02	.211E+05	-.192E+04	.103E-03	.811E+03	.141E+11	.454E+02
294.0	-.563E-02	.103E+05	-.165E+04	.109E-03	.788E+03	.141E+11	.438E+02
300.0	-.496E-02	.103E+04	-.140E+04	.112E-03	.768E+03	.141E+11	.420E+02
306.0	-.429E-02	-.670E+04	-.115E+04	.110E-03	.780E+03	.141E+11	.400E+02
312.0	-.364E-02	-.130E+05	-.918E+03	.106E-03	.794E+03	.141E+11	.379E+02
318.0	-.302E-02	-.179E+05	-.698E+03	.997E-04	.804E+03	.141E+11	.356E+02
324.0	-.244E-02	-.215E+05	-.491E+03	.914E-04	.812E+03	.141E+11	.331E+02
330.0	-.192E-02	-.240E+05	-.300E+03	.817E-04	.818E+03	.141E+11	.306E+02
336.0	-.146E-02	-.253E+05	-.125E+03	.713E-04	.821E+03	.141E+11	.279E+02
342.0	-.106E-02	-.256E+05	.346E+02	.605E-04	.821E+03	.141E+11	.251E+02
348.0	-.734E-03	-.250E+05	.177E+03	.497E-04	.820E+03	.141E+11	.222E+02
354.0	-.468E-03	-.236E+05	.301E+03	.394E-04	.817E+03	.141E+11	.191E+02
360.0	-.261E-03	-.214E+05	.422E+03	.299E-04	.812E+03	.141E+11	.213E+02
366.0	-.110E-03	-.186E+05	.514E+03	.214E-04	.806E+03	.141E+11	.946E+01
372.0	-.495E-05	-.153E+05	.544E+03	.142E-04	.799E+03	.141E+11	.451E+00
378.0	.606E-04	-.121E+05	.528E+03	.837E-05	.792E+03	.141E+11	-.582E+01
384.0	.955E-04	-.900E+04	.481E+03	.390E-05	.785E+03	.141E+11	-.962E+01
390.0	.107E-03	-.628E+04	.419E+03	.661E-06	.779E+03	.141E+11	-.113E+02
396.0	.103E-03	-.397E+04	.350E+03	-.152E-05	.774E+03	.141E+11	-.114E+02
402.0	.893E-04	-.208E+04	.285E+03	-.280E-05	.770E+03	.141E+11	-.103E+02
408.0	.699E-04	-.546E+03	.229E+03	-.336E-05	.766E+03	.141E+11	-.838E+01
414.0	.490E-04	.682E+03	.186E+03	-.333E-05	.767E+03	.141E+11	-.612E+01
420.0	.299E-04	.169E+04	.110E+03	-.282E-05	.769E+03	.141E+11	-.193E+02
426.0	.151E-04	.200E+04	.117E+02	-.204E-05	.770E+03	.141E+11	-.134E+02
432.0	.545E-05	.183E+04	-.571E+02	-.123E-05	.769E+03	.141E+11	-.954E+01
438.0	.429E-06	.132E+04	-.979E+02	-.556E-06	.768E+03	.141E+11	-.410E+01
444.0	-.123E-05	.659E+03	-.926E+02	-.136E-06	.767E+03	.141E+11	.580E+01
450.0	-.121E-05	.208E+03	-.578E+02	.477E-07	.766E+03	.141E+11	.576E+01
456.0	-.656E-06	-.344E+02	-.263E+02	.846E-07	.765E+03	.141E+11	.470E+01

462.0	-.193E-06	-.107E+03	-.261E+01	.546E-07	.766E+03	.141E+11	.312E+01
468.0	-.140E-08	-.658E+02	.866E+01	.179E-07	.765E+03	.141E+11	.611E+00
474.0	.223E-07	-.309E+01	.527E+01	.329E-08	.765E+03	.141E+11	-.143E+01
480.0	.381E-07	-.251E+01	.935E-01	.210E-08	.765E+03	.141E+11	-.105E-02
486.0	.475E-07	-.197E+01	.849E-01	.115E-08	.765E+03	.141E+11	-.134E-02
492.0	.519E-07	-.149E+01	.748E-01	.415E-09	.765E+03	.141E+11	-.149E-02
498.0	.525E-07	-.108E+01	.639E-01	-.130E-09	.765E+03	.141E+11	-.155E-02
504.0	.504E-07	-.726E+00	.530E-01	-.513E-09	.765E+03	.141E+11	-.151E-02
510.0	.464E-07	-.440E+00	.425E-01	-.760E-09	.765E+03	.141E+11	-.142E-02
516.0	.412E-07	-.214E+00	.328E-01	-.899E-09	.765E+03	.141E+11	-.129E-02
522.0	.356E-07	-.444E-01	.241E-01	-.954E-09	.765E+03	.141E+11	-.114E-02
528.0	.298E-07	.767E-01	.166E-01	-.947E-09	.765E+03	.141E+11	-.972E-03
534.0	.242E-07	.156E+00	.102E-01	-.897E-09	.765E+03	.141E+11	-.806E-03
540.0	.190E-07	.201E+00	.505E-02	-.822E-09	.765E+03	.141E+11	-.645E-03
546.0	.144E-07	.218E+00	.975E-03	-.733E-09	.765E+03	.141E+11	-.496E-03
552.0	.102E-07	.214E+00	-.208E-02	-.641E-09	.765E+03	.141E+11	-.360E-03
558.0	.666E-08	.194E+00	-.421E-02	-.554E-09	.765E+03	.141E+11	-.239E-03
564.0	.359E-08	.164E+00	-.553E-02	-.478E-09	.765E+03	.141E+11	-.131E-03
570.0	.926E-09	.129E+00	-.612E-02	-.416E-09	.765E+03	.141E+11	-.349E-04
576.0	-.140E-08	.917E-01	-.605E-02	-.369E-09	.765E+03	.141E+11	.524E-04
582.0	-.350E-08	.569E-01	-.539E-02	-.337E-09	.765E+03	.141E+11	.134E-03
588.0	-.545E-08	.277E-01	-.415E-02	-.319E-09	.765E+03	.141E+11	.212E-03
594.0	-.733E-08	.764E-02	-.236E-02	-.312E-09	.765E+03	.141E+11	.290E-03
600.0	-.920E-08	.000E+00	.000E+00	-.310E-09	.765E+03	.141E+11	.370E-03

OUTPUT VERIFICATION

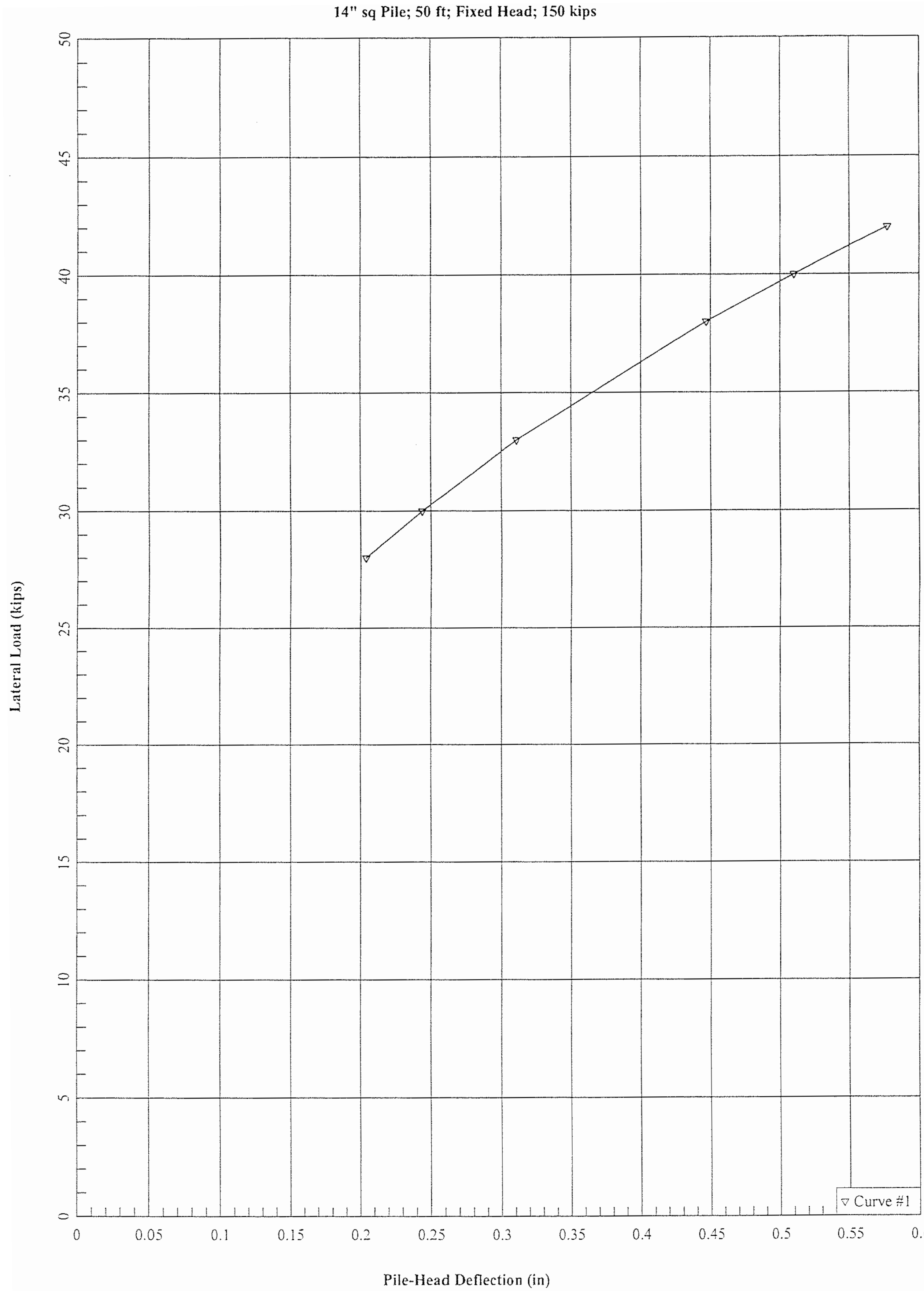
THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.522E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .943E-08 LBS

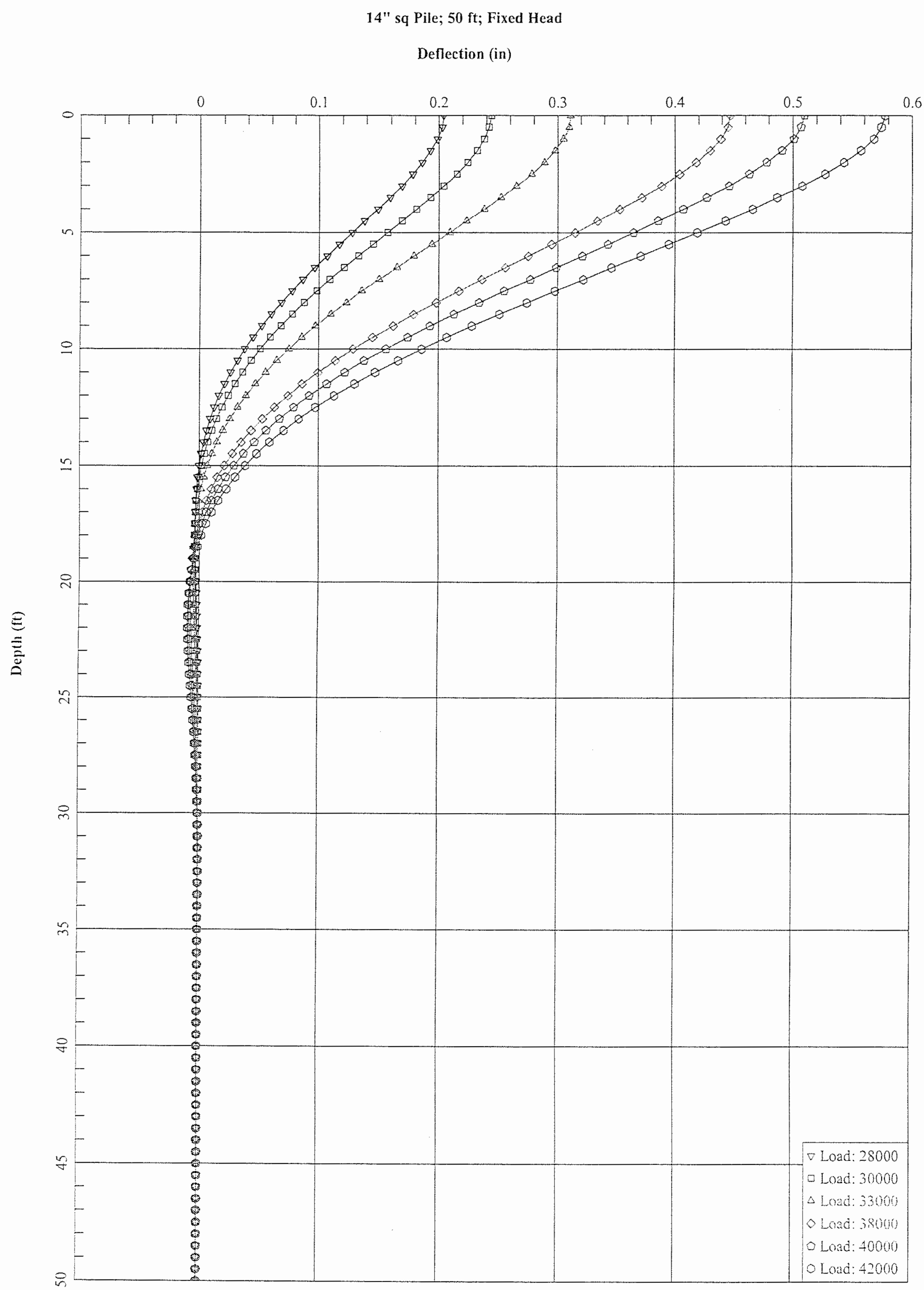
OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .562E+00 IN
COMPUTED SLOPE AT PILE HEAD = .111E-15
MAXIMUM BENDING MOMENT = -.192E+07 LBS-IN
MAXIMUM SHEAR FORCE = .420E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 5

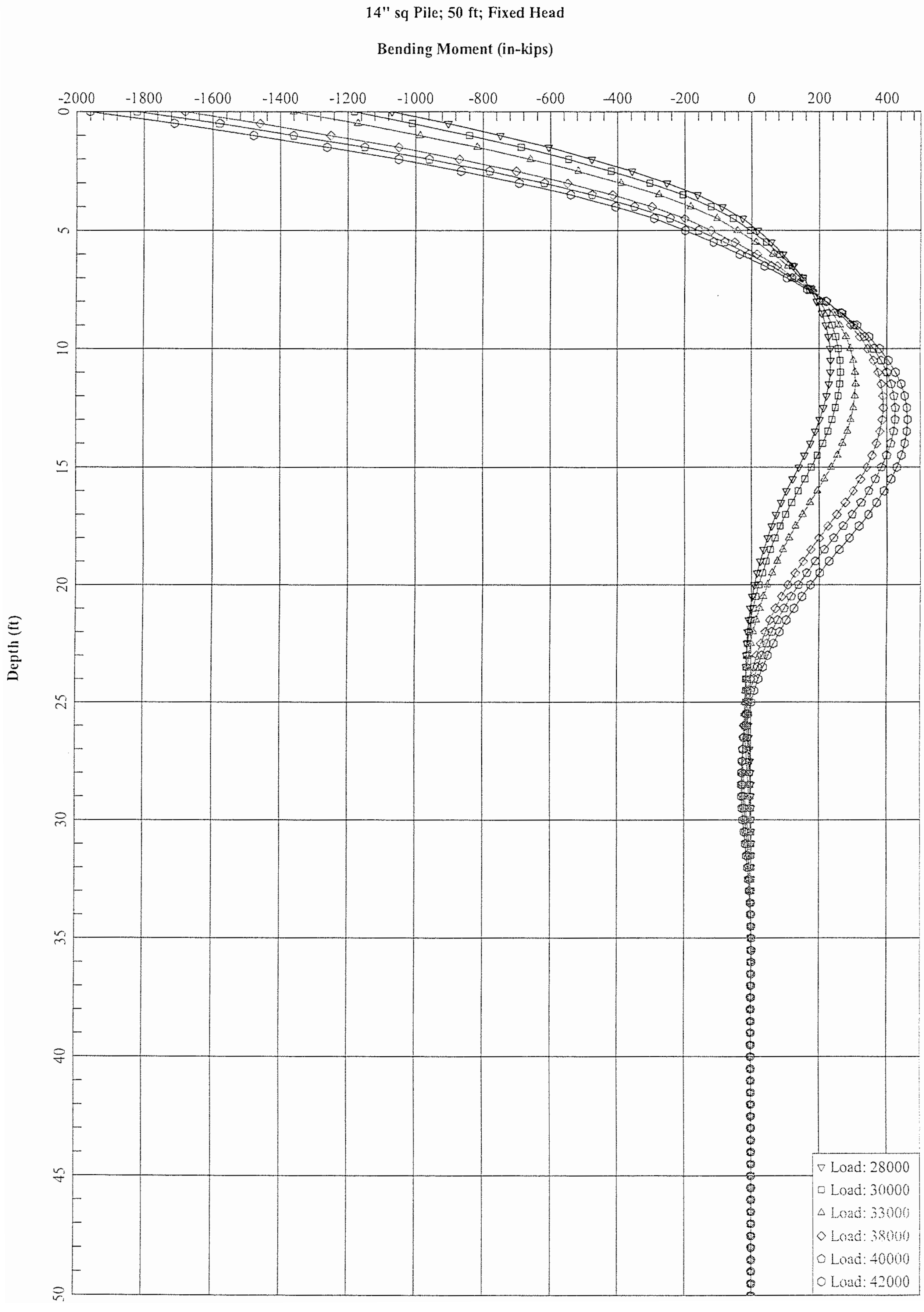
S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.3000E+05	.0000E+00	.1500E+06	.2394E+00	-.1167E+07	.3000E+05
.3300E+05	.0000E+00	.1500E+06	.3054E+00	-.1344E+07	.3300E+05
.3200E+05	.0000E+00	.1500E+06	.2823E+00	-.1284E+07	.3200E+05
.3400E+05	.0000E+00	.1500E+06	.3294E+00	-.1405E+07	.3400E+05
.3800E+05	.0000E+00	.1500E+06	.4368E+00	-.1658E+07	.3800E+05
.4000E+05	.0000E+00	.1500E+06	.4973E+00	-.1790E+07	.4000E+05
.4200E+05	.0000E+00	.1500E+06	.5623E+00	-.1925E+07	.4200E+05


14" sq Pile; 50 ft; Fixed Head; 150 kips
Lateral Load (kips)
0
5
10
15
20
25
30
35
40
45
50
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0.6
Pile-Head Deflection (in)
▽ Curve #1



14" sq Pile; 50 ft; Fixed Head
Deflection (in)
0
0.1
0.2
0.3
0.4
0.5
0.6
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 28000
Load: 30000
Load: 33000
Load: 38000
Load: 40000
Load: 42000



14" sq Pile; 50 ft; Fixed Head
Bending Moment (in-kips)
-2000
-1800
-1600
-1400
-1200
-1000
-800
-600
-400
-200
0
200
400
Depth (ft)
0
5
10
15
20
25
30
35
40
45
50
Load: 28000
Load: 30000
Load: 33000
Load: 38000
Load: 40000
Load: 42000

Licensed to: janet

enge

Sutter Medical Center - 14"sq. Concrete Pile; Axial L=300kips; 50'deep;

UNITS--ENGLISH UNITS

I N P U T   I N F O R M A T I O N

THE LOADING IS STATIC

PILE GEOMETRY AND PROPERTIES

PILE LENGTH = 600.00 IN
2 POINTS

X	DIAMETER	MOMENT OF INERTIA	AREA	MODULUS OF ELASTICITY
IN	IN	IN**4	IN**2	LBS/IN**2
.00	14.000	.320E+04	.196E+03	.442E+07
600.00	14.000	.320E+04	.196E+03	.442E+07

SOILS INFORMATION

X AT THE GROUND SURFACE = .00 IN

SLOPE ANGLE AT THE GROUND SURFACE = .00 DEG.

5 LAYER(S) OF SOIL

LAYER 1
THE SOIL IS A STIFF CLAY WITH NO FREE WATER
X AT THE TOP OF THE LAYER = .00 IN
X AT THE BOTTOM OF THE LAYER = 60.00 IN
MODULUS OF SUBGRADE REACTION = .500E+03 LBS/IN**3

LAYER 2
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 60.00 IN
X AT THE BOTTOM OF THE LAYER = 360.00 IN
MODULUS OF SUBGRADE REACTION = .300E+02 LBS/IN**3

LAYER 3
THE SOIL IS A STIFF CLAY WITH WATER-INDUCED EROSION
X AT THE TOP OF THE LAYER = 360.00 IN
X AT THE BOTTOM OF THE LAYER = 420.00 IN
MODULUS OF SUBGRADE REACTION = .800E+03 LBS/IN**3

LAYER 4
THE SOIL IS A SOFT CLAY
X AT THE TOP OF THE LAYER = 420.00 IN
X AT THE BOTTOM OF THE LAYER = 480.00 IN
MODULUS OF SUBGRADE REACTION = .100E+03 LBS/IN**3

LAYER 5
THE SOIL IS A SAND - P-Y CRITERIA BY REESE ET AL, 1974
X AT THE TOP OF THE LAYER = 480.00 IN

X AT THE BOTTOM OF THE LAYER = 720.00 IN
MODULUS OF SUBGRADE REACTION = .125E+03 LBS/IN**3

DISTRIBUTION OF EFFECTIVE UNIT WEIGHT WITH DEPTH
8 POINTS

X,IN	WEIGHT,LBS/IN**3
.00	.67E-01
60.00	.67E-01
60.00	.22E-01
360.00	.22E-01
360.00	.28E-01
480.00	.28E-01
480.00	.30E-01
720.00	.30E-01

DISTRIBUTION OF STRENGTH PARAMETERS WITH DEPTH
10 POINTS

X,IN	C,LBS/IN**2	PHI,DEGREES	E50
.00	.139E+02	.000	.700E-02
60.00	.139E+02	.000	.700E-02
60.00	.347E+01	.000	.200E-01
360.00	.347E+01	.000	.200E-01
360.00	.139E+02	.000	.500E-02
420.00	.139E+02	.000	.500E-02
420.00	.694E+01	.000	.150E-01
480.00	.694E+01	.000	.150E-01
480.00	.000E+00	.260E+02	-----
720.00	.000E+00	.260E+02	-----

BOUNDARY AND LOADING CONDITIONS

LOADING NUMBER 1

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .280E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

LOADING NUMBER 2

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .300E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .380E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .400E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 2

```
LATERAL LOAD AT THE PILE HEAD          =    .420E+05 LBS
SLOPE AT THE PILE HEAD                 =    .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD            =    .300E+06 LBS

FINITE-DIFFERENCE PARAMETERS
    NUMBER OF PILE INCREMENTS                                 =       100
    DEFLECTION TOLERANCE ON DETERMINATION OF CLOSURE          =   .100E-04 IN
    MAXIMUM NUMBER OF ITERATIONS ALLOWED FOR PILE ANALYSIS    =       100
    MAXIMUM ALLOWABLE DEFLECTION                              =    .10E+03 IN

OUTPUT CODES
    KOUTPT =  1
    KPYOP  =  0
    INC    =  1
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O U T P U T   I N F O R M A T I O N
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************************************************
* COMPUTE LOAD-DISTRIBUTION AND LOAD-DEFLECTION *
* CURVES FOR LATERAL LOADING                    *
************************************************
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```
LOADING NUMBER   1

BOUNDARY CONDITION CODE                =          2
LATERAL LOAD AT THE PILE HEAD          =    .280E+05 LBS
SLOPE AT THE PILE HEAD                 =    .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD            =    .300E+06 LBS
```

X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.204E+00	-.107E+07	.280E+05	-.324E-16	.386E+04	.141E+11	-.279E+03
6.0	.203E+00	-.902E+06	.263E+05	-.417E-03	.350E+04	.141E+11	-.301E+03
12.0	.199E+00	-.748E+06	.244E+05	-.768E-03	.317E+04	.141E+11	-.322E+03
18.0	.193E+00	-.606E+06	.224E+05	-.106E-02	.286E+04	.141E+11	-.342E+03
24.0	.186E+00	-.476E+06	.203E+05	-.128E-02	.257E+04	.141E+11	-.361E+03
30.0	.178E+00	-.358E+06	.181E+05	-.146E-02	.231E+04	.141E+11	-.378E+03
36.0	.169E+00	-.254E+06	.158E+05	-.159E-02	.209E+04	.141E+11	-.395E+03
42.0	.159E+00	-.163E+06	.133E+05	-.168E-02	.189E+04	.141E+11	-.410E+03
48.0	.149E+00	-.874E+05	.108E+05	-.173E-02	.172E+04	.141E+11	-.424E+03
54.0	.138E+00	-.268E+05	.826E+04	-.176E-02	.159E+04	.141E+11	-.437E+03
60.0	.128E+00	.180E+05	.652E+04	-.176E-02	.157E+04	.141E+11	-.141E+03
66.0	.117E+00	.578E+05	.574E+04	-.174E-02	.166E+04	.141E+11	-.120E+03
72.0	.107E+00	.931E+05	.502E+04	-.171E-02	.173E+04	.141E+11	-.117E+03
78.0	.965E-01	.124E+06	.434E+04	-.167E-02	.180E+04	.141E+11	-.113E+03
84.0	.866E-01	.151E+06	.367E+04	-.161E-02	.186E+04	.141E+11	-.109E+03
90.0	.772E-01	.174E+06	.303E+04	-.154E-02	.191E+04	.141E+11	-.105E+03
96.0	.682E-01	.193E+06	.241E+04	-.146E-02	.195E+04	.141E+11	-.101E+03
102.0	.597E-01	.208E+06	.182E+04	-.137E-02	.199E+04	.141E+11	-.962E+02
108.0	.517E-01	.220E+06	.126E+04	-.128E-02	.201E+04	.141E+11	-.917E+02
114.0	.443E-01	.228E+06	.721E+03	-.119E-02	.203E+04	.141E+11	-.871E+02
120.0	.374E-01	.233E+06	.213E+03	-.109E-02	.204E+04	.141E+11	-.824E+02
126.0	.312E-01	.234E+06	-.267E+03	-.992E-03	.204E+04	.141E+11	-.775E+02
132.0	.255E-01	.233E+06	-.717E+03	-.893E-03	.204E+04	.141E+11	-.725E+02
138.0	.205E-01	.229E+06	-.114E+04	-.794E-03	.203E+04	.141E+11	-.673E+02
144.0	.160E-01	.222E+06	-.152E+04	-.699E-03	.202E+04	.141E+11	-.620E+02
150.0	.121E-01	.213E+06	-.188E+04	-.606E-03	.200E+04	.141E+11	-.565E+02
156.0	.871E-02	.202E+06	-.220E+04	-.518E-03	.197E+04	.141E+11	-.507E+02
162.0	.586E-02	.189E+06	-.249E+04	-.435E-03	.194E+04	.141E+11	-.444E+02
168.0	.349E-02	.174E+06	-.273E+04	-.358E-03	.191E+04	.141E+11	-.373E+02
174.0	.156E-02	.157E+06	-.293E+04	-.288E-03	.187E+04	.141E+11	-.286E+02
180.0	.358E-04	.140E+06	-.304E+04	-.225E-03	.184E+04	.141E+11	-.801E+01
186.0	-.114E-02	.122E+06	-.299E+04	-.170E-03	.180E+04	.141E+11	.257E+02

192.0	-.200E-02	.104E+06	-.282E+04	-.122E-03	.176E+04	.141E+11	.310E+02
198.0	-.260E-02	.881E+05	-.262E+04	-.808E-04	.172E+04	.141E+11	.338E+02
204.0	-.297E-02	.731E+05	-.242E+04	-.466E-04	.169E+04	.141E+11	.354E+02
210.0	-.315E-02	.593E+05	-.220E+04	-.185E-04	.166E+04	.141E+11	.361E+02
216.0	-.319E-02	.468E+05	-.199E+04	.406E-05	.163E+04	.141E+11	.362E+02
222.0	-.311E-02	.355E+05	-.177E+04	.215E-04	.161E+04	.141E+11	.359E+02
228.0	-.293E-02	.255E+05	-.156E+04	.344E-04	.159E+04	.141E+11	.352E+02
234.0	-.269E-02	.167E+05	-.135E+04	.434E-04	.157E+04	.141E+11	.343E+02
240.0	-.241E-02	.914E+04	-.114E+04	.489E-04	.155E+04	.141E+11	.330E+02
246.0	-.211E-02	.277E+04	-.951E+03	.514E-04	.154E+04	.141E+11	.316E+02
252.0	-.179E-02	-.246E+04	-.767E+03	.515E-04	.154E+04	.141E+11	.299E+02
258.0	-.149E-02	-.661E+04	-.592E+03	.495E-04	.155E+04	.141E+11	.281E+02
264.0	-.120E-02	-.975E+04	-.430E+03	.461E-04	.155E+04	.141E+11	.262E+02
270.0	-.936E-03	-.119E+05	-.279E+03	.415E-04	.156E+04	.141E+11	.241E+02
276.0	-.703E-03	-.132E+05	-.141E+03	.361E-04	.156E+04	.141E+11	.219E+02
282.0	-.503E-03	-.138E+05	-.164E+02	.304E-04	.156E+04	.141E+11	.196E+02
288.0	-.338E-03	-.136E+05	.938E+02	.246E-04	.156E+04	.141E+11	.172E+02
294.0	-.208E-03	-.127E+05	.189E+03	.190E-04	.156E+04	.141E+11	.146E+02
300.0	-.110E-03	-.113E+05	.268E+03	.139E-04	.156E+04	.141E+11	.118E+02
306.0	-.413E-04	-.955E+04	.329E+03	.946E-05	.155E+04	.141E+11	.850E+01
312.0	.335E-05	-.743E+04	.344E+03	.586E-05	.155E+04	.141E+11	-.373E+01
318.0	.290E-04	-.544E+04	.311E+03	.313E-05	.154E+04	.141E+11	-.758E+01
324.0	.409E-04	-.371E+04	.263E+03	.119E-05	.154E+04	.141E+11	-.849E+01
330.0	.433E-04	-.229E+04	.211E+03	-.881E-07	.154E+04	.141E+11	-.865E+01
336.0	.398E-04	-.118E+04	.160E+03	-.824E-06	.153E+04	.141E+11	-.841E+01
342.0	.334E-04	-.365E+03	.111E+03	-.115E-05	.153E+04	.141E+11	-.793E+01
348.0	.260E-04	.162E+03	.655E+02	-.119E-05	.153E+04	.141E+11	-.730E+01
354.0	.191E-04	.426E+03	.239E+02	-.107E-05	.153E+04	.141E+11	-.658E+01
360.0	.132E-04	.452E+03	.970E+00	-.884E-06	.153E+04	.141E+11	-.107E+01
366.0	.845E-05	.440E+03	-.444E+01	-.694E-06	.153E+04	.141E+11	-.729E+00
372.0	.485E-05	.402E+03	-.796E+01	-.516E-06	.153E+04	.141E+11	-.441E+00
378.0	.227E-05	.347E+03	-.994E+01	-.357E-06	.153E+04	.141E+11	-.217E+00
384.0	.569E-06	.284E+03	-.108E+02	-.223E-06	.153E+04	.141E+11	-.566E-01
390.0	-.407E-06	.218E+03	-.108E+02	-.116E-06	.153E+04	.141E+11	.436E-01
396.0	-.826E-06	.154E+03	-.104E+02	-.372E-07	.153E+04	.141E+11	.917E-01
402.0	-.853E-06	.937E+02	-.983E+01	.155E-07	.153E+04	.141E+11	.985E-01
408.0	-.640E-06	.364E+02	-.931E+01	.431E-07	.153E+04	.141E+11	.770E-01
414.0	-.335E-06	-.182E+02	-.895E+01	.470E-07	.153E+04	.141E+11	.419E-01
420.0	-.767E-07	-.712E+02	-.938E+00	.280E-07	.153E+04	.141E+11	.264E+01
426.0	.396E-09	-.296E+02	.581E+01	.658E-08	.153E+04	.141E+11	-.407E+00
432.0	.222E-08	-.158E+01	.254E+01	-.327E-10	.153E+04	.141E+11	-.705E+00
438.0	.321E-11	.867E+00	.132E+00	-.185E-09	.153E+04	.141E+11	-.745E-01
444.0	-.645E-13	.131E-02	-.723E-01	-.267E-12	.153E+04	.141E+11	.207E-01
450.0	-.324E-16	-.253E-04	-.109E-03	.537E-14	.153E+04	.141E+11	.307E-04
456.0	.601E-18	-.132E-07	.211E-05	.270E-17	.153E+04	.141E+11	-.604E-06
462.0	.325E-21	.236E-09	.110E-08	-.501E-19	.153E+04	.141E+11	-.309E-09
468.0	-.560E-23	.132E-12	-.196E-10	-.271E-22	.153E+04	.141E+11	.563E-11
474.0	-.316E-26	-.630E-15	-.110E-13	.799E-24	.153E+04	.141E+11	.301E-14
480.0	.399E-23	-.526E-15	.172E-16	.553E-24	.153E+04	.141E+11	-.113E-18
486.0	.664E-23	-.426E-15	.161E-16	.351E-24	.153E+04	.141E+11	-.192E-18
492.0	.820E-23	-.334E-15	.146E-16	.190E-24	.153E+04	.141E+11	-.243E-18
498.0	.891E-23	-.252E-15	.128E-16	.652E-25	.153E+04	.141E+11	-.269E-18
504.0	.898E-23	-.181E-15	.109E-16	-.268E-25	.153E+04	.141E+11	-.277E-18
510.0	.859E-23	-.121E-15	.898E-17	-.911E-25	.153E+04	.141E+11	-.271E-18
516.0	.789E-23	-.730E-16	.715E-17	-.132E-24	.153E+04	.141E+11	-.254E-18
522.0	.700E-23	-.351E-16	.547E-17	-.155E-24	.153E+04	.141E+11	-.230E-18
528.0	.603E-23	-.682E-17	.397E-17	-.164E-24	.153E+04	.141E+11	-.202E-18
534.0	.503E-23	.131E-16	.267E-17	-.163E-24	.153E+04	.141E+11	-.172E-18
540.0	.407E-23	.258E-16	.158E-17	-.155E-24	.153E+04	.141E+11	-.141E-18
546.0	.318E-23	.325E-16	.692E-18	-.142E-24	.153E+04	.141E+11	-.112E-18
552.0	.237E-23	.346E-16	.376E-20	-.128E-24	.153E+04	.141E+11	-.852E-19
558.0	.164E-23	.331E-16	-.503E-18	-.114E-24	.153E+04	.141E+11	-.602E-19
564.0	.100E-23	.290E-16	-.843E-18	-.100E-24	.153E+04	.141E+11	-.374E-19
570.0	.436E-24	.233E-16	-.103E-17	-.894E-25	.153E+04	.141E+11	-.166E-19
576.0	-.705E-25	.169E-16	-.108E-17	-.808E-25	.153E+04	.141E+11	.272E-20
582.0	-.534E-24	.106E-16	-.997E-18	-.750E-25	.153E+04	.141E+11	.210E-19
588.0	-.970E-24	.523E-17	-.789E-18	-.716E-25	.153E+04	.141E+11	.387E-19
594.0	-.139E-23	.144E-17	-.457E-18	-.702E-25	.153E+04	.141E+11	.565E-19
600.0	-.181E-23	.000E+00	.000E+00	-.699E-25	.153E+04	.141E+11	.747E-19

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.104E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .920E-08 LBS

OUTPUT SUMMARY

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PILE-HEAD DEFLECTION            =   .204E+00 IN
COMPUTED SLOPE AT PILE HEAD     =  -.324E-16
MAXIMUM BENDING MOMENT          =  -.107E+07 LBS-IN
MAXIMUM SHEAR FORCE             =   .280E+05 LBS
NO. OF ITERATIONS               =        27
NO. OF ZERO DEFLECTION POINTS   =         9


LOADING NUMBER   2

BOUNDARY CONDITION CODE                   =          2
LATERAL LOAD AT THE PILE HEAD             =    .300E+05 LBS
SLOPE AT THE PILE HEAD                    =    .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD               =    .300E+06 LBS
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X IN	DEFLECTION IN	MOMENT LBS-IN	SHEAR LBS	SLOPE RAD.	TOTAL STRESS LBS/IN**2	FLEXURAL RIGIDITY LBS-IN**2	SOIL REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.244E+00	-.118E+07	.300E+05	.116E-16	.411E+04	.141E+11	-.291E+03
6.0	.242E+00	-.101E+07	.282E+05	-.464E-03	.373E+04	.141E+11	-.314E+03
12.0	.238E+00	-.840E+06	.262E+05	-.856E-03	.337E+04	.141E+11	-.337E+03
18.0	.232E+00	-.687E+06	.241E+05	-.118E-02	.303E+04	.141E+11	-.358E+03
24.0	.224E+00	-.546E+06	.219E+05	-.144E-02	.273E+04	.141E+11	-.378E+03
30.0	.215E+00	-.419E+06	.196E+05	-.165E-02	.245E+04	.141E+11	-.397E+03
36.0	.204E+00	-.305E+06	.172E+05	-.180E-02	.220E+04	.141E+11	-.414E+03
42.0	.193E+00	-.206E+06	.147E+05	-.191E-02	.198E+04	.141E+11	-.431E+03
48.0	.181E+00	-.122E+06	.120E+05	-.198E-02	.180E+04	.141E+11	-.446E+03
54.0	.169E+00	-.547E+05	.930E+04	-.202E-02	.165E+04	.141E+11	-.460E+03
60.0	.157E+00	-.350E+04	.747E+04	-.203E-02	.154E+04	.141E+11	-.151E+03
66.0	.145E+00	.423E+05	.663E+04	-.202E-02	.162E+04	.141E+11	-.129E+03
72.0	.133E+00	.833E+05	.586E+04	-.199E-02	.171E+04	.141E+11	-.126E+03
78.0	.121E+00	.120E+06	.512E+04	-.195E-02	.179E+04	.141E+11	-.122E+03
84.0	.109E+00	.152E+06	.440E+04	-.189E-02	.186E+04	.141E+11	-.118E+03
90.0	.983E-01	.179E+06	.371E+04	-.182E-02	.192E+04	.141E+11	-.114E+03
96.0	.876E-01	.203E+06	.304E+04	-.174E-02	.197E+04	.141E+11	-.109E+03
102.0	.774E-01	.222E+06	.240E+04	-.165E-02	.202E+04	.141E+11	-.105E+03
108.0	.678E-01	.238E+06	.178E+04	-.155E-02	.205E+04	.141E+11	-.100E+03
114.0	.588E-01	.249E+06	.119E+04	-.145E-02	.208E+04	.141E+11	-.957E+02
120.0	.504E-01	.257E+06	.632E+03	-.134E-02	.209E+04	.141E+11	-.909E+02
126.0	.427E-01	.262E+06	.101E+03	-.123E-02	.210E+04	.141E+11	-.860E+02
132.0	.356E-01	.263E+06	-.400E+03	-.112E-02	.211E+04	.141E+11	-.810E+02
138.0	.292E-01	.261E+06	-.870E+03	-.101E-02	.210E+04	.141E+11	-.758E+02
144.0	.235E-01	.256E+06	-.131E+04	-.901E-03	.209E+04	.141E+11	-.705E+02
150.0	.184E-01	.248E+06	-.172E+04	-.794E-03	.207E+04	.141E+11	-.650E+02
156.0	.139E-01	.238E+06	-.209E+04	-.690E-03	.205E+04	.141E+11	-.593E+02
162.0	.101E-01	.226E+06	-.243E+04	-.592E-03	.202E+04	.141E+11	-.532E+02
168.0	.684E-02	.211E+06	-.273E+04	-.499E-03	.199E+04	.141E+11	-.467E+02
174.0	.411E-02	.195E+06	-.298E+04	-.413E-03	.196E+04	.141E+11	-.394E+02
180.0	.188E-02	.177E+06	-.319E+04	-.334E-03	.192E+04	.141E+11	-.304E+02
186.0	.101E-03	.158E+06	-.332E+04	-.263E-03	.188E+04	.141E+11	-.114E+02
192.0	-.128E-02	.138E+06	-.328E+04	-.200E-03	.183E+04	.141E+11	.267E+02
198.0	-.230E-02	.119E+06	-.310E+04	-.146E-03	.179E+04	.141E+11	.325E+02
204.0	-.303E-02	.101E+06	-.289E+04	-.990E-04	.175E+04	.141E+11	.356E+02
210.0	-.349E-02	.848E+05	-.267E+04	-.595E-04	.172E+04	.141E+11	.374E+02
216.0	-.374E-02	.695E+05	-.245E+04	-.268E-04	.168E+04	.141E+11	.382E+02
222.0	-.381E-02	.555E+05	-.222E+04	-.258E-06	.165E+04	.141E+11	.385E+02
228.0	-.374E-02	.428E+05	-.199E+04	.206E-04	.162E+04	.141E+11	.382E+02
234.0	-.357E-02	.316E+05	-.176E+04	.364E-04	.160E+04	.141E+11	.376E+02
240.0	-.331E-02	.216E+05	-.154E+04	.477E-04	.158E+04	.141E+11	.367E+02
246.0	-.299E-02	.129E+05	-.132E+04	.550E-04	.156E+04	.141E+11	.355E+02
252.0	-.265E-02	.555E+04	-.111E+04	.589E-04	.154E+04	.141E+11	.341E+02
258.0	-.229E-02	-.622E+03	-.913E+03	.600E-04	.153E+04	.141E+11	.324E+02
264.0	-.193E-02	-.562E+04	-.723E+03	.587E-04	.154E+04	.141E+11	.306E+02
270.0	-.158E-02	-.952E+04	-.546E+03	.554E-04	.155E+04	.141E+11	.287E+02
276.0	-.126E-02	-.124E+05	-.380E+03	.508E-04	.156E+04	.141E+11	.266E+02
282.0	-.972E-03	-.143E+05	-.227E+03	.451E-04	.156E+04	.141E+11	.244E+02
288.0	-.720E-03	-.153E+05	-.873E+02	.389E-04	.156E+04	.141E+11	.221E+02
294.0	-.506E-03	-.154E+05	.378E+02	.324E-04	.156E+04	.141E+11	.196E+02
300.0	-.331E-03	-.149E+05	.148E+03	.259E-04	.156E+04	.141E+11	.170E+02
306.0	-.195E-03	-.138E+05	.242E+03	.198E-04	.156E+04	.141E+11	.143E+02
312.0	-.930E-04	-.121E+05	.318E+03	.144E-04	.156E+04	.141E+11	.111E+02
318.0	-.222E-04	-.100E+05	.372E+03	.967E-05	.155E+04	.141E+11	.691E+01

324.0	.230E-04	-.765E+04	.372E+03	.592E-05	.155E+04	.141E+11	-.702E+01
330.0	.488E-04	-.555E+04	.324E+03	.312E-05	.154E+04	.141E+11	-.900E+01
336.0	.604E-04	-.377E+04	.268E+03	.114E-05	.154E+04	.141E+11	-.967E+01
342.0	.625E-04	-.234E+04	.210E+03	-.159E-06	.154E+04	.141E+11	-.977E+01
348.0	.585E-04	-.125E+04	.152E+03	-.920E-06	.153E+04	.141E+11	-.956E+01
354.0	.514E-04	-.507E+03	.961E+02	-.129E-05	.153E+04	.141E+11	-.916E+01
360.0	.430E-04	-.924E+02	.581E+02	-.142E-05	.153E+04	.141E+11	-.351E+01
366.0	.344E-04	.196E+03	.387E+02	-.140E-05	.153E+04	.141E+11	-.297E+01
372.0	.262E-04	.377E+03	.226E+02	-.128E-05	.153E+04	.141E+11	-.239E+01
378.0	.191E-04	.472E+03	.995E+01	-.110E-05	.153E+04	.141E+11	-.183E+01
384.0	.131E-04	.500E+03	.512E+00	-.890E-06	.153E+04	.141E+11	-.132E+01
390.0	.838E-05	.481E+03	-.610E+01	-.682E-06	.153E+04	.141E+11	-.885E+00
396.0	.490E-05	.430E+03	-.104E+02	-.488E-06	.153E+04	.141E+11	-.541E+00
402.0	.252E-05	.358E+03	-.129E+02	-.321E-06	.153E+04	.141E+11	-.290E+00
408.0	.105E-05	.276E+03	-.141E+02	-.186E-06	.153E+04	.141E+11	-.126E+00
414.0	.284E-06	.190E+03	-.146E+02	-.875E-07	.153E+04	.141E+11	-.353E-01
420.0	-.172E-10	.101E+03	-.143E+02	-.257E-07	.153E+04	.141E+11	.169E+00
426.0	-.252E-07	.184E+02	-.905E+01	-.296E-09	.153E+04	.141E+11	.159E+01
432.0	-.357E-08	-.710E+01	-.165E+01	.211E-08	.153E+04	.141E+11	.810E+00
438.0	.147E-10	-.141E+01	.592E+00	.298E-09	.153E+04	.141E+11	-.141E+00
444.0	.174E-12	.564E-02	.118E+00	-.123E-11	.153E+04	.141E+11	-.265E-01
450.0	-.131E-15	.684E-04	-.470E-03	-.145E-13	.153E+04	.141E+11	.185E-03
456.0	-.163E-17	-.501E-07	-.570E-05	.109E-16	.153E+04	.141E+11	.127E-05
462.0	.116E-20	-.641E-09	.418E-08	.136E-18	.153E+04	.141E+11	-.168E-08
468.0	.153E-22	.444E-12	.534E-10	-.969E-22	.153E+04	.141E+11	-.120E-10
474.0	-.105E-25	.172E-14	-.369E-13	-.218E-23	.153E+04	.141E+11	.154E-13
480.0	-.109E-22	.144E-14	-.468E-16	-.151E-23	.153E+04	.141E+11	.241E-18
486.0	-.181E-22	.116E-14	-.439E-16	-.958E-24	.153E+04	.141E+11	.409E-18
492.0	-.224E-22	.913E-15	-.398E-16	-.517E-24	.153E+04	.141E+11	.517E-18
498.0	-.243E-22	.688E-15	-.349E-16	-.177E-24	.153E+04	.141E+11	.574E-18
504.0	-.245E-22	.494E-15	-.297E-16	.736E-25	.153E+04	.141E+11	.591E-18
510.0	-.235E-22	.331E-15	-.245E-16	.249E-24	.153E+04	.141E+11	.577E-18
516.0	-.215E-22	.199E-15	-.195E-16	.361E-24	.153E+04	.141E+11	.541E-18
522.0	-.191E-22	.958E-16	-.149E-16	.424E-24	.153E+04	.141E+11	.489E-18
528.0	-.164E-22	.185E-16	-.108E-16	.448E-24	.153E+04	.141E+11	.429E-18
534.0	-.137E-22	-.357E-16	-.728E-17	.445E-24	.153E+04	.141E+11	.366E-18
540.0	-.111E-22	-.704E-16	-.430E-17	.422E-24	.153E+04	.141E+11	.301E-18
546.0	-.867E-23	-.889E-16	-.189E-17	.388E-24	.153E+04	.141E+11	.239E-18
552.0	-.646E-23	-.945E-16	-.839E-20	.349E-24	.153E+04	.141E+11	.182E-18
558.0	-.448E-23	-.902E-16	.137E-17	.310E-24	.153E+04	.141E+11	.128E-18
564.0	-.273E-23	-.791E-16	.230E-17	.274E-24	.153E+04	.141E+11	.796E-19
570.0	-.119E-23	-.636E-16	.281E-17	.244E-24	.153E+04	.141E+11	.352E-19
576.0	.193E-24	-.462E-16	.295E-17	.221E-24	.153E+04	.141E+11	-.584E-20
582.0	.146E-23	-.290E-16	.272E-17	.205E-24	.153E+04	.141E+11	-.447E-19
588.0	.265E-23	-.143E-16	.215E-17	.195E-24	.153E+04	.141E+11	-.825E-19
594.0	.380E-23	-.392E-17	.125E-17	.192E-24	.153E+04	.141E+11	-.120E-18
600.0	.495E-23	.000E+00	.000E+00	.191E-24	.153E+04	.141E+11	-.159E-18

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .242E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .230E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .244E+00 IN
COMPUTED SLOPE AT PILE HEAD = .116E-16
MAXIMUM BENDING MOMENT = -.118E+07 LBS-IN
MAXIMUM SHEAR FORCE = .300E+05 LBS
NO. OF ITERATIONS = 28
NO. OF ZERO DEFLECTION POINTS = 8

LOADING NUMBER 3

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .330E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X DEFLECTION MOMENT SHEAR SLOPE TOTAL FLEXURAL SOIL

IN	IN	LBS-IN	LBS	RAD.	STRESS LBS/IN**2	RIGIDITY LBS-IN**2	REACTION LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.311E+00	-.136E+07	.330E+05	-.370E-16	.451E+04	.141E+11	-.310E+03
6.0	.310E+00	-.117E+07	.311E+05	-.537E-03	.408E+04	.141E+11	-.334E+03
12.0	.305E+00	-.986E+06	.290E+05	-.994E-03	.369E+04	.141E+11	-.358E+03
18.0	.298E+00	-.816E+06	.268E+05	-.138E-02	.332E+04	.141E+11	-.381E+03
24.0	.289E+00	-.660E+06	.244E+05	-.169E-02	.297E+04	.141E+11	-.402E+03
30.0	.278E+00	-.517E+06	.219E+05	-.194E-02	.266E+04	.141E+11	-.423E+03
36.0	.265E+00	-.390E+06	.194E+05	-.213E-02	.238E+04	.141E+11	-.442E+03
42.0	.252E+00	-.277E+06	.166E+05	-.227E-02	.214E+04	.141E+11	-.460E+03
48.0	.238E+00	-.182E+06	.138E+05	-.237E-02	.193E+04	.141E+11	-.477E+03
54.0	.223E+00	-.103E+06	.109E+05	-.243E-02	.176E+04	.141E+11	-.493E+03
60.0	.209E+00	-.417E+05	.895E+04	-.246E-02	.162E+04	.141E+11	-.167E+03
66.0	.194E+00	.134E+05	.802E+04	-.247E-02	.156E+04	.141E+11	-.143E+03
72.0	.179E+00	.634E+05	.717E+04	-.245E-02	.167E+04	.141E+11	-.139E+03
78.0	.165E+00	.108E+06	.635E+04	-.242E-02	.177E+04	.141E+11	-.135E+03
84.0	.150E+00	.148E+06	.556E+04	-.236E-02	.185E+04	.141E+11	-.131E+03
90.0	.136E+00	.183E+06	.478E+04	-.229E-02	.193E+04	.141E+11	-.127E+03
96.0	.123E+00	.214E+06	.404E+04	-.221E-02	.200E+04	.141E+11	-.122E+03
102.0	.110E+00	.240E+06	.332E+04	-.211E-02	.206E+04	.141E+11	-.118E+03
108.0	.974E-01	.261E+06	.262E+04	-.200E-02	.210E+04	.141E+11	-.113E+03
114.0	.857E-01	.279E+06	.196E+04	-.189E-02	.214E+04	.141E+11	-.109E+03
120.0	.747E-01	.292E+06	.132E+04	-.177E-02	.217E+04	.141E+11	-.104E+03
126.0	.644E-01	.301E+06	.713E+03	-.164E-02	.219E+04	.141E+11	-.987E+02
132.0	.550E-01	.306E+06	.136E+03	-.151E-02	.220E+04	.141E+11	-.936E+02
138.0	.463E-01	.308E+06	-.410E+03	-.138E-02	.220E+04	.141E+11	-.884E+02
144.0	.384E-01	.306E+06	-.924E+03	-.125E-02	.220E+04	.141E+11	-.830E+02
150.0	.312E-01	.301E+06	-.141E+04	-.112E-02	.219E+04	.141E+11	-.775E+02
156.0	.249E-01	.293E+06	-.185E+04	-.998E-03	.217E+04	.141E+11	-.719E+02
162.0	.193E-01	.283E+06	-.227E+04	-.876E-03	.215E+04	.141E+11	-.660E+02
168.0	.144E-01	.269E+06	-.265E+04	-.758E-03	.212E+04	.141E+11	-.599E+02
174.0	.102E-01	.254E+06	-.299E+04	-.647E-03	.209E+04	.141E+11	-.533E+02
180.0	.661E-02	.236E+06	-.328E+04	-.544E-03	.205E+04	.141E+11	-.462E+02
186.0	.365E-02	.216E+06	-.354E+04	-.448E-03	.200E+04	.141E+11	-.379E+02
192.0	.124E-02	.195E+06	-.373E+04	-.360E-03	.196E+04	.141E+11	-.264E+02
198.0	-.679E-03	.173E+06	-.374E+04	-.282E-03	.191E+04	.141E+11	.217E+02
204.0	-.215E-02	.151E+06	-.358E+04	-.214E-03	.186E+04	.141E+11	.318E+02
210.0	-.324E-02	.130E+06	-.338E+04	-.154E-03	.182E+04	.141E+11	.364E+02
216.0	-.400E-02	.111E+06	-.315E+04	-.103E-03	.177E+04	.141E+11	.391E+02
222.0	-.448E-02	.930E+05	-.291E+04	-.594E-04	.173E+04	.141E+11	.406E+02
228.0	-.471E-02	.763E+05	-.267E+04	-.235E-04	.170E+04	.141E+11	.413E+02
234.0	-.476E-02	.610E+05	-.242E+04	.568E-05	.166E+04	.141E+11	.414E+02
240.0	-.464E-02	.472E+05	-.217E+04	.286E-04	.163E+04	.141E+11	.411E+02
246.0	-.441E-02	.348E+05	-.193E+04	.461E-04	.161E+04	.141E+11	.404E+02
252.0	-.409E-02	.239E+05	-.169E+04	.585E-04	.158E+04	.141E+11	.394E+02
258.0	-.371E-02	.144E+05	-.146E+04	.666E-04	.156E+04	.141E+11	.381E+02
264.0	-.329E-02	.617E+04	-.123E+04	.710E-04	.154E+04	.141E+11	.366E+02
270.0	-.286E-02	-.693E+03	-.102E+04	.722E-04	.153E+04	.141E+11	.349E+02
276.0	-.243E-02	-.630E+04	-.814E+03	.707E-04	.154E+04	.141E+11	.331E+02
282.0	-.201E-02	-.107E+05	-.621E+03	.671E-04	.155E+04	.141E+11	.311E+02
288.0	-.162E-02	-.140E+05	-.441E+03	.618E-04	.156E+04	.141E+11	.289E+02
294.0	-.127E-02	-.162E+05	-.275E+03	.554E-04	.157E+04	.141E+11	.267E+02
300.0	-.956E-03	-.175E+05	-.122E+03	.483E-04	.157E+04	.141E+11	.243E+02
306.0	-.689E-03	-.179E+05	.161E+02	.407E-04	.157E+04	.141E+11	.217E+02
312.0	-.467E-03	-.174E+05	.139E+03	.332E-04	.157E+04	.141E+11	.191E+02
318.0	-.290E-03	-.163E+05	.245E+03	.261E-04	.157E+04	.141E+11	.163E+02
324.0	-.154E-03	-.146E+05	.333E+03	.195E-04	.156E+04	.141E+11	.132E+02
330.0	-.560E-04	-.124E+05	.401E+03	.138E-04	.156E+04	.141E+11	.941E+01
336.0	.109E-04	-.984E+04	.413E+03	.906E-05	.155E+04	.141E+11	-.548E+01
342.0	.528E-04	-.747E+04	.369E+03	.539E-05	.155E+04	.141E+11	-.924E+01
348.0	.756E-04	-.543E+04	.310E+03	.265E-05	.154E+04	.141E+11	-.104E+02
354.0	.846E-04	-.375E+04	.247E+03	.705E-06	.154E+04	.141E+11	-.108E+02
360.0	.841E-04	-.247E+04	.194E+03	-.616E-06	.154E+04	.141E+11	-.686E+01
366.0	.773E-04	-.143E+04	.153E+03	-.144E-05	.153E+04	.141E+11	-.667E+01
372.0	.668E-04	-.625E+03	.115E+03	-.188E-05	.153E+04	.141E+11	-.609E+01
378.0	.547E-04	-.413E+02	.809E+02	-.202E-05	.153E+04	.141E+11	-.525E+01
384.0	.425E-04	.353E+03	.523E+02	-.195E-05	.153E+04	.141E+11	-.429E+01
390.0	.313E-04	.593E+03	.295E+02	-.175E-05	.153E+04	.141E+11	-.330E+01
396.0	.215E-04	.714E+03	.125E+02	-.147E-05	.153E+04	.141E+11	-.237E+01
402.0	.136E-04	.749E+03	.697E+00	-.116E-05	.153E+04	.141E+11	-.156E+01
408.0	.755E-05	.727E+03	-.671E+01	-.851E-06	.153E+04	.141E+11	-.905E+00
414.0	.337E-05	.671E+03	-.107E+02	-.554E-06	.153E+04	.141E+11	-.420E+00
420.0	.896E-06	.600E+03	-.299E+02	-.284E-06	.153E+04	.141E+11	-.598E+01
426.0	-.455E-07	.314E+03	-.420E+02	-.904E-07	.153E+04	.141E+11	.193E+01
432.0	-.189E-06	.962E+02	-.269E+02	-.345E-08	.153E+04	.141E+11	.311E+01
438.0	-.869E-07	-.905E+01	-.103E+02	.150E-07	.153E+04	.141E+11	.239E+01
444.0	-.813E-08	-.274E+02	.426E+00	.732E-08	.153E+04	.141E+11	.106E+01
450.0	.978E-09	-.396E+01	.231E+01	.678E-09	.153E+04	.141E+11	-.542E+00

456.0	.429E-11	.381E+00	.330E+00	-.815E-10	.153E+04	.141E+11	-.722E-01
462.0	-.898E-14	.169E-02	-.317E-01	-.358E-12	.153E+04	.141E+11	.108E-01
468.0	-.404E-16	-.349E-05	-.141E-03	.748E-15	.153E+04	.141E+11	.262E-04
474.0	.829E-19	-.457E-08	.291E-06	.578E-17	.153E+04	.141E+11	-.101E-06
480.0	.290E-16	-.381E-08	.124E-09	.401E-17	.153E+04	.141E+11	-.530E-12
486.0	.481E-16	-.309E-08	.117E-09	.254E-17	.153E+04	.141E+11	-.901E-12
492.0	.595E-16	-.242E-08	.106E-09	.137E-17	.153E+04	.141E+11	-.114E-11
498.0	.646E-16	-.183E-08	.927E-10	.470E-18	.153E+04	.141E+11	-.126E-11
504.0	.651E-16	-.131E-08	.789E-10	-.196E-18	.153E+04	.141E+11	-.130E-11
510.0	.623E-16	-.879E-09	.650E-10	-.661E-18	.153E+04	.141E+11	-.127E-11
516.0	.572E-16	-.528E-09	.518E-10	-.960E-18	.153E+04	.141E+11	-.119E-11
522.0	.507E-16	-.254E-09	.396E-10	-.113E-17	.153E+04	.141E+11	-.108E-11
528.0	.437E-16	-.489E-10	.287E-10	-.119E-17	.153E+04	.141E+11	-.943E-12
534.0	.365E-16	.951E-10	.193E-10	-.118E-17	.153E+04	.141E+11	-.803E-12
540.0	.295E-16	.187E-09	.114E-10	-.112E-17	.153E+04	.141E+11	-.662E-12
546.0	.230E-16	.236E-09	.500E-11	-.103E-17	.153E+04	.141E+11	-.526E-12
552.0	.171E-16	.251E-09	.168E-13	-.927E-18	.153E+04	.141E+11	-.399E-12
558.0	.119E-16	.240E-09	-.365E-11	-.823E-18	.153E+04	.141E+11	-.282E-12
564.0	.725E-17	.210E-09	-.611E-11	-.728E-18	.153E+04	.141E+11	-.175E-12
570.0	.315E-17	.169E-09	-.747E-11	-.647E-18	.153E+04	.141E+11	-.772E-13
576.0	-.516E-18	.123E-09	-.782E-11	-.585E-18	.153E+04	.141E+11	.130E-13
582.0	-.387E-17	.771E-10	-.722E-11	-.543E-18	.153E+04	.141E+11	.983E-13
588.0	-.703E-17	.379E-10	-.571E-11	-.519E-18	.153E+04	.141E+11	.181E-12
594.0	-.101E-16	.104E-10	-.331E-11	-.508E-18	.153E+04	.141E+11	.265E-12
600.0	-.131E-16	.000E+00	.000E+00	-.506E-18	.153E+04	.141E+11	.350E-12

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.125E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .129E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .311E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.370E-16
MAXIMUM BENDING MOMENT = -.136E+07 LBS-IN
MAXIMUM SHEAR FORCE = .330E+05 LBS
NO. OF ITERATIONS = 29
NO. OF ZERO DEFLECTION POINTS = 7

LOADING NUMBER 4

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .380E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.447E+00	-.168E+07	.380E+05	.879E-16	.521E+04	.141E+11	-.339E+03
6.0	.445E+00	-.146E+07	.359E+05	-.667E-03	.472E+04	.141E+11	-.366E+03
12.0	.439E+00	-.125E+07	.336E+05	-.124E-02	.426E+04	.141E+11	-.392E+03
18.0	.430E+00	-.105E+07	.312E+05	-.173E-02	.383E+04	.141E+11	-.417E+03
24.0	.418E+00	-.869E+06	.286E+05	-.214E-02	.343E+04	.141E+11	-.441E+03
30.0	.404E+00	-.701E+06	.259E+05	-.247E-02	.306E+04	.141E+11	-.465E+03
36.0	.389E+00	-.549E+06	.230E+05	-.274E-02	.273E+04	.141E+11	-.486E+03
42.0	.372E+00	-.414E+06	.201E+05	-.294E-02	.244E+04	.141E+11	-.507E+03
48.0	.353E+00	-.298E+06	.170E+05	-.309E-02	.218E+04	.141E+11	-.527E+03
54.0	.334E+00	-.200E+06	.137E+05	-.320E-02	.197E+04	.141E+11	-.545E+03
60.0	.315E+00	-.121E+06	.115E+05	-.327E-02	.180E+04	.141E+11	-.191E+03
66.0	.295E+00	-.498E+05	.105E+05	-.330E-02	.164E+04	.141E+11	-.164E+03
72.0	.275E+00	.160E+05	.949E+04	-.331E-02	.157E+04	.141E+11	-.160E+03
78.0	.256E+00	.760E+05	.854E+04	-.329E-02	.170E+04	.141E+11	-.156E+03
84.0	.236E+00	.130E+06	.761E+04	-.325E-02	.182E+04	.141E+11	-.152E+03
90.0	.217E+00	.179E+06	.671E+04	-.318E-02	.192E+04	.141E+11	-.148E+03
96.0	.198E+00	.222E+06	.584E+04	-.309E-02	.202E+04	.141E+11	-.143E+03
102.0	.179E+00	.260E+06	.499E+04	-.299E-02	.210E+04	.141E+11	-.139E+03
108.0	.162E+00	.293E+06	.417E+04	-.287E-02	.217E+04	.141E+11	-.134E+03

114.0	.145E+00	.321E+06	.338E+04	-.274E-02	.223E+04	.141E+11	-.129E+03
120.0	.129E+00	.343E+06	.262E+04	-.260E-02	.228E+04	.141E+11	-.124E+03
126.0	.114E+00	.362E+06	.189E+04	-.245E-02	.232E+04	.141E+11	-.119E+03
132.0	.995E-01	.375E+06	.119E+04	-.230E-02	.235E+04	.141E+11	-.114E+03
138.0	.862E-01	.384E+06	.522E+03	-.214E-02	.237E+04	.141E+11	-.109E+03
144.0	.738E-01	.389E+06	-.114E+03	-.197E-02	.238E+04	.141E+11	-.103E+03
150.0	.625E-01	.390E+06	-.717E+03	-.181E-02	.238E+04	.141E+11	-.977E+02
156.0	.522E-01	.387E+06	-.129E+04	-.164E-02	.238E+04	.141E+11	-.920E+02
162.0	.428E-01	.380E+06	-.182E+04	-.148E-02	.236E+04	.141E+11	-.861E+02
168.0	.344E-01	.370E+06	-.232E+04	-.132E-02	.234E+04	.141E+11	-.801E+02
174.0	.270E-01	.357E+06	-.278E+04	-.117E-02	.231E+04	.141E+11	-.738E+02
180.0	.204E-01	.341E+06	-.320E+04	-.102E-02	.228E+04	.141E+11	-.673E+02
186.0	.147E-01	.322E+06	-.359E+04	-.877E-03	.224E+04	.141E+11	-.604E+02
192.0	.990E-02	.301E+06	-.393E+04	-.744E-03	.219E+04	.141E+11	-.529E+02
198.0	.581E-02	.278E+06	-.422E+04	-.621E-03	.214E+04	.141E+11	-.443E+02
204.0	.244E-02	.253E+06	-.445E+04	-.509E-03	.208E+04	.141E+11	-.331E+02
210.0	-.289E-03	.226E+06	-.450E+04	-.407E-03	.203E+04	.141E+11	.163E+02
216.0	-.244E-02	.200E+06	-.435E+04	-.316E-03	.197E+04	.141E+11	.332E+02
222.0	-.408E-02	.175E+06	-.414E+04	-.237E-03	.191E+04	.141E+11	.394E+02
228.0	-.528E-02	.152E+06	-.389E+04	-.167E-03	.186E+04	.141E+11	.429E+02
234.0	-.609E-02	.129E+06	-.363E+04	-.108E-03	.181E+04	.141E+11	.450E+02
240.0	-.657E-02	.108E+06	-.335E+04	-.572E-04	.177E+04	.141E+11	.461E+02
246.0	-.678E-02	.892E+05	-.307E+04	-.153E-04	.173E+04	.141E+11	.466E+02
252.0	-.676E-02	.716E+05	-.280E+04	.189E-04	.169E+04	.141E+11	.465E+02
258.0	-.655E-02	.556E+05	-.252E+04	.458E-04	.165E+04	.141E+11	.461E+02
264.0	-.621E-02	.412E+05	-.224E+04	.664E-04	.162E+04	.141E+11	.452E+02
270.0	-.576E-02	.284E+05	-.198E+04	.811E-04	.159E+04	.141E+11	.441E+02
276.0	-.523E-02	.172E+05	-.172E+04	.908E-04	.157E+04	.141E+11	.427E+02
282.0	-.467E-02	.749E+04	-.146E+04	.961E-04	.155E+04	.141E+11	.411E+02
288.0	-.408E-02	-.725E+03	-.122E+04	.975E-04	.153E+04	.141E+11	.393E+02
294.0	-.350E-02	-.752E+04	-.992E+03	.957E-04	.155E+04	.141E+11	.374E+02
300.0	-.293E-02	-.130E+05	-.774E+03	.914E-04	.156E+04	.141E+11	.352E+02
306.0	-.240E-02	-.171E+05	-.569E+03	.850E-04	.157E+04	.141E+11	.330E+02
312.0	-.191E-02	-.201E+05	-.379E+03	.771E-04	.157E+04	.141E+11	.306E+02
318.0	-.147E-02	-.220E+05	-.203E+03	.682E-04	.158E+04	.141E+11	.280E+02
324.0	-.109E-02	-.228E+05	-.431E+02	.587E-04	.158E+04	.141E+11	.254E+02
330.0	-.770E-03	-.227E+05	.101E+03	.490E-04	.158E+04	.141E+11	.226E+02
336.0	-.505E-03	-.218E+05	.227E+03	.396E-04	.158E+04	.141E+11	.196E+02
342.0	-.295E-03	-.201E+05	.335E+03	.307E-04	.157E+04	.141E+11	.164E+02
348.0	-.137E-03	-.179E+05	.422E+03	.226E-04	.157E+04	.141E+11	.127E+02
354.0	-.238E-04	-.151E+05	.482E+03	.156E-04	.156E+04	.141E+11	.708E+01
360.0	.506E-04	-.121E+05	.491E+03	.984E-05	.156E+04	.141E+11	-.413E+01
366.0	.942E-04	-.927E+04	.454E+03	.529E-05	.155E+04	.141E+11	-.813E+01
372.0	.114E-03	-.670E+04	.398E+03	.191E-05	.155E+04	.141E+11	-.104E+02
378.0	.117E-03	-.449E+04	.333E+03	-.469E-06	.154E+04	.141E+11	-.112E+02
384.0	.109E-03	-.269E+04	.267E+03	-.200E-05	.154E+04	.141E+11	-.109E+02
390.0	.931E-04	-.128E+04	.205E+03	-.284E-05	.153E+04	.141E+11	-.983E+01
396.0	.744E-04	-.228E+03	.151E+03	-.316E-05	.153E+04	.141E+11	-.821E+01
402.0	.552E-04	.533E+03	.107E+03	-.310E-05	.153E+04	.141E+11	-.635E+01
408.0	.373E-04	.107E+04	.744E+02	-.276E-05	.153E+04	.141E+11	-.447E+01
414.0	.221E-04	.144E+04	.527E+02	-.223E-05	.153E+04	.141E+11	-.276E+01
420.0	.106E-04	.171E+04	.352E+01	-.156E-05	.153E+04	.141E+11	-.136E+02
426.0	.340E-05	.148E+04	-.618E+02	-.882E-06	.153E+04	.141E+11	-.815E+01
432.0	.278E-09	.967E+03	-.872E+02	-.362E-06	.153E+04	.141E+11	-.370E+00
438.0	-.941E-06	.438E+03	-.723E+02	-.640E-07	.153E+04	.141E+11	.531E+01
444.0	-.767E-06	.998E+02	-.414E+02	.502E-07	.153E+04	.141E+11	.496E+01
450.0	-.339E-06	-.595E+02	-.152E+02	.587E-07	.153E+04	.141E+11	.377E+01
456.0	-.629E-07	-.824E+02	.274E+01	.286E-07	.153E+04	.141E+11	.214E+01
462.0	.355E-08	-.268E+02	.687E+01	.538E-08	.153E+04	.141E+11	-.841E+00
468.0	.169E-08	.634E-01	.225E+01	-.296E-09	.153E+04	.141E+11	-.602E+00
474.0	.726E-14	.191E+00	.791E-02	-.242E-09	.153E+04	.141E+11	.162E-01
480.0	-.121E-08	.159E+00	-.519E-02	-.167E-09	.153E+04	.141E+11	.321E-04
486.0	-.201E-08	.129E+00	-.487E-02	-.106E-09	.153E+04	.141E+11	.547E-04
492.0	-.248E-08	.101E+00	-.441E-02	-.574E-10	.153E+04	.141E+11	.691E-04
498.0	-.270E-08	.763E-01	-.387E-02	-.197E-10	.153E+04	.141E+11	.767E-04
504.0	-.272E-08	.548E-01	-.329E-02	.813E-11	.153E+04	.141E+11	.790E-04
510.0	-.260E-08	.367E-01	-.272E-02	.276E-10	.153E+04	.141E+11	.771E-04
516.0	-.239E-08	.221E-01	-.216E-02	.400E-10	.153E+04	.141E+11	.723E-04
522.0	-.212E-08	.106E-01	-.165E-02	.470E-10	.153E+04	.141E+11	.654E-04
528.0	-.182E-08	.206E-02	-.120E-02	.497E-10	.153E+04	.141E+11	.574E-04
534.0	-.152E-08	-.396E-02	-.807E-03	.493E-10	.153E+04	.141E+11	.489E-04
540.0	-.123E-08	-.780E-02	-.477E-03	.468E-10	.153E+04	.141E+11	.403E-04
546.0	-.961E-09	-.985E-02	-.209E-03	.430E-10	.153E+04	.141E+11	.320E-04
552.0	-.716E-09	-.105E-01	-.105E-05	.387E-10	.153E+04	.141E+11	.243E-04
558.0	-.497E-09	-.100E-01	.152E-03	.344E-10	.153E+04	.141E+11	.171E-04
564.0	-.303E-09	-.876E-02	.255E-03	.304E-10	.153E+04	.141E+11	.106E-04
570.0	-.132E-09	-.705E-02	.312E-03	.270E-10	.153E+04	.141E+11	.471E-05
576.0	.214E-10	-.512E-02	.326E-03	.245E-10	.153E+04	.141E+11	-.777E-06
582.0	.162E-09	-.322E-02	.302E-03	.227E-10	.153E+04	.141E+11	-.597E-05

588.0	.294E-09	-.158E-02	.239E-03	.217E-10	.153E+04	.141E+11	-.110E-04
594.0	.422E-09	-.434E-03	.138E-03	.212E-10	.153E+04	.141E+11	-.161E-04
600.0	.548E-09	.000E+00	.000E+00	.211E-10	.153E+04	.141E+11	-.213E-04

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = .321E-06 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .271E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .447E+00 IN
COMPUTED SLOPE AT PILE HEAD = .879E-16
MAXIMUM BENDING MOMENT = -.168E+07 LBS-IN
MAXIMUM SHEAR FORCE = .380E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 6

LOADING NUMBER 5

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .400E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.510E+00	-.182E+07	.400E+05	-.925E-17	.550E+04	.141E+11	-.350E+03
6.0	.507E+00	-.158E+07	.378E+05	-.722E-03	.499E+04	.141E+11	-.378E+03
12.0	.501E+00	-.136E+07	.355E+05	-.135E-02	.451E+04	.141E+11	-.405E+03
18.0	.491E+00	-.115E+07	.330E+05	-.188E-02	.405E+04	.141E+11	-.431E+03
24.0	.478E+00	-.959E+06	.303E+05	-.233E-02	.363E+04	.141E+11	-.457E+03
30.0	.463E+00	-.780E+06	.275E+05	-.270E-02	.324E+04	.141E+11	-.481E+03
36.0	.446E+00	-.619E+06	.245E+05	-.299E-02	.288E+04	.141E+11	-.503E+03
42.0	.427E+00	-.475E+06	.214E+05	-.323E-02	.257E+04	.141E+11	-.525E+03
48.0	.407E+00	-.350E+06	.182E+05	-.340E-02	.230E+04	.141E+11	-.546E+03
54.0	.386E+00	-.244E+06	.149E+05	-.353E-02	.207E+04	.141E+11	-.565E+03
60.0	.365E+00	-.159E+06	.126E+05	-.361E-02	.188E+04	.141E+11	-.201E+03
66.0	.343E+00	-.803E+05	.115E+05	-.366E-02	.171E+04	.141E+11	-.172E+03
72.0	.321E+00	-.790E+04	.105E+05	-.368E-02	.155E+04	.141E+11	-.169E+03
78.0	.299E+00	.584E+05	.945E+04	-.367E-02	.166E+04	.141E+11	-.165E+03
84.0	.277E+00	.119E+06	.848E+04	-.363E-02	.179E+04	.141E+11	-.160E+03
90.0	.255E+00	.173E+06	.753E+04	-.357E-02	.191E+04	.141E+11	-.156E+03
96.0	.234E+00	.222E+06	.661E+04	-.349E-02	.202E+04	.141E+11	-.152E+03
102.0	.213E+00	.265E+06	.571E+04	-.339E-02	.211E+04	.141E+11	-.147E+03
108.0	.193E+00	.303E+06	.484E+04	-.327E-02	.219E+04	.141E+11	-.142E+03
114.0	.174E+00	.335E+06	.400E+04	-.313E-02	.226E+04	.141E+11	-.137E+03
120.0	.156E+00	.362E+06	.319E+04	-.298E-02	.232E+04	.141E+11	-.132E+03
126.0	.138E+00	.384E+06	.241E+04	-.282E-02	.237E+04	.141E+11	-.127E+03
132.0	.122E+00	.401E+06	.166E+04	-.266E-02	.241E+04	.141E+11	-.122E+03
138.0	.107E+00	.413E+06	.947E+03	-.248E-02	.243E+04	.141E+11	-.117E+03
144.0	.921E-01	.421E+06	.263E+03	-.231E-02	.245E+04	.141E+11	-.111E+03
150.0	.788E-01	.425E+06	-.388E+03	-.213E-02	.246E+04	.141E+11	-.106E+03
156.0	.666E-01	.424E+06	-.100E+04	-.195E-02	.246E+04	.141E+11	-.998E+02
162.0	.555E-01	.420E+06	-.158E+04	-.177E-02	.245E+04	.141E+11	-.939E+02
168.0	.454E-01	.412E+06	-.213E+04	-.159E-02	.243E+04	.141E+11	-.878E+02
174.0	.364E-01	.400E+06	-.264E+04	-.142E-02	.241E+04	.141E+11	-.816E+02
180.0	.284E-01	.385E+06	-.311E+04	-.125E-02	.237E+04	.141E+11	-.751E+02
186.0	.214E-01	.367E+06	-.354E+04	-.109E-02	.233E+04	.141E+11	-.683E+02
192.0	.153E-01	.347E+06	-.393E+04	-.941E-03	.229E+04	.141E+11	-.611E+02
198.0	.101E-01	.324E+06	-.427E+04	-.798E-03	.224E+04	.141E+11	-.532E+02
204.0	.569E-02	.298E+06	-.456E+04	-.667E-03	.218E+04	.141E+11	-.439E+02
210.0	.207E-02	.271E+06	-.479E+04	-.546E-03	.212E+04	.141E+11	-.314E+02
216.0	-.860E-03	.243E+06	-.481E+04	-.437E-03	.206E+04	.141E+11	.234E+02
222.0	-.317E-02	.215E+06	-.463E+04	-.339E-03	.200E+04	.141E+11	.362E+02
228.0	-.493E-02	.188E+06	-.440E+04	-.254E-03	.194E+04	.141E+11	.419E+02
234.0	-.621E-02	.163E+06	-.414E+04	-.179E-03	.189E+04	.141E+11	.453E+02
240.0	-.708E-02	.139E+06	-.386E+04	-.115E-03	.184E+04	.141E+11	.473E+02

246.0	-.759E-02	.117E+06	-.357E+04	-.603E-04	.179E+04	.141E+11	.484E+02
252.0	-.780E-02	.968E+05	-.328E+04	-.149E-04	.174E+04	.141E+11	.488E+02
258.0	-.777E-02	.780E+05	-.299E+04	.222E-04	.170E+04	.141E+11	.488E+02
264.0	-.754E-02	.608E+05	-.270E+04	.516E-04	.166E+04	.141E+11	.483E+02
270.0	-.715E-02	.454E+05	-.241E+04	.742E-04	.163E+04	.141E+11	.474E+02
276.0	-.665E-02	.316E+05	-.213E+04	.906E-04	.160E+04	.141E+11	.463E+02
282.0	-.606E-02	.195E+05	-.186E+04	.101E-03	.157E+04	.141E+11	.449E+02
288.0	-.543E-02	.902E+04	-.159E+04	.107E-03	.155E+04	.141E+11	.433E+02
294.0	-.477E-02	.616E+02	-.134E+04	.109E-03	.153E+04	.141E+11	.415E+02
300.0	-.412E-02	-.741E+04	-.109E+04	.108E-03	.155E+04	.141E+11	.395E+02
306.0	-.348E-02	-.135E+05	-.863E+03	.103E-03	.156E+04	.141E+11	.373E+02
312.0	-.288E-02	-.181E+05	-.646E+03	.967E-04	.157E+04	.141E+11	.350E+02
318.0	-.232E-02	-.216E+05	-.444E+03	.883E-04	.158E+04	.141E+11	.326E+02
324.0	-.182E-02	-.238E+05	-.256E+03	.787E-04	.158E+04	.141E+11	.300E+02
330.0	-.138E-02	-.249E+05	-.834E+02	.683E-04	.159E+04	.141E+11	.274E+02
336.0	-.997E-03	-.250E+05	.726E+02	.577E-04	.159E+04	.141E+11	.246E+02
342.0	-.683E-03	-.242E+05	.211E+03	.473E-04	.158E+04	.141E+11	.217E+02
348.0	-.430E-03	-.227E+05	.332E+03	.373E-04	.158E+04	.141E+11	.186E+02
354.0	-.235E-03	-.204E+05	.433E+03	.282E-04	.158E+04	.141E+11	.152E+02
360.0	-.918E-04	-.176E+05	.502E+03	.201E-04	.157E+04	.141E+11	.749E+01
366.0	.655E-05	-.144E+05	.522E+03	.133E-04	.156E+04	.141E+11	-.566E+00
372.0	.681E-04	-.113E+05	.502E+03	.786E-05	.156E+04	.141E+11	-.621E+01
378.0	.101E-03	-.845E+04	.454E+03	.365E-05	.155E+04	.141E+11	-.967E+01
384.0	.112E-03	-.590E+04	.391E+03	.608E-06	.154E+04	.141E+11	-.113E+02
390.0	.108E-03	-.376E+04	.323E+03	-.144E-05	.154E+04	.141E+11	-.114E+02
396.0	.947E-04	-.202E+04	.258E+03	-.267E-05	.154E+04	.141E+11	-.104E+02
402.0	.761E-04	-.651E+03	.200E+03	-.323E-05	.153E+04	.141E+11	-.876E+01
408.0	.559E-04	.399E+03	.154E+03	-.329E-05	.153E+04	.141E+11	-.670E+01
414.0	.366E-04	.121E+04	.120E+03	-.295E-05	.153E+04	.141E+11	-.457E+01
420.0	.205E-04	.185E+04	.554E+02	-.230E-05	.153E+04	.141E+11	-.170E+02
426.0	.907E-05	.188E+04	-.294E+02	-.151E-05	.153E+04	.141E+11	-.113E+02
432.0	.243E-05	.150E+04	-.852E+02	-.788E-06	.153E+04	.141E+11	-.729E+01
438.0	-.381E-06	.860E+03	-.952E+02	-.286E-06	.153E+04	.141E+11	.392E+01
444.0	-.100E-05	.360E+03	-.671E+02	-.274E-07	.153E+04	.141E+11	.542E+01
450.0	-.710E-06	.552E+02	-.363E+02	.608E-07	.153E+04	.141E+11	.483E+01
456.0	-.275E-06	-.756E+02	-.112E+02	.564E-07	.153E+04	.141E+11	.352E+01
462.0	-.325E-07	-.790E+02	.470E+01	.236E-07	.153E+04	.141E+11	.172E+01
468.0	.863E-08	-.193E+02	.666E+01	.276E-08	.153E+04	.141E+11	-.112E+01
474.0	.603E-09	.893E+00	.167E+01	-.115E-08	.153E+04	.141E+11	-.412E+00
480.0	-.515E-08	.747E+00	-.240E-01	-.800E-09	.153E+04	.141E+11	.181E-03
486.0	-.900E-08	.607E+00	-.226E-01	-.513E-09	.153E+04	.141E+11	.319E-03
492.0	-.113E-07	.478E+00	-.206E-01	-.282E-09	.153E+04	.141E+11	.408E-03
498.0	-.124E-07	.361E+00	-.181E-01	-.104E-09	.153E+04	.141E+11	.455E-03
504.0	-.126E-07	.261E+00	-.154E-01	.278E-10	.153E+04	.141E+11	.470E-03
510.0	-.121E-07	.176E+00	-.128E-01	.121E-09	.153E+04	.141E+11	.461E-03
516.0	-.111E-07	.107E+00	-.102E-01	.181E-09	.153E+04	.141E+11	.433E-03
522.0	-.989E-08	.532E-01	-.782E-02	.215E-09	.153E+04	.141E+11	.393E-03
528.0	-.853E-08	.126E-01	-.570E-02	.229E-09	.153E+04	.141E+11	.345E-03
534.0	-.714E-08	-.160E-01	-.386E-02	.228E-09	.153E+04	.141E+11	.294E-03
540.0	-.579E-08	-.345E-01	-.231E-02	.217E-09	.153E+04	.141E+11	.243E-03
546.0	-.453E-08	-.445E-01	-.105E-02	.200E-09	.153E+04	.141E+11	.194E-03
552.0	-.339E-08	-.478E-01	-.643E-04	.181E-09	.153E+04	.141E+11	.147E-03
558.0	-.236E-08	-.459E-01	.663E-03	.161E-09	.153E+04	.141E+11	.104E-03
564.0	-.146E-08	-.404E-01	.115E-02	.143E-09	.153E+04	.141E+11	.652E-04
570.0	-.651E-09	-.326E-01	.143E-02	.127E-09	.153E+04	.141E+11	.294E-04
576.0	.702E-10	-.237E-01	.151E-02	.115E-09	.153E+04	.141E+11	-.369E-05
582.0	.731E-09	-.150E-01	.140E-02	.107E-09	.153E+04	.141E+11	-.351E-04
588.0	.135E-08	-.736E-02	.111E-02	.102E-09	.153E+04	.141E+11	-.656E-04
594.0	.196E-08	-.202E-02	.644E-03	.100E-09	.153E+04	.141E+11	-.963E-04
600.0	.256E-08	.000E+00	.000E+00	.998E-10	.153E+04	.141E+11	-.128E-03

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.575E-07 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .116E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .510E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.925E-17
MAXIMUM BENDING MOMENT = -.182E+07 LBS-IN
MAXIMUM SHEAR FORCE = .400E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 6

LOADING NUMBER 6

BOUNDARY CONDITION CODE = 2
LATERAL LOAD AT THE PILE HEAD = .420E+05 LBS
SLOPE AT THE PILE HEAD = .000E+00 IN/IN
AXIAL LOAD AT THE PILE HEAD = .300E+06 LBS

X	DEFLECTION	MOMENT	SHEAR	SLOPE	TOTAL STRESS	FLEXURAL RIGIDITY	SOIL REACTION
IN	IN	LBS-IN	LBS	RAD.	LBS/IN**2	LBS-IN**2	LBS/IN
*****	*********	*********	*********	*********	*********	*********	*********
.0	.577E+00	-.196E+07	.420E+05	-.120E-15	.581E+04	.141E+11	-.361E+03
6.0	.574E+00	-.171E+07	.397E+05	-.778E-03	.527E+04	.141E+11	-.390E+03
12.0	.568E+00	-.148E+07	.373E+05	-.145E-02	.476E+04	.141E+11	-.418E+03
18.0	.557E+00	-.126E+07	.347E+05	-.203E-02	.428E+04	.141E+11	-.445E+03
24.0	.543E+00	-.105E+07	.320E+05	-.252E-02	.383E+04	.141E+11	-.471E+03
30.0	.527E+00	-.864E+06	.291E+05	-.293E-02	.342E+04	.141E+11	-.496E+03
36.0	.508E+00	-.693E+06	.260E+05	-.326E-02	.305E+04	.141E+11	-.520E+03
42.0	.487E+00	-.540E+06	.228E+05	-.352E-02	.271E+04	.141E+11	-.543E+03
48.0	.466E+00	-.406E+06	.195E+05	-.372E-02	.242E+04	.141E+11	-.564E+03
54.0	.443E+00	-.292E+06	.161E+05	-.387E-02	.217E+04	.141E+11	-.585E+03
60.0	.419E+00	-.199E+06	.137E+05	-.398E-02	.197E+04	.141E+11	-.210E+03
66.0	.395E+00	-.114E+06	.125E+05	-.404E-02	.178E+04	.141E+11	-.181E+03
72.0	.371E+00	-.346E+05	.114E+05	-.407E-02	.161E+04	.141E+11	-.177E+03
78.0	.346E+00	.383E+05	.104E+05	-.407E-02	.161E+04	.141E+11	-.173E+03
84.0	.322E+00	.105E+06	.937E+04	-.404E-02	.176E+04	.141E+11	-.169E+03
90.0	.298E+00	.165E+06	.837E+04	-.399E-02	.189E+04	.141E+11	-.164E+03
96.0	.274E+00	.220E+06	.739E+04	-.390E-02	.201E+04	.141E+11	-.160E+03
102.0	.251E+00	.268E+06	.645E+04	-.380E-02	.212E+04	.141E+11	-.155E+03
108.0	.228E+00	.311E+06	.553E+04	-.368E-02	.221E+04	.141E+11	-.150E+03
114.0	.207E+00	.348E+06	.464E+04	-.354E-02	.229E+04	.141E+11	-.146E+03
120.0	.186E+00	.379E+06	.379E+04	-.338E-02	.236E+04	.141E+11	-.141E+03
126.0	.166E+00	.405E+06	.296E+04	-.322E-02	.242E+04	.141E+11	-.135E+03
132.0	.147E+00	.426E+06	.216E+04	-.304E-02	.246E+04	.141E+11	-.130E+03
138.0	.130E+00	.442E+06	.140E+04	-.286E-02	.250E+04	.141E+11	-.125E+03
144.0	.113E+00	.453E+06	.667E+03	-.267E-02	.252E+04	.141E+11	-.119E+03
150.0	.975E-01	.460E+06	-.300E+02	-.247E-02	.254E+04	.141E+11	-.113E+03
156.0	.833E-01	.462E+06	-.693E+03	-.228E-02	.254E+04	.141E+11	-.108E+03
162.0	.702E-01	.460E+06	-.132E+04	-.208E-02	.254E+04	.141E+11	-.102E+03
168.0	.583E-01	.453E+06	-.191E+04	-.189E-02	.252E+04	.141E+11	-.955E+02
174.0	.475E-01	.443E+06	-.247E+04	-.170E-02	.250E+04	.141E+11	-.892E+02
180.0	.379E-01	.430E+06	-.298E+04	-.151E-02	.247E+04	.141E+11	-.827E+02
186.0	.294E-01	.413E+06	-.346E+04	-.133E-02	.243E+04	.141E+11	-.760E+02
192.0	.219E-01	.393E+06	-.389E+04	-.116E-02	.239E+04	.141E+11	-.689E+02
198.0	.154E-01	.371E+06	-.428E+04	-.100E-02	.234E+04	.141E+11	-.613E+02
204.0	.991E-02	.346E+06	-.462E+04	-.848E-03	.229E+04	.141E+11	-.529E+02
210.0	.526E-02	.318E+06	-.491E+04	-.707E-03	.223E+04	.141E+11	-.428E+02
216.0	.142E-02	.289E+06	-.512E+04	-.578E-03	.216E+04	.141E+11	-.277E+02
222.0	-.168E-02	.259E+06	-.512E+04	-.462E-03	.210E+04	.141E+11	.293E+02
228.0	-.412E-02	.229E+06	-.491E+04	-.359E-03	.203E+04	.141E+11	.395E+02
234.0	-.598E-02	.201E+06	-.466E+04	-.267E-03	.197E+04	.141E+11	.447E+02
240.0	-.733E-02	.174E+06	-.438E+04	-.187E-03	.191E+04	.141E+11	.478E+02
246.0	-.823E-02	.149E+06	-.409E+04	-.119E-03	.186E+04	.141E+11	.497E+02
252.0	-.875E-02	.126E+06	-.379E+04	-.604E-04	.181E+04	.141E+11	.507E+02
258.0	-.895E-02	.104E+06	-.348E+04	-.117E-04	.176E+04	.141E+11	.511E+02
264.0	-.889E-02	.839E+05	-.318E+04	.282E-04	.171E+04	.141E+11	.510E+02
270.0	-.862E-02	.657E+05	-.287E+04	.600E-04	.167E+04	.141E+11	.505E+02
276.0	-.817E-02	.492E+05	-.257E+04	.844E-04	.164E+04	.141E+11	.496E+02
282.0	-.760E-02	.345E+05	-.228E+04	.102E-03	.161E+04	.141E+11	.484E+02
288.0	-.695E-02	.215E+05	-.199E+04	.114E-03	.158E+04	.141E+11	.470E+02
294.0	-.623E-02	.102E+05	-.172E+04	.121E-03	.155E+04	.141E+11	.453E+02
300.0	-.550E-02	.504E+03	-.145E+04	.123E-03	.153E+04	.141E+11	.435E+02
306.0	-.476E-02	-.763E+04	-.120E+04	.122E-03	.155E+04	.141E+11	.414E+02
312.0	-.404E-02	-.143E+05	-.953E+03	.117E-03	.156E+04	.141E+11	.392E+02
318.0	-.336E-02	-.195E+05	-.725E+03	.110E-03	.157E+04	.141E+11	.369E+02
324.0	-.272E-02	-.234E+05	-.511E+03	.101E-03	.158E+04	.141E+11	.344E+02
330.0	-.215E-02	-.260E+05	-.313E+03	.902E-04	.159E+04	.141E+11	.318E+02
336.0	-.164E-02	-.274E+05	-.131E+03	.788E-04	.159E+04	.141E+11	.290E+02
342.0	-.120E-02	-.278E+05	.350E+02	.671E-04	.159E+04	.141E+11	.262E+02
348.0	-.834E-03	-.273E+05	.183E+03	.554E-04	.159E+04	.141E+11	.232E+02
354.0	-.537E-03	-.258E+05	.313E+03	.441E-04	.159E+04	.141E+11	.200E+02
360.0	-.305E-03	-.237E+05	.447E+03	.336E-04	.158E+04	.141E+11	.249E+02
366.0	-.134E-03	-.206E+05	.556E+03	.242E-04	.158E+04	.141E+11	.115E+02
372.0	-.146E-04	-.171E+05	.595E+03	.162E-04	.157E+04	.141E+11	.133E+01

378.0	.609E-04	-.135E+05	.581E+03	.971E-05	.156E+04	.141E+11	-.584E+01
384.0	.102E-03	-.101E+05	.533E+03	.469E-05	.155E+04	.141E+11	-.103E+02
390.0	.117E-03	-.713E+04	.465E+03	.102E-05	.155E+04	.141E+11	-.124E+02
396.0	.114E-03	-.456E+04	.390E+03	-.146E-05	.154E+04	.141E+11	-.126E+02
402.0	.996E-04	-.244E+04	.318E+03	-.295E-05	.154E+04	.141E+11	-.115E+02
408.0	.787E-04	-.735E+03	.256E+03	-.363E-05	.153E+04	.141E+11	-.944E+01
414.0	.560E-04	.635E+03	.206E+03	-.365E-05	.153E+04	.141E+11	-.699E+01
420.0	.349E-04	.175E+04	.124E+03	-.314E-05	.153E+04	.141E+11	-.203E+02
426.0	.183E-04	.214E+04	.207E+02	-.232E-05	.154E+04	.141E+11	-.143E+02
432.0	.715E-05	.201E+04	-.535E+02	-.144E-05	.154E+04	.141E+11	-.104E+02
438.0	.109E-05	.150E+04	-.101E+03	-.691E-06	.153E+04	.141E+11	-.559E+01
444.0	-.114E-05	.794E+03	-.101E+03	-.203E-06	.153E+04	.141E+11	.565E+01
450.0	-.135E-05	.290E+03	-.661E+02	.269E-07	.153E+04	.141E+11	.598E+01
456.0	-.816E-06	.988E+00	-.328E+02	.886E-07	.153E+04	.141E+11	.506E+01
462.0	-.283E-06	-.105E+03	-.684E+01	.666E-07	.153E+04	.141E+11	.355E+01
468.0	-.171E-07	-.813E+02	.811E+01	.271E-07	.153E+04	.141E+11	.140E+01
474.0	.420E-07	-.744E+01	.627E+01	.827E-08	.153E+04	.141E+11	-.182E+01
480.0	.821E-07	-.609E+01	.220E+00	.539E-08	.153E+04	.141E+11	-.248E-02
486.0	.107E-06	-.482E+01	.202E+00	.308E-08	.153E+04	.141E+11	-.331E-02
492.0	.119E-06	-.368E+01	.178E+00	.128E-08	.153E+04	.141E+11	-.378E-02
498.0	.122E-06	-.268E+01	.153E+00	-.745E-10	.153E+04	.141E+11	-.396E-02
504.0	.118E-06	-.184E+01	.128E+00	-.103E-08	.153E+04	.141E+11	-.392E-02
510.0	.110E-06	-.114E+01	.103E+00	-.167E-08	.153E+04	.141E+11	-.372E-02
516.0	.981E-07	-.594E+00	.801E-01	-.204E-08	.153E+04	.141E+11	-.340E-02
522.0	.852E-07	-.176E+00	.594E-01	-.220E-08	.153E+04	.141E+11	-.301E-02
528.0	.717E-07	.126E+00	.413E-01	-.221E-08	.153E+04	.141E+11	-.259E-02
534.0	.586E-07	.328E+00	.260E-01	-.211E-08	.153E+04	.141E+11	-.216E-02
540.0	.464E-07	.445E+00	.134E-01	-.195E-08	.153E+04	.141E+11	-.174E-02
546.0	.352E-07	.495E+00	.344E-02	-.175E-08	.153E+04	.141E+11	-.135E-02
552.0	.254E-07	.493E+00	-.409E-02	-.154E-08	.153E+04	.141E+11	-.989E-03
558.0	.168E-07	.452E+00	-.942E-02	-.134E-08	.153E+04	.141E+11	-.665E-03
564.0	.929E-08	.385E+00	-.128E-01	-.116E-08	.153E+04	.141E+11	-.377E-03
570.0	.281E-08	.303E+00	-.143E-01	-.102E-08	.153E+04	.141E+11	-.117E-03
576.0	-.291E-08	.216E+00	-.143E-01	-.907E-09	.153E+04	.141E+11	.119E-03
582.0	-.807E-08	.134E+00	-.128E-01	-.832E-09	.153E+04	.141E+11	.340E-03
588.0	-.129E-07	.651E-01	-.993E-02	-.790E-09	.153E+04	.141E+11	.553E-03
594.0	-.176E-07	.177E-01	-.566E-02	-.772E-09	.153E+04	.141E+11	.766E-03
600.0	-.222E-07	.000E+00	.000E+00	-.769E-09	.153E+04	.141E+11	.984E-03

OUTPUT VERIFICATION

THE MAXIMUM MOMENT IMBALANCE FOR ANY ELEMENT = -.104E-05 IN-LBS
THE MAX. LATERAL FORCE IMBALANCE FOR ANY ELEMENT = .892E-07 LBS

OUTPUT SUMMARY

PILE-HEAD DEFLECTION = .577E+00 IN
COMPUTED SLOPE AT PILE HEAD = -.120E-15
MAXIMUM BENDING MOMENT = -.196E+07 LBS-IN
MAXIMUM SHEAR FORCE = .420E+05 LBS
NO. OF ITERATIONS = 30
NO. OF ZERO DEFLECTION POINTS = 5

S U M M A R Y   T A B L E
****

BOUNDARY CONDITION BC1	BOUNDARY CONDITION BC2	AXIAL LOAD LBS	PILE HEAD DEFLECTION IN	MAX. MOMENT IN-LBS	MAX. SHEAR LBS
.2800E+05	.0000E+00	.3000E+06	.2040E+00	-.1065E+07	.2800E+05
.3000E+05	.0000E+00	.3000E+06	.2437E+00	-.1180E+07	.3000E+05
.3300E+05	.0000E+00	.3000E+06	.3115E+00	-.1361E+07	.3300E+05
.3800E+05	.0000E+00	.3000E+06	.4471E+00	-.1682E+07	.3800E+05
.4000E+05	.0000E+00	.3000E+06	.5096E+00	-.1817E+07	.4000E+05
.4200E+05	.0000E+00	.3000E+06	.5769E+00	-.1956E+07	.4200E+05

APPENDIX F

Probabilistic Seismic Hazard Analysis

6486.2.003.01
May 22, 2006

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**********************************************
*****       PROGRAM EZ-FRISK 7.10        *****
*****     SEISMIC HAZARD CALCULATION     *****
*****       RISK ENGINEERING, INC.       *****
*****          BOULDER, CO  USA          *****
**********************************************
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Sutter Medical Center - Hospital Tower

CALCULATIONAL PARAMETERS
- Fault Seismic Sources -
  - Vertical integration increment : 1 km
  - Horizontal integration increment : 2 km
  - Number rupture length per EarthQuake : 4
  - Include Near-SourceDirectivity : NO
- Area Seismic Sources -
  - Number area integration steps : 100
  - Vertical integration increment : 3 km
  - Number rupture azimuths : 3
- Background Seismic Sources -
  - Maximum Inclusion Distance : 200 km
- Both Fault and Area Sources -
  - Magnitude integration step : 0.1 M
  - Apply magnitude scaling : NO

AMPLITUDES (Acceleration, (g))
- Designated Values: 0.01 0.02 0.05 0.07 0.1 0.2 0.2 0.3 0.4 0.5 0.7 1 2 3
- Deaggregation: Status: OFF
  - Amplitude: 0.2
  - Period: PGA

SITE COORDINATES: Longitude -122.751 Latitude 38.4949

PERIODS (S): PGA 5.e-002 0.1 0.2 0.3 0.4 0.5 0.75 1. 2. 3. 4.

PERIOD TO PLOT PGA: 0.030303
SHEAR WAVE VELOCITY (m/s): 160
DEPTH TO BASEMENT ROCK (km): 20
ALLUVIUM THICKNESS (m): 200
DETERMINISTIC FRACTILES: Mean

************ FAULT SOURCE ************
NAME: Bartlett Springs-fault system
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.734

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	15

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.198	Activity	1.158e-002	6.500000	7.600000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	1.212e-002	6.500000	7.800000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	1.079e-002	6.500000	7.400000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.402000	Slip	6.007e+000	7.400000	7.800000	0.000000	7.600000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	6.007e+000	7.600000	8.000000	0.000000	7.800000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	6.007e+000	7.200000	7.600000	0.000000	7.400000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-123.503	40.265
-123.440	40.144
-123.417	40.006
-123.396	39.962
-123.293	39.824
-123.187	39.719
-123.040	39.575

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  -123.052  39.566
  -122.504  38.933

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - CC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.23

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         11

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic         1     Activity  5.767e-003  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl        Aw         Bw       Sigw        Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.807  37.445
  -121.762  37.400
  -121.715  37.343
  -121.648  37.248
  -121.580  37.152
  -121.542  37.096
  -121.468  36.990

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - CC+CN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic  0.142857     Activity  3.050e-006  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  3.370e-005  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  1.404e-004  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  2.579e-004  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  2.209e-004  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  8.970e-005  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  1.380e-005  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl        Aw         Bw       Sigw        Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.009  37.817
```

```
  -121.938  37.715
  -121.933  37.694
  -121.862  37.568
  -121.851  37.539
  -121.835  37.510
  -121.824  37.489
  -121.807  37.445
  -121.762  37.400
  -121.715  37.343
  -121.648  37.248
  -121.580  37.152
  -121.542  37.096
  -121.468  36.990

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - CN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.78

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1    Depth2    Depth3
           1        90        90         0      0.01        13

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic  0.142857    Activity  9.140e-005  6.490000  6.500000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.739e-003  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  5.944e-003  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  8.511e-003  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  6.138e-003  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  2.053e-003  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  9.200e-005  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.009  37.817
  -121.938  37.715
  -121.933  37.694
  -121.862  37.568
  -121.851  37.539
  -121.835  37.510
  -121.824  37.489
  -121.807  37.445

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - CS+CC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.36

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1    Depth2    Depth3
           1        90        90         0      0.01        11
```

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	1	Activity	1.908e-003	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-121.807	37.445
-121.762	37.400
-121.715	37.343
-121.648	37.248
-121.580	37.152
-121.542	37.096
-121.468	36.990
-121.396	36.826

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Calaveras - CS+CC+CN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.93

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.125	Activity	5.430e-006	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	1.106e-004	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	7.072e-004	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	1.705e-003	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	1.884e-003	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	9.128e-004	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	1.717e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.125000	Activity	6.780e-007	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.009	37.817
-121.938	37.715
-121.933	37.694
-121.862	37.568
-121.851	37.539
-121.835	37.510
-121.824	37.489
-121.807	37.445
-121.762	37.400
-121.715	37.343
-121.648	37.248
-121.580	37.152
-121.542	37.096
-121.468	36.990
-121.396	36.826

ATTENUATION EQUATIONS

```
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.2

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType     Weight     RateType          Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1     Delta2
      Exponential        0.6     Activity   3.243e-003  6.190000  6.200000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential   0.200000     Activity   5.518e-003  6.190000  6.400000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential   0.200000     Activity   0.000e+000  5.990000  6.000000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa        Ba      Sigw
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -122.009  37.817
  -121.938  37.715
  -121.933  37.694
  -121.862  37.568
  -121.851  37.539
  -121.835  37.510
  -121.824  37.489
  -121.807  37.445
  -121.762  37.400
  -121.715  37.343
  -121.648  37.248
  -121.580  37.152
  -121.542  37.096
  -121.468  36.990
  -121.396  36.826

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Calaveras - floating CS+CC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.2

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         11

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType     Weight     RateType          Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1     Delta2
      Exponential        0.6     Activity   1.262e-002  6.190000  6.200000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential   0.200000     Activity   2.147e-002  6.190000  6.400000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential   0.200000     Activity   0.000e+000  5.990000  6.000000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa        Ba      Sigw
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000
    0.000000   0.000000   0.000000   0.000000   0.000000   0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -121.807  37.445
  -121.762  37.400
  -121.715  37.343
```

```
  -121.648  37.248
  -121.580  37.152
  -121.542  37.096
  -121.468  36.990
  -121.396  36.826

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Collayomi
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         10

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
           Normal       0.6        Slip  6.007e-001  6.300000  6.700000  0.000000  6.500000  0.120000
0.000000  0.000000
           Normal  0.200000        Slip  6.007e-001  6.500000  6.900000  0.000000  6.700000  0.120000
0.000000  0.000000
           Normal  0.200000        Slip  6.007e-001  6.100000  6.500000  0.000000  6.300000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.863  38.993
  -122.682  38.779

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - CON
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.25

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         16

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic         1    Activity  1.448e-003  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.077  38.039
  -121.990  37.900

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - CON+GVS
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.58
```

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	15

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.0833333	Activity	1.790e-005	5.990000	6.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	2.156e-004	6.090000	6.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	4.850e-004	6.190000	6.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	5.954e-004	6.290000	6.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	8.920e-004	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.126e-003	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.366e-003	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.174e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	6.996e-004	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	2.880e-004	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	4.610e-005	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	5.290e-007	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.146	38.259
-122.077	38.039
-121.990	37.900

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Concord/GV - CON+GVS+GVN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.71

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	15

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.0909091	Activity	3.820e-005	6.190000	6.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	2.533e-004	6.290000	6.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	6.403e-004	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	1.493e-003	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	2.730e-003	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	3.750e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.090909	Activity	4.303e-003	6.790000	6.800000	2.300000	0.000000	0.120000		

```
0.000100 10.000000
   Characteristic  0.090909    Activity  3.519e-003  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.090909    Activity  1.540e-003  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.090909    Activity  3.970e-004  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.090909    Activity  2.620e-005  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
         Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.179  38.382
  -122.146  38.259
  -122.077  38.039
  -121.990  37.900

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.2

FAULT PROFILE PARAMETERS
      Weight       Dipl       Dip2    Depthl     Depth2     Depth3
           1         90         90         0       0.01         15

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Deltal    Delta2
      Exponential       0.6     Activity  2.757e-003  6.190000  6.200000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000     Activity  4.692e-003  6.190000  6.400000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000     Activity  0.000e+000  5.990000  6.000000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
         Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -122.179  38.382
  -122.146  38.259
  -122.077  38.039
  -121.990  37.900

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - GVN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.02

FAULT PROFILE PARAMETERS
      Weight       Dipl       Dip2    Depthl     Depth2     Depth3
           1         90         90         0       0.01         14
```

```
MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic         1    Activity  1.648e-003  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    4.000000   0.000000   0.010000   4.000000   0.000000   0.010000   0.000000   0.000000   0.000000

TRACE COORDINATES
  -122.179  38.382
  -122.146  38.259

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - GVS
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.24

FAULT PROFILE PARAMETERS
      Weight      Dip1       Dip2    Depth1     Depth2     Depth3
          1         90         90         0       0.01         14

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic         1    Activity  7.066e-004  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    4.000000   0.000000   0.010000   4.000000   0.000000   0.010000   0.000000   0.000000   0.000000

TRACE COORDINATES
  -122.146  38.259
  -122.077  38.039

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Concord/GV - GVS+GVN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.48

FAULT PROFILE PARAMETERS
      Weight      Dip1       Dip2    Depth1     Depth2     Depth3
          1         90         90         0       0.01         14

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic 0.0833333    Activity  1.690e-006  5.890000  5.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  1.196e-004  5.990000  6.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  5.302e-004  6.090000  6.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  5.932e-004  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  8.681e-004  6.290000  6.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  1.385e-003  6.390000  6.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  1.944e-003  6.490000  6.500000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  2.017e-003  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  1.546e-003  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  8.950e-004  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.083333    Activity  2.869e-004  6.890000  6.900000  2.300000  0.000000  0.120000
```

									0.000100	10.000000
Characteristic	0.083333	Activity	3.490e-005	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.179 38.382
-122.146 38.259
-122.077 38.039

ATTENUATION EQUATIONS

Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************

NAME: Great Valley 1
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.834

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	15	7	7.01	9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.198	Activity	1.473e-004	6.500000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	2.492e-004	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	8.820e-005	6.490000	6.500000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.402000	Slip	1.004e-001	6.500000	6.900000	0.000000	6.700000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	1.004e-001	6.700000	7.100000	0.000000	6.900000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	1.004e-001	6.300000	6.700000	0.000000	6.500000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.300 39.679
-122.281 39.286

ATTENUATION EQUATIONS

Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************

NAME: Great Valley 2
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.8

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	165	7	7.01	9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Normal	0.6	Slip	1.004e-001	6.200000	6.600000	0.000000	6.400000	0.120000	0.000000	0.000000
Normal	0.200000	Slip	1.004e-001	6.400000	6.800000	0.000000	6.600000	0.120000	0.000000	0.000000
Normal	0.200000	Slip	1.004e-001	6.000000	6.400000	0.000000	6.200000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

A1	B1	Sig1	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.292 39.089
-122.281 39.286

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Great Valley 3
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.934

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	15	7	7.01	9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.099	Activity	1.967e-003	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	2.524e-003	6.500000	7.100000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.163e-003	6.500000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.099000	Activity	2.768e-003	6.500000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	4.683e-003	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.657e-003	6.490000	6.500000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.268000	Slip	1.506e+000	6.700000	7.100000	0.000000	6.900000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.506e+000	6.900000	7.300000	0.000000	7.100000	0.120000	0.000000	0.000000
Normal	0.268000	Slip	1.506e+000	6.500000	6.900000	0.000000	6.700000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.506e+000	6.300000	6.700000	0.000000	6.500000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

A1	B1	Sig1	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.278 39.117
-122.003 38.673

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************

NAME: Great Valley 4
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.734

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	15	7	7.01	9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.198	Activity	2.516e-003	6.500000	6.600000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	6.351e-003	6.500000	6.800000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.066000	Activity	0.000e+000	6.390000	6.400000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.402000	Slip	1.506e+000	6.400000	6.800000	0.000000	6.600000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	1.506e+000	6.600000	7.000000	0.000000	6.800000	0.120000	0.000000	0.000000
Normal	0.134000	Slip	1.506e+000	6.200000	6.600000	0.000000	6.400000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.051 38.652
-121.893 38.296

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Great Valley 5
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	15	7	7.01	9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Normal	0.6	Slip	1.506e+000	6.300000	6.700000	0.000000	6.500000	0.120000	0.000000	0.000000
Normal	0.200000	Slip	1.506e+000	6.500000	6.900000	0.000000	6.700000	0.120000	0.000000	0.000000
Normal	0.200000	Slip	1.506e+000	6.100000	6.500000	0.000000	6.300000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-121.899 38.303
-121.748 38.081

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Great Valley 7
REGION: California USGS02
TYPE: Reverse

```
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.834

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1    Depth2    Depth3
         1         90        15         7       7.01   9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType        Rate    MinMag     MaxMag       Beta       Mean      Sigma
Delta1    Delta2
      Exponential     0.198     Activity  2.255e-003  6.500000  6.700000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  3.815e-003  6.500000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  1.350e-003  6.490000  6.500000  1.842070  0.000000  0.000000
0.000000  0.000000
           Normal  0.402000         Slip  1.506e+000  6.500000  6.900000  0.000000  6.700000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  1.506e+000  6.700000  7.100000  0.000000  6.900000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  1.506e+000  6.300000  6.700000  0.000000  6.500000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl      Sigl         Aw         Bw      Sigw         Aa         Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.524  37.734
  -121.161  37.454

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Great Valley 8
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.734

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1    Depth2    Depth3
         1         90        15         7       7.01   9.58819

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType        Rate    MinMag     MaxMag       Beta       Mean      Sigma
Delta1    Delta2
      Exponential     0.198     Activity  2.450e-003  6.500000  6.600000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  6.182e-003  6.500000  6.800000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  0.000e+000  6.390000  6.400000  1.842070  0.000000  0.000000
0.000000  0.000000
           Normal  0.402000         Slip  1.506e+000  6.400000  6.800000  0.000000  6.600000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  1.506e+000  6.600000  7.000000  0.000000  6.800000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  1.506e+000  6.200000  6.600000  0.000000  6.400000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl      Sigl         Aw         Bw      Sigw         Aa         Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.158  37.434
  -120.989  37.092

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil
```

```
************ FAULT SOURCE ************
NAME: Greenville - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.2

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1     Depth2     Depth3
          1        90        90         0       0.01         15

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
      Exponential       0.6    Activity  1.816e-004  6.190000  6.200000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000    Activity  3.091e-004  6.190000  6.400000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000    Activity  0.000e+000  5.990000  6.000000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -121.833  37.884
  -121.763  37.793
  -121.700  37.722
  -121.665  37.686
  -121.644  37.644
  -121.581  37.575
  -121.554  37.526
  -121.541  37.499

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Greenville - GN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.66

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1     Depth2     Depth3
          1        90        90         0       0.01         15

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic  0.111111    Activity  1.260e-005  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  1.438e-004  6.290000  6.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  6.922e-004  6.390000  6.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  1.565e-003  6.490000  6.500000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  2.413e-003  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  2.731e-003  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  1.365e-003  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  2.944e-004  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.111111    Activity  3.300e-005  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
```

```
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.833  37.884
  -121.763  37.793
  -121.700  37.722
  -121.665  37.686

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Greenville - GS
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.6

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         15

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1     Delta2
   Characteristic       0.1    Activity  2.400e-006  6.090000  6.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  5.280e-005  6.190000  6.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  3.828e-004  6.290000  6.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  1.409e-003  6.390000  6.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  3.025e-003  6.490000  6.500000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  3.192e-003  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  2.067e-003  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  7.337e-004  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  9.840e-005  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.100000    Activity  3.290e-006  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.665  37.686
  -121.644  37.644
  -121.581  37.575
  -121.554  37.526
  -121.541  37.499

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Greenville - GS+GN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.94

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
```

```
          1        90        90        0      0.01        15

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType     Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic  0.142857    Activity  5.850e-006  6.590000  6.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.714e-004  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  7.784e-004  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.396e-003  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  9.989e-004  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  3.859e-004  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  2.090e-005  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          A1        B1      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -121.833  37.884
  -121.763  37.793
  -121.700  37.722
  -121.665  37.686
  -121.644  37.644
  -121.581  37.575
  -121.554  37.526
  -121.541  37.499

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Hayward/RC - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS
      Weight       Dip1      Dip2    Depth1    Depth2    Depth3
          1        90        90        0      0.01        12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType     Weight     RateType         Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
      Exponential       0.6    Activity  2.883e-004  6.890000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000    Activity  4.906e-004  6.890000  7.100000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000    Activity  0.000e+000  6.690000  6.700000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          A1        B1      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -122.788  38.575
  -122.614  38.332
  -122.434  38.088
  -122.213  37.827
  -122.128  37.730
  -122.082  37.676
  -121.849  37.453

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil
```

************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - NH
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.49

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.0833333	Activity	2.760e-005	5.790000	5.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.273e-004	5.890000	5.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	7.055e-004	5.990000	6.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.820e-003	6.090000	6.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	3.997e-003	6.190000	6.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	7.052e-003	6.290000	6.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	1.149e-002	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	7.837e-003	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	5.258e-003	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	2.656e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	4.300e-004	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.083333	Activity	4.410e-005	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.434 38.088
-122.213 37.827

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - NH+RC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.11

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.166667	Activity	6.270e-006	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	3.485e-004	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.218e-003	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000

```
   Characteristic  0.166667    Activity  1.289e-003  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  7.440e-004  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  8.710e-005  7.290000  7.300000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl        Sigl         Aw         Bw        Sigw         Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.788  38.575
  -122.614  38.332
  -122.434  38.088
  -122.213  37.827

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - RC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.98

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2     Depth1     Depth2     Depth3
           1         90         90          0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType     Weight     RateType          Rate     MinMag     MaxMag       Beta       Mean      Sigma
Delta1     Delta2
   Characteristic  0.166667    Activity  2.009e-004  6.690000  6.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  2.425e-003  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  9.650e-003  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  8.213e-003  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  4.444e-003  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  2.734e-004  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl        Sigl         Aw         Bw        Sigw         Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.788  38.575
  -122.614  38.332
  -122.434  38.088

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - SH
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.67

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2     Depth1     Depth2     Depth3
           1         90         90          0       0.01         12
```

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.1	Activity	6.780e-005	6.190000	6.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	4.392e-004	6.290000	6.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	1.765e-003	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	4.914e-003	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	9.069e-003	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	8.122e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	7.119e-003	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	3.294e-003	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	5.521e-004	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.100000	Activity	1.122e-004	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.213	37.827
-122.128	37.730
-122.082	37.676
-121.849	37.453

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - SH+NH
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.91

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.111111	Activity	5.460e-005	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	6.000e-004	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	2.691e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	5.938e-003	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	7.542e-003	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	4.936e-003	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	1.565e-003	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	1.085e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	1.820e-006	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

```
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.434  38.088
  -122.213  37.827
  -122.128  37.730
  -122.082  37.676
  -121.849  37.453

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Hayward-Rodgers Creek - SH+NH+RC
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.26

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1     Depth2     Depth3
         1         90        90          0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType          Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
   Characteristic  0.166667    Activity  2.420e-005  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  2.432e-004  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  6.582e-004  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  5.945e-004  7.290000  7.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  2.009e-004  7.390000  7.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  6.070e-006  7.490000  7.500000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.788  38.575
  -122.614  38.332
  -122.434  38.088
  -122.213  37.827
  -122.128  37.730
  -122.082  37.676
  -121.849  37.453

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Hunting Creek-Berryessa
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.134

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1     Depth2     Depth3
         1         90        90          0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType          Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
```

```
      Exponential      0.099    Activity  3.664e-003  6.500000  7.100000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000    Activity  4.223e-003  6.500000  7.300000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000    Activity  2.856e-003  6.500000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.099000    Activity  5.143e-003  6.500000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000    Activity  6.597e-003  6.500000  7.100000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000    Activity  3.040e-003  6.500000  6.700000  1.842070  0.000000  0.000000
0.000000  0.000000
           Normal  0.268000        Slip  3.004e+000  6.900000  7.300000  0.000000  7.100000  0.120000
0.000000  0.000000
           Normal  0.067000        Slip  3.004e+000  7.100000  7.500000  0.000000  7.300000  0.120000
0.000000  0.000000
           Normal  0.268000        Slip  3.004e+000  6.700000  7.100000  0.000000  6.900000  0.120000
0.000000  0.000000
           Normal  0.067000        Slip  3.004e+000  6.500000  6.900000  0.000000  6.700000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.504  38.933
  -122.198  38.453

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Maacama-garberville
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.5

FAULT PROFILE PARAMETERS
      Weight      Dip1      Dip2    Depth1    Depth2    Depth3
           1        90        90         0      0.01        12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight    RateType        Rate    MinMag    MaxMag      Beta      Mean     Sigma
Delta1    Delta2
      Exponential        0.3    Activity  4.540e-003  7.490000  7.500000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.100000    Activity  7.725e-003  7.490000  7.700000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.100000    Activity  0.000e+000  7.290000  7.300000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.300000    Activity  2.083e-002  6.500000  7.500000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.100000    Activity  2.204e-002  6.500000  7.700000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.100000    Activity  1.909e-002  6.500000  7.300000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al        Bl      Sigl        Aw        Bw      Sigw        Aa        Ba      Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -124.017  40.265
  -123.719  39.994
  -123.717  39.993
  -123.001  38.864
  -122.693  38.576
```

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ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Monte Vista-Shannon
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.834

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         60         60         0       0.01    8.66025

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate     MinMag     MaxMag       Beta       Mean      Sigma
Delta1    Delta2
      Exponential     0.198     Activity  6.083e-004  6.500000  6.700000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  1.029e-003  6.500000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.066000     Activity  3.641e-004  6.490000  6.500000  1.842070  0.000000  0.000000
0.000000  0.000000
           Normal  0.402000         Slip  4.005e-001  6.500000  6.900000  0.000000  6.700000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  4.005e-001  6.700000  7.100000  0.000000  6.900000  0.120000
0.000000  0.000000
           Normal  0.134000         Slip  4.005e-001  6.300000  6.700000  0.000000  6.500000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.250  37.438
  -122.065  37.305
  -122.000  37.265
  -121.927  37.228
  -121.838  37.210

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Monterey Bay-Tularcitos
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.384

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         14

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate     MinMag     MaxMag       Beta       Mean      Sigma
Delta1    Delta2
      Exponential     0.099     Activity  7.124e-004  6.500000  7.300000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000     Activity  7.777e-004  6.500000  7.500000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000     Activity  6.181e-004  6.500000  7.100000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.099000     Activity  8.427e-004  6.500000  7.200000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000     Activity  9.415e-004  6.500000  7.400000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.033000     Activity  7.001e-004  6.500000  7.000000  1.842070  0.000000  0.000000
0.000000  0.000000
           Normal  0.201000         Slip  5.006e-001  7.100000  7.500000  0.000000  7.300000  0.120000
0.000000  0.000000
           Normal  0.067000         Slip  5.006e-001  7.300000  7.700000  0.000000  7.500000  0.120000
0.000000  0.000000
```

Normal	0.067000	Slip	5.006e-001	6.900000	7.300000	0.000000	7.100000	0.120000	0.000000	0.000000
Normal	0.201000	Slip	5.005e-001	7.000000	7.400000	0.000000	7.200000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	5.005e-001	7.200000	7.600000	0.000000	7.400000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	5.005e-001	6.800000	7.200000	0.000000	7.000000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.122	36.921
-122.010	36.814
-121.866	36.585
-121.735	36.469
-121.649	36.439
-121.596	36.400
-121.525	36.368

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Mt Diablo - MTD
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.65

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	142	8	8.01	16.6193

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.111111	Activity	1.790e-005	6.190000	6.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	2.455e-004	6.290000	6.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	1.400e-003	6.390000	6.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	4.929e-003	6.490000	6.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	6.605e-003	6.590000	6.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	6.872e-003	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	3.947e-003	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	5.360e-004	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.111111	Activity	4.790e-005	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.039	37.877

-121.823 37.730

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Ortigalita
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.134

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	11

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.099	Activity	1.317e-003	6.500000	7.100000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.518e-003	6.500000	7.300000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.027e-003	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.099000	Activity	1.849e-003	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	2.372e-003	6.500000	7.100000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.093e-003	6.500000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.268000	Slip	1.001e+000	6.900000	7.300000	0.000000	7.100000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e+000	7.100000	7.500000	0.000000	7.300000	0.120000	0.000000	0.000000
Normal	0.268000	Slip	1.001e+000	6.700000	7.100000	0.000000	6.900000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e+000	6.500000	6.900000	0.000000	6.700000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-121.281 37.271
-121.225 37.192
-121.151 37.118
-121.126 37.038
-121.011 36.907
-120.904 36.794
-120.895 36.732

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: Point Reyes
REGION: California USGS02
TYPE: Reverse
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.034

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	130	130	0	0.01	9.19253

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.099	Activity	3.453e-004	6.500000	7.000000	1.842070	0.000000	0.000000		

0.000000 0.000000

Exponential	0.033000	Activity	4.157e-004	6.500000	7.200000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	2.436e-004	6.500000	6.800000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.099000	Activity	4.852e-004	6.500000	6.800000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	6.879e-004	6.500000	7.000000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.923e-004	6.500000	6.600000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.268000	Slip	3.003e-001	6.800000	7.200000	0.000000	7.000000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	3.003e-001	7.000000	7.400000	0.000000	7.200000	0.120000	0.000000	0.000000
Normal	0.268000	Slip	3.003e-001	6.600000	7.000000	0.000000	6.800000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	3.003e-001	6.400000	6.800000	0.000000	6.600000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-123.241	38.184
-123.066	37.991
-122.834	37.943

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	13

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.6	Activity	9.585e-004	6.890000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.200000	Activity	1.631e-003	6.890000	7.100000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.200000	Activity	0.000e+000	6.690000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000

TRACE COORDINATES

-124.403	40.244
-124.138	40.097
-124.063	40.051
-124.049	40.026
-124.007	39.914
-123.995	39.673
-123.922	39.396
-123.873	39.259
-123.841	39.171
-123.789	39.101
-123.114	38.408
-123.042	38.329
-122.917	38.181
-122.722	37.962

-122.574	37.786
-122.283	37.438
-122.210	37.367
-122.140	37.297
-122.004	37.176
-121.907	37.104
-121.812	37.053
-121.652	36.926
-121.564	36.870
-121.482	36.806

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.45

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.2	Activity	2.220e-005	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.200000	Activity	1.496e-004	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.200000	Activity	3.105e-004	7.390000	7.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.200000	Activity	2.318e-004	7.490000	7.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.200000	Activity	3.900e-005	7.590000	7.600000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-123.841	39.171
-123.789	39.101
-123.114	38.408
-123.042	38.329
-122.917	38.181
-122.722	37.962
-122.574	37.786

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAN+SAO
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.7

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.142857	Activity	9.740e-006	7.390000	7.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	6.577e-004	7.490000	7.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	2.706e-003	7.590000	7.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	3.517e-003	7.690000	7.700000	2.300000	0.000000	0.120000		

0.000100 10.000000

Characteristic	0.142857	Activity	2.128e-003	7.790000	7.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	1.569e-004	7.890000	7.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	9.090e-006	7.990000	8.000000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-124.403	40.244
-124.138	40.097
-124.063	40.051
-124.049	40.026
-124.007	39.914
-123.995	39.673
-123.922	39.396
-123.873	39.259
-123.841	39.171
-123.789	39.101
-123.114	38.408
-123.042	38.329
-122.917	38.181
-122.722	37.962
-122.574	37.786

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAO
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.29

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.166667	Activity	9.780e-007	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	3.990e-005	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	3.054e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	5.486e-004	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	4.124e-004	7.390000	7.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	7.570e-005	7.490000	7.500000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-124.403	40.244
-124.138	40.097
-124.063	40.051
-124.049	40.026
-124.007	39.914
-123.995	39.673
-123.922	39.396
-123.873	39.259

```
  -123.841  39.171

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: San Andreas - SAP
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.15

FAULT PROFILE PARAMETERS
      Weight       Dip1      Dip2    Depth1     Depth2     Depth3
          1         90        90          0       0.01         13

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1    Delta2
   Characteristic  0.142857    Activity  8.610e-006  6.790000  6.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.277e-004  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  6.022e-004  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.268e-003  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  1.166e-003  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  4.071e-004  7.290000  7.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857    Activity  7.690e-005  7.390000  7.400000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.574  37.786
  -122.283  37.438
  -122.210  37.367
  -122.140  37.297
  -122.004  37.176

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: San Andreas - SAP+SAN+SAO
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.83

FAULT PROFILE PARAMETERS
      Weight       Dip1      Dip2    Depth1     Depth2     Depth3
          1         90        90          0       0.01         12

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType         Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1    Delta2
   Characteristic  0.166667    Activity  2.260e-005  7.590000  7.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  1.220e-004  7.690000  7.700000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  1.915e-004  7.790000  7.800000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  1.423e-004  7.890000  7.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  9.160e-006  7.990000  8.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667    Activity  7.300e-007  8.090000  8.100000  2.300000  0.000000  0.120000
0.000100 10.000000
```

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

```
-124.403  40.244
-124.138  40.097
-124.063  40.051
-124.049  40.026
-124.007  39.914
-123.995  39.673
-123.922  39.396
-123.873  39.259
-123.841  39.171
-123.789  39.101
-123.114  38.408
-123.042  38.329
-122.917  38.181
-122.722  37.962
-122.574  37.786
-122.283  37.438
-122.210  37.367
-122.140  37.297
-122.004  37.176
```

ATTENUATION EQUATIONS

Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAS
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.03

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	15

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.142857	Activity	8.790e-006	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	1.792e-004	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	9.394e-004	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	2.022e-003	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	1.499e-003	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	5.923e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	3.270e-005	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

```
-122.004  37.176
-121.907  37.104
-121.812  37.053
-121.652  36.926
-121.564  36.870
-121.482  36.806
```

ATTENUATION EQUATIONS

Name: Abra.-Silva (1997) Deep Soil

Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAS+SAP
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.42

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	14

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.166667	Activity	2.880e-007	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.356e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.454e-003	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	2.637e-003	7.390000	7.400000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.738e-003	7.490000	7.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.550e-004	7.590000	7.600000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-122.574	37.786
-122.283	37.438
-122.210	37.367
-122.140	37.297
-122.004	37.176
-121.907	37.104
-121.812	37.053
-121.652	36.926
-121.564	36.870
-121.482	36.806

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAS+SAP+SAN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.76

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	13

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.166667	Activity	2.300e-006	7.490000	7.500000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	3.140e-005	7.590000	7.600000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.730e-005	7.690000	7.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.080e-005	7.790000	7.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	1.380e-005	7.890000	7.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.560e-007	7.990000	8.000000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-123.841	39.171
-123.789	39.101
-123.114	38.408
-123.042	38.329
-122.917	38.181
-122.722	37.962
-122.574	37.786
-122.283	37.438
-122.210	37.367
-122.140	37.297
-122.004	37.176
-121.907	37.104
-121.812	37.053
-121.652	36.926
-121.564	36.870
-121.482	36.806

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Andreas - SAS+SAP+SAN+SAO
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.9

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	13

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.166667	Activity	1.072e-003	7.690000	7.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	5.906e-003	7.790000	7.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.247e-003	7.890000	7.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	2.911e-003	7.990000	8.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.270e-004	8.090000	8.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.166667	Activity	6.270e-005	8.190000	8.200000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-124.403	40.244
-124.138	40.097
-124.063	40.051
-124.049	40.026
-124.007	39.914
-123.995	39.673
-123.922	39.396
-123.873	39.259
-123.841	39.171
-123.789	39.101
-123.114	38.408
-123.042	38.329
-122.917	38.181
-122.722	37.962
-122.574	37.786
-122.283	37.438
-122.210	37.367

```
  -122.140  37.297
  -122.004  37.176
  -121.907  37.104
  -121.812  37.053
  -121.652  36.926
  -121.564  36.870
  -121.482  36.806

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: San Gregorio - floating
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         13

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType          Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1    Delta2
      Exponential       0.6     Activity  8.435e-004  6.890000  6.900000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000     Activity  1.435e-003  6.890000  7.100000  1.842070  0.000000  0.000000
0.000000  0.000000
      Exponential  0.200000     Activity  0.000e+000  6.690000  6.700000  1.842070  0.000000  0.000000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000
    0.000000  0.000000  0.000000  0.000000  0.000000  0.000000 -3.490000  0.910000  0.240000

TRACE COORDINATES
  -122.617  37.768
  -122.394  37.291
  -122.156  36.853
  -122.130  36.750
  -122.094  36.670
  -122.021  36.556
  -121.980  36.517
  -121.954  36.467
  -121.935  36.419
  -121.859  36.313

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: San Gregorio - SGN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.23

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         13

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight     RateType          Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1    Delta2
   Characteristic  0.142857     Activity  6.770e-006  6.890000  6.900000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  2.445e-004  6.990000  7.000000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  1.389e-003  7.090000  7.100000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  3.207e-003  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  2.869e-003  7.290000  7.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  1.035e-003  7.390000  7.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.142857     Activity  6.380e-005  7.490000  7.500000  2.300000  0.000000  0.120000
```

0.000100 10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.617 37.768
-122.394 37.291
-122.156 36.853

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Gregorio - SGS
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.96

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Characteristic	0.142857	Activity	5.210e-006	6.690000	6.700000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	2.251e-004	6.790000	6.800000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	8.547e-004	6.890000	6.900000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	1.737e-003	6.990000	7.000000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	1.406e-003	7.090000	7.100000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	5.432e-004	7.190000	7.200000	2.300000	0.000000	0.120000	0.000100	10.000000
Characteristic	0.142857	Activity	6.660e-005	7.290000	7.300000	2.300000	0.000000	0.120000	0.000100	10.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES
-122.156 36.853
-122.130 36.750
-122.094 36.670
-122.021 36.556
-121.980 36.517
-121.954 36.467
-121.935 36.419
-121.859 36.313

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

************ FAULT SOURCE ************
NAME: San Gregorio - SGS+SGN
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.44

FAULT PROFILE PARAMETERS

```
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         13

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight      RateType         Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1     Delta2
   Characteristic  0.166667     Activity  9.770e-006  7.190000  7.200000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667     Activity  3.754e-004  7.290000  7.300000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667     Activity  1.729e-003  7.390000  7.400000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667     Activity  2.031e-003  7.490000  7.500000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667     Activity  8.532e-004  7.590000  7.600000  2.300000  0.000000  0.120000
0.000100 10.000000
   Characteristic  0.166667     Activity  5.210e-005  7.690000  7.700000  2.300000  0.000000  0.120000
0.000100 10.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.617  37.768
  -122.394  37.291
  -122.156  36.853
  -122.130  36.750
  -122.094  36.670
  -122.021  36.556
  -121.980  36.517
  -121.954  36.467
  -121.935  36.419
  -121.859  36.313

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: West Napa
REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 6.9

FAULT PROFILE PARAMETERS
      Weight       Dip1       Dip2    Depth1     Depth2     Depth3
           1         90         90         0       0.01         10

MAGNITUDE RECURRENCE DISTRIBUTIONS
        ModelType    Weight      RateType         Rate    MinMag    MaxMag       Beta       Mean      Sigma
Delta1     Delta2
           Normal       0.6          Slip  1.001e+000  6.300000  6.700000  0.000000  6.500000  0.120000
0.000000  0.000000
           Normal  0.200000          Slip  1.001e+000  6.500000  6.900000  0.000000  6.700000  0.120000
0.000000  0.000000
           Normal  0.200000          Slip  1.001e+000  6.100000  6.500000  0.000000  6.300000  0.120000
0.000000  0.000000

RUPTURE LENGTH PARAMETERS
          Al         Bl       Sigl         Aw         Bw       Sigw         Aa         Ba       Sigw
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000
    4.000000  0.000000  0.010000  4.000000  0.000000  0.010000  0.000000  0.000000  0.000000

TRACE COORDINATES
  -122.369  38.412
  -122.289  38.234
  -122.244  38.164

ATTENUATION EQUATIONS
  Name: Abra.-Silva (1997) Deep Soil
  Name: Boore-Joyner-Fumal (1997) USGS 2002
  Name: Sadigh (1997) Soil


************ FAULT SOURCE ************
NAME: Zayante-Vergeles
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REGION: California USGS02
TYPE: Strike Slip
PROBABILITY OF ACTIVITY: 1.00000000
DETERMINISTIC MAGNITUDE: 7.084

FAULT PROFILE PARAMETERS

Weight	Dip1	Dip2	Depth1	Depth2	Depth3
1	90	90	0	0.01	12

MAGNITUDE RECURRENCE DISTRIBUTIONS

ModelType	Weight	RateType	Rate	MinMag	MaxMag	Beta	Mean	Sigma	Delta1	Delta2
Exponential	0.099	Activity	1.404e-004	6.500000	7.000000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	1.691e-004	6.500000	7.200000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	9.910e-005	6.500000	6.800000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.099000	Activity	1.664e-004	6.500000	6.900000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	2.135e-004	6.500000	7.100000	1.842070	0.000000	0.000000	0.000000	0.000000
Exponential	0.033000	Activity	9.840e-005	6.500000	6.700000	1.842070	0.000000	0.000000	0.000000	0.000000
Normal	0.201000	Slip	1.001e-001	6.800000	7.200000	0.000000	7.000000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e-001	7.000000	7.400000	0.000000	7.200000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e-001	6.600000	7.000000	0.000000	6.800000	0.120000	0.000000	0.000000
Normal	0.201000	Slip	1.001e-001	6.700000	7.100000	0.000000	6.900000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e-001	6.900000	7.300000	0.000000	7.100000	0.120000	0.000000	0.000000
Normal	0.067000	Slip	1.001e-001	6.500000	6.900000	0.000000	6.700000	0.120000	0.000000	0.000000

RUPTURE LENGTH PARAMETERS

Al	Bl	Sigl	Aw	Bw	Sigw	Aa	Ba	Sigw
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	-3.490000	0.910000	0.240000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000
4.000000	0.000000	0.010000	4.000000	0.000000	0.010000	0.000000	0.000000	0.000000

TRACE COORDINATES

-121.973	37.089
-121.742	36.938
-121.610	36.813
-121.464	36.793

ATTENUATION EQUATIONS
Name: Abra.-Silva (1997) Deep Soil
Name: Boore-Joyner-Fumal (1997) USGS 2002
Name: Sadigh (1997) Soil

APPENDIX G

Guide Contract Specifications

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform with the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials. ENGEO environmental personnel will conduct an assessment of the suspect hazardous material to determine the appropriate response and mitigation. Regulatory agencies may also be contacted to request concurrence and oversight. *ENGEO will rely on the Owner, or a designated Owner's representative, to make necessary notices to the appropriate regulatory agencies. The Owner may request ENGEO's assistance in notifying regulatory agencies, provided ENGEO receives Owner's written authorization to expand its scope of services.*

4. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	Sieve Size	Percent Passing
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	Liquid Limit	Plasticity Index
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	Percent Heave	Swell Pressure
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, free from clay or organic material, suitable for the intended purpose with 90 to 100 percent passing a No. 4 U.S. Standard Sieve, not more than 5 percent passing a No. 200 U.S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

<u>Design depths less than 30 feet</u>

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)
- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
$^{3}/8$-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632) ....180 lbs
Mass Per Unit Area (ASTM D-4751)....................................6 oz/yd^2
Apparent Opening Size (ASTM D-4751) ....70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491) ....80 gal/min/ft^2
Puncture Strength (ASTM D-4833).......................................80 lbs

D. Vapor Retarder: Vapor Retarders shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick.

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
3/8-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials."

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percent above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percentage point above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities, the upper 6 inches of engineered fill in areas to receive pavement shall be compacted to at least 95 percent relative compaction with a minimum moisture content of at least 3 percentage points above optimum.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percent above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor retarder membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are the Contractor's responsibility.

Appendix F3

Supplemental Geotechnical Exploration, Proposed Medical Office and Administrative Buildings, Sutter Medical Center

SUPPLEMENTAL GEOTECHNICAL EXPLORATION

PROPOSED HOSPITAL BUILDING
SUTTER MEDICAL CENTER OF SANTA ROSA

SONOMA COUNTY, CALIFORNIA

SUBMITTED

TO

SUTTER MEDICAL CENTER OF SANTA ROSA

SANTA ROSA, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6486.200.601

NOVEMBER 24, 2008

ENGEO
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
6486.200.601

November 24, 2008

Mr. Tom Minard, Director
Facilities and Support Services
Sutter Medical Center of Santa Rosa
3325 Chanate Road
Santa Rosa, CA 95404

Subject: Proposed Hospital Building
Sutter Medical Center of Santa Rosa
Sonoma County, California

SUPPLEMENTAL GEOTECHNICAL EXPLORATION

Dear Mr. Minard:

This report contains the results of our supplemental geotechnical exploration and presents our updated conclusions and recommendations for the current planned Sutter Medical Center hospital project in Santa Rosa, Sonoma County, California. ENGEO previously performed a geotechnical exploration at the site for a previous conceptual hospital development as presented in our report dated May 22, 2006.

Since the time of our previous report, the proposed hospital development plans have been modified. The current plans include: a 2-story Medical Center Bed Tower and Diagnostic and Treatment (D&T) structure, a 3-story Joint Venture (JV) Bed Tower and Surgery Wing structure. It is anticipated that both structures will have pavements and landscaping surrounding the building. This supplemental report has been performed to address the current planned hospital development. Where deemed appropriate subsurface information obtained in our previous studies have been incorporated into this report; the conclusions and recommendations presented herein supersede those presented in our earlier report.

Based on the finding of this study, it is our opinion that the proposed development is feasible from a geotechnical standpoint provided that the conclusions and recommendations by ENGEO Incorporated, are incorporated into project plans, and implemented during construction. We are pleased to be of service to you on this project and will continue to consult with you and your design team as project planning progresses.

Very truly yours,

ENGEO Incorporated

Leroy Chan, CE

Theodore P. Bayham, GE, CEG

Brooks Ramsdell, CEG

William Rudolph, GE

lc/jbr/tpb/wr/mb/gex

cc: 6 - Mr. Brent Forslin, HGA
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INTRODUCTION

ENGEO Incorporated previously performed a geotechnical exploration at the subject site and presented the results in a report dated May 22, 2006. As a result of planned development modifications including both building type and layout for the proposed Sutter Medical facility, additional exploration and analysis was undertaken to provide updated conclusions and recommendation for the proposed project.

The purpose of this report is to provide updated recommendations for planned building foundations, site grading and pavements for the proposed Sutter Medical Center Hospital Building and associated facilities.

We prepared this geotechnical exploration update report in accordance with the requirements established by the Hospital Facilities Seismic Safety Act (SB 1953), the California Building Code (CBC), and the Engineering Geology and Seismology for Pubic Schools and Hospitals in California prepared by the California Geological Survey. Additionally, for convenience, a copy of **California Geologic Survey – Note 48 "*Checklist for Review of Engineering Geology and Seismologic Reports for California Public Schools, Hospitals and Essential Services Buildings, Updated October 2007*"** is provided in Appendix E with reference to specific inclusions in this report.

Scope of Services

The scope of our services for this study has included:

1. Supplemental field exploration which included drilling 3 exploratory rotary wash borings and advancing 10 cone penetration test holes to augment previous borings and CPTs covering the current footprint of the proposed hospital building.

2. Laboratory testing on selected materials obtained during this study.

3. Analysis of the geological and geotechnical data.

4. Preparation of this report updating our preliminary findings and recommendations.

Once design plans have been prepared, ENGEO should review them for conformance with the intent of our recommendations. During that time, ENGEO may need to perform additional evaluation and/or modify the recommendations contained herein. ENGEO prepared this report for the exclusive use of the Sutter Medical Center and their design team consultants. In the event that any changes are made in the character, design, or layout of the development, the conclusions and recommendations contained in this report should be reviewed by ENGEO to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO Incorporated.

Site Location and Description

The subject site is located at 50 Mark West Springs Road in Santa Rosa, Sonoma County, California (Latitude of 38.4953 degrees North; Longitude of 122.7520 degrees West). The approximate site location is shown on both the Site Coordinate and Site Location Maps, Figures 1 and 2, respectively.

The existing site topography is shown on Figure 3. Currently, the planned hospital footprint is situated mainly within the open-space used as pasture area. The pasture area is relatively flat, having estimated elevations ranging from 156 to 159 feet above mean sea level (MSL) from south to north. The pasture area is currently covered with grass and has a few mature trees.

A fence encloses the wastewater treatment ponds and the pond embankments are several feet higher in elevation than the adjacent pasture area. The top embankment elevation that surrounds the ponds is approximately 165 feet above MSL, with side slopes of approximately 2:1 (horizontal:vertical). We understand that the treatment ponds are approximately 8 feet deeper than the average elevation at the site. Additionally, the treatment ponds have associated facilities including pumps and buried pipes in the fenced area.

Proposed Development

Hammel, Green and Abrahamson (HGA) Architects and Engineers, Inc., prepared the current hospital development plans which include: a 2-story Medical Center Bed Tower and Diagnostic and Treatment (D&T) structure, and a 3-story Joint Venture (JV) Bed Tower and Surgery Wing structure. The proposed D&T and JV structures have approximate building footprints of 97,500 ft^2 and 58,500 ft^2, respectively. It is anticipated that both structures will have pavements and landscaping surrounding the building. The proposed hospital Joint Venture (JV) Bed Tower and Surgery Wing extends into an area occupied by the waste water treatment ponds.

The details regarding building loads have not been finalized at this time. However, preliminary maximum column loads provided by the Structural Engineer are anticipated to range up to 140 kips for dead load, 50 kips for live load in the 2-story D&T structure; for columns in the 3-story (JV) structure maximum loads are anticipated to range up to 210 kips for dead load, 75 kips for live load.

The hospital buildings are planned to be constructed within the west portion of the site. It is also our understanding that a 3-story medical office and administrative building is to be located in the east portion of the site; however the location had not been determined at the time of this report. Geotechnical recommendation for the nearby administrative structure will be provided in a separate report.

Previous Geotechnical Studies

ENGEO previously published both a "Preliminary Geotechnical Report" (November 2004), and a "Geotechnical Exploration Report" (May 2006) for the site. Our previous studies combined included drilling 32 exploratory borings (B-1 to B-21 and 2-B01 to 2-B11), the advancement of 28 CPT's (2-CPT01 to 2-CPT28), laboratory testing, analysis and report preparation which presented our findings, conclusions and recommendations for site development. The previous boring logs, CPT data and laboratory testing are included as Appendix A-2 to this report. As a part of this current study, ENGEO reviewed the previous work and incorporated pertinent data, as deemed appropriate.

In addition, ENGEO previously conducted a Phase 1 - Environmental Site Assessment (ESA) at the property and presented the results in a report dated December 28, 2004. In summary, the Phase One ESA identified a number of items of concern within the property. Subsequently, ENGEO performed a limited Phase 2 ESA to sample and test for a number of the constituents recommended in our December 28, 2004 report. The findings presented in the report dated February 24, 2005, indicate that no further ESA work is required; however, the ESA studies assessed that existing structures and Luther Burbank Center (LBC) facilities were not included, and that the waste water treatment facilities associated with LBC use should be decommissioned in accordance with regulatory requirements.

GEOTECHNICAL EXPLORATION

Field Exploration

For this supplemental exploration, we drilled 3 rotary-wash borings on October 15 through 17, 2008. Also, we advanced 10 cone penetration test holes (CPTs) on October 15, 2008. Borings and CPTs were advanced to depths of up to 51 feet below the existing ground surface (bgs). Figure 3 presents the approximate boring and CPT hole locations advanced for this supplemental study, and previous borings and CPTs are depicted as well.

We drilled the rotary-wash borings using a truck-mounted CME 750 drill rig equipped with 6-inch-diameter tri-cone bit. Borings ranged in depth from about 43½ to 51 feet bgs. An ENGEO Geologist logged the boring holes in the field and collected soil samples using a 2½-inch-inside-diameter (I.D.) California-type split-spoon sampler fitted with 6-inch-long brass liners, a 2-inch-outside-diameter (O.D.) Standard Penetration Test split-spoon sampler, and Shelby tube.

The penetration of the California-type and the SPT sampler into the native materials was field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. Blow count results on the boring logs are recorded as the number of blows required for the last one foot of penetration. The samplers were driven with a 140-pound safety hammer falling a distance of 30 inches. We utilized the field logs to develop the report boring logs presented in Appendix A1. The soils are described in accordance with the Unified Soil Classification System (USCS).

A CPT rig was used to push the cone penetrometer, which has a 20-ton capacity cone with a 15-square-centimeter (cm^2) tip area and a friction sleeve with a surface area of 225 cm^2. The cone, connected with a series of rods, is pushed into the ground at a constant rate. CPT readings are taken at 5 cm intervals with soundings conducted in accordance with the revised (2002) ASTM D-5778-95. Measurements include the tip resistance to penetration of the cone (q_c), the resistance of the surface sleeve (f_s), and pore pressure (u_2). The CPT logs are presented in Appendix A-1. All previous Boring logs and CPT soundings from our previous explorations are included in Appendix A-2. In addition, shear wave velocity measurements were acquired from 2-CPT27 and 2-CPT8 during our previous study. The shear wave velocity profiles are reported in Appendix C.

The logs depict subsurface conditions within the borings at the time of exploration. The report boring logs represent the actual field blow counts for the last one foot of penetration and have not been subjected to conversion factors to achieve representative SPT results. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions. All ENGEO boreholes were backfilled on the day of drilling with approved backfill material in accordance with Solano County requirements.

Laboratory Testing

We tested samples recovered during drilling to determine the following soil characteristics:

Test	Test Method	Location of Results Within this Report
Natural Unit Weight and Moisture Content	ASTM D-2216	Appendix A-1
Atterberg Limits	ASTM D-4318	Appendix B-1
Hydrometer Analysis and Fines Content	ASTM D-422-63	Appendix B-1
Consolidation	ASTM D-2435-90	Appendix B-1

The laboratory test results are shown on the boring logs (Appendix A-1). Individual test results are presented in Appendix B-1.

GEOLOGY AND SEISMICITY

Regional Geology

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, about 4 million years before present. Locally, the site is mapped as underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). This alluvium consists of unconsolidated deposits of sand, silt, gravel and clay likely derived from the bedrock uplands and older unconsolidated deposits. The alluvial deposits extend at least 106 ½ feet below ground surface (depth of our deepest boring).

Subsurface Conditions

Subsurface conditions encountered during this exploration are generally consistent with those from previous explorations at the site. We encountered the following general subsurface conditions at the exploratory boring and CPT locations:

- Existing fill was encountered within the embankments of the waste water treatment ponds extending to a depth of approximately 7 feet (which correspond to approximate Elevation 158 feet). The embankment fills consist of stiff to very stiff clays, and silty clays with various amounts of gravel and rock fragments. Natural alluvial soil deposits underlie the fill.

- With the exception of the wastewater pond area, alluvial soils were encountered from ground surface to the depth explored. The alluvial deposits generally consist of inter-layered sandy clay, silty clay and clayey sand. Generally the soil deposits encountered above groundwater (13 to 14 feet deep) consist of medium stiff to very stiff clays; below groundwater the soil deposits consist of soft to medium stiff clays with thin layers of loose to medium dense silty and clayey sand that extend to depths of about 30 to 35 feet. Beneath this depth stiff to very stiff clays and dense to very dense sands were encountered to approximately 50 feet bgs in our borings and CPTs.

- A consistent layer of hard to very dense clayey silts and clayey gravels was encountered within each boring and CPT that extended beyond 40 feet to approximately 50 feet. Based on our previous explorations at the site, this hard layer extended to depths of 101½ and 106½ feet within Borings 2-B3 and 2-B8, respectively.

Figure 7 present interpretive geologic cross sections depicting subsurface conditions at the site. These cross sections have been derived based on an interpolation between similar strata encountered among various boring and CPT locations; as such, variations in actual subsurface conditions should be expected.

Groundwater Conditions

Groundwater levels were encountered during our supplemental exploration at depths ranging from approximately 13 to 14 feet. At the time of our May 2006 study, the groundwater levels generally varied from 3 to 5 feet below the ground surface, with the exception for borings adjacent to the waste water treatment ponds where groundwater was about 9 to 10 feet deep. During our supplemental field exploration in September 2008, groundwater levels appeared be lower, typically at or below about 10 feet below ground surface. It should be noted that fluctuations in the level of groundwater may occur due to variations in rainfall and other factors not evident at the time measurements were made.

Regional Faulting and Seismicity

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active[1] and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 0.7 miles east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996).

[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene time (about the last 11,000 years) (Hart, 1997).

The Maacama Fault is located 6.3 miles east of the site, and the San Andreas Fault is located 19.5 miles west of the site. Figure 5 presents the Regional Faulting and Seismicity Map, which shows regional proximity of major active faults and significant historic earthquakes with respect to the site. A map of potentially active faults and Alquist-Priolo Zone in vicinity of the site is provided on Figure 5A. Historically, the San Francisco Bay Area has been subjected to strong ground shaking from several large earthquakes. Figure 8 shows approximate epicentral locations of historic earthquakes of magnitude M5 or greater that may have generated strong ground motions at the site. The following list (Bakun 1999) contains historical earthquakes that may have generated strong ground motions in the vicinity of the subject site.

1838 Mw 6.8 (San Andreas Fault)
1868 Mw 6.8 (Hayward Fault)
1906 Mw 7.8 San Francisco (San Andreas Fault)
1923 Mg-r 7.3 Off-shore Cape Mendocino
1969 ML 5.6 and 5.7 Santa Rosa (Healdsburg Fault)
1989 Mw 6.8 Loma Prieta (San Andreas Fault Zone)

The regional seismicity of the Bay Area was recently evaluated by the Working Group on Northern California Earthquake Probabilities (WGEP 2007). The Working Group periodically attempts to summarize seismic risk in the Bay Area by presenting probabilities of 6.7 Mw or greater earthquakes on active Bay Area faults for a 30-year return interval (2007-2036); the most recent summary gives a 63 percent aggregate probability for the entire Bay Area. The active Rodgers Creek fault system is estimated to have a 30-year probability of 31 percent for a M6.7 or greater earthquake. According to the Working Group the likelihood of an even more powerful earthquake (magnitude 7.5M or greater) the probability for the Bay Area is 15 percent in the next 30 years (WGCEP 2007). It should therefore be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

Site Class

The Site Class was evaluated using the procedures outlined in the 2007 California Building Code (CBC) Section 1613.5.5 and Table 1613.5.2. The results of the seismic CPT and shear strength tests from the deeper test boring (greater than 50 feet) were correlated with the criteria presented in Table 1613.5.2. The seismic CPT measurements indicate that the shear wave velocities in the upper 50 feet range from about 551 to 1515 feet per second (fps) with the majority of the velocity measurements greater than 600 fps. From a depth of 50 to 100 feet the boring logs indicate stiffer alluvial material which are judged to have undrained shear strengths in the range of 1000 to 2000 pounds per square foot. For the given soil properties, we conclude that Site Class D (S_D) is appropriate for seismic design.

Seismic Hazards

The ground motions were developed in accordance with the 2007 CBC with the exception of the requirements outlined in Code Application Notice for File No. 2-1802A.6.2-1 draft date March 24, 2008. CBC Section 1614A.1.2 requires that a ground motion hazard analysis be performed in accordance with Section 21.1 of ASCE 7 Chapter 21.1, where the subject site is closer than 10 km of an active fault. Since the site is located within 10 km of several active faults, we performed site-specific ground motion hazard analyses, as outlined below.

In preparing the spectra, we utilized the following methodology:

Probabilistic MCE – We developed site specific probabilistic spectra response accelerations defined as 5 percent damped acceleration response spectra with a 2 percent chance of exceedance in a 50 year period. To perform this probabilistic analysis, we utilized the computer software EZFrisk (Version 7.25). We performed our analyses using faults within a 200 kilometer radius. We utilized recently published Next Generation Attenuation (NGA) relationships for shallow crustal earthquakes on the West Coast which have been used by the USGS in their recent 2008 seismic mapping project. Specifically, we utilized NGA relationships by Boore and Atkinson (2007), Campbell and Bozorgnia (2008) and Chiou and Youngs (2006). The results of the three NGA relationships were averaged for use in our analyses. We then scaled these results to estimate the ground motions in the maximum direction of response using scaling factors published by Huang et al. (2008a, 2008b). We also performed a deaggregation of the PSHA analysis and the controlling fault parameters for the Probabilistic MCE spectra are a Moment Magnitude of 6.85 with a modal distance of 1.25 km from the project site.

Deterministic MCE – We also developed a Deterministic MCE for 5 percent damping using the 84th percentile spectral response acceleration calculated for faults within the same radius and using the same NGA relationships as with the Probabilistic MCE. We performed this search using EZFrisk. We scaled this spectra to represent the direction of maximum ground motion as with the Probabilistic MCE. The highest spectral response values calculated by EZFrisk were for shaking on the Hayward-Rodgers Creek System Fault with a Moment Magnitude of 7.26. This spectra was then compared to the minimum deterministic values as discussed in Chapter 21.2.2 of Reference 2.

Recommended MCE – We developed our recommended Design Spectra by comparing the lesser of the Probabilistic MCE and the Deterministic MCE spectra and by taking 2/3 of the controlling spectra. The lowest of the two spectra was then compared to 80 percent of the mapped spectra developed in accordance with Chapter 11 of Reference 2; where necessary, the design spectral acceleration was increased so that it is never less than 80 percent of the mapped spectra. The "Recommended Design Spectra" shown on Figure 9 shows the spectra developed as discussed above.

Liquefaction

As discussed in our previous study, localized discontinuous thin layers of potentially liquefiable zones were encountered within the project area. Based on our analysis, we conclude that the general site conditions have a low potential for liquefaction; however there are isolated, discontinuous, relatively thin, inter-layers of “marginally liquefiable” soils; these marginally susceptible deposits were encountered at various depths ranging 5 to 35 feet. As part of this current study, we have further refined our characterization and analyses related to liquefaction potential, as well as our assessment of potential seismically induced settlement as it relates to the planned development. We have considered both classical liquefaction of sands containing varying amounts of fines, as well as “seismic softening” of low plasticity clays and silts. Based on our assessment, we estimated that the potential seismically induced settlement (in the event that liquefactions were to occur) during a strong earthquake would generally be less than 2 inches.. A detailed discussion of the susceptibility to and the consequences of liquefaction/seismic softening with supporting calculations are provided in Appendix D. As discussed in the subsequent sections of this report, the potential for and consequences of seismically induced settlements will be mitigated by surcharging to reduce static settlements and overexcavation for shallow foundations, or alternatively by the use of deep foundations that deriving support below the potentially susceptible material.

Earthquake-Induced Densification. In addition to potential seismic settlement related to liquefaction/seismic softening below the groundwater levels, there is a potential of settlement from densification of loose to medium-dense sands above the groundwater level if the site is subject to strong earthquake ground shaking. As previously stated, we did not encounter loose to medium-dense sands above the groundwater level during the subsurface exploration, and therefore we believe the risk of densification induced by earthquake shaking is considered low at this site.

Lateral Spreading. Lateral spreading is a failure within a nearly horizontal soil zone (possibly due to liquefaction), which causes the overlying soil mass to move toward a free face or down a gentle slope. No free face or slopes are present near the hospital footprint; therefore, the potential for lateral spreading is considered low.

Earthquake-Induced Landsliding. No landslides have been mapped within or immediately adjacent to the site; therefore, the potential for earthquake-induced landsliding to occur is considered low.

Inundation Due to 100-Year Flood

The project site is not located within the 100-year flood inundation area; therefore, risk of flooding is considered low. However, the Civil Engineer should review pertinent information relating to possible flood levels for the subject site based on final hospital pad elevations and provide appropriate design measures for development of the project, if necessary.

Corrosion Potential

An evaluation of possible corrosion impact to site improvement was previously performed. Soil samples were selected from the soil profile and tested for water soluble sulfates in accordance with the 2007 California Building Code. Results show water soluble sulfate concentrations ranging from 6 to 36 mg/kg. The results are attached in Appendix B2. Based on these results, site surface soils would be classified in the negligible range with respect to sulfate exposure for design of foundation concrete. ENGEO has provided recommendations for foundation concrete in a later section of this report.

With regard to pipelines and other buried elements, high chloride concentrations and low resistivity soil conditions can produce corrosive conditions according to the latest Caltrans Corrosion Guidelines (September 2003, Version 1.0). Based on the proximity of the site to the

San Francisco Bay and our experience on projects with similar site conditions, high chloride and low resistivity conditions are anticipated. A corrosion consultant may be retained to provide site-specific design recommendations in order to protect buried pipelines and other elements against corrosion.

Expansive Soils

Expansive soils shrink and swell as a result of moisture changes. These soils may cause heaving, cracking and related distress to structures and site improvements if not properly mitigated. Based on lab testing results on the current and previous study, the Plasticity Index (PI) of near surface soils range from 13 to 26 indicating that site soils have low to moderate expansion potential. Successful development on expansive soils requires special attention during construction. Exposed subgrade materials should be kept moist at all times during construction. Long-term mitigation measures should also include the prevention of moisture variation, and the use of a layer of low expansive “select” materials below lightly loaded structural elements.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings from this subsurface exploration, laboratory test results and analyses, it is our opinion that the planned project development is feasible from a geotechnical standpoint, provided that the recommendations contained in this report along with sound engineering practices are incorporated in the design and construction of the project. It is our opinion, from a geotechnical perspective, that the main considerations for the current planned development include:

1. The presence of a zone comprised of soft to medium stiff alluvial soil deposits. These deposits consist of intermixed clays, silts and lesser sands between depths of 5 to 35 feet, and are considered potentially compressible when subject to increased loads. Additionally, these fine-grained alluvial deposits are classified as low plasticity and may potentially be susceptible to “seismic softening” and incrementally small amounts of seismically induced settlements. Therefore, to reduce potential settlements adversely impacting the planned hospital several options may be considered as follows:

   - The building may be supported on shallow foundation systems provided the compressible soil layer is mitigated to reduce potential excessive total and differential settlements resulting from the increased loads. The increased loads are anticipated to result from raising site grades as well as loads induced by foundations. To mitigate the susceptible soils it is recommended that pre-consolidation measures by surcharging be performed as discussed in the following sections of this report. While the potential for seismically induced settlements within these soft to medium stiff fine-grained soils is relatively small, surcharging will additionally reduce the risk of potential seismically-induced settlements affecting the planned building. To promote uniform load support underlying the foundation elements for this option it is recommended that the building pad be overexcavated to a depth of 5 feet below pad grade and restored with engineered.

   - Alternatively, the building may be supported by deep foundations deriving support at depths below the compressible soils. Of the available deep foundation systems driven piles would be suitable for this site, not to the exclusion of other systems. This report provides design criteria for driven piles systems for this alternative.

2. The presence of moderately expansive soil underlying the site which may undergo significant volume changes (swell and compression) when subjected to varying moisture contents. Measures to mitigate adverse effects of expansive soils, such as selective moisture conditioning and compaction are presented in the following sections of this report.

3. The presence of existing undocumented fills extending to depths of about 7 feet in exploratory borings. These fills are associated with the existing embankment. These fills should be completely overexcavated and removed within the planned development areas and replaced with properly compacted engineered fill in order to reduce potential excessive total and differential settlement.

If there are significant changes to the hospital plans including layout, grading or design loads, the recommendations presented herein may need to be refined and modified, as deemed appropriate by the Geotechnical Engineer. Geotechnical engineering recommendations contained in this report include: site preparation and grading, foundation design criteria, retaining walls, pavements, underground utilities, and drainage.

Treatment of Compressible Soils

As previously discussed, soft to medium stiff, fine-grained alluvial soils are present between depths of 5 to 35 feet, and these are potentially compressible when subject to increased loads. Also, some of the layers within this zone are considered marginally susceptible to seismic softening which could result in settlement. If shallow foundation systems are desired for the planned building, in order to reduce potential settlement pre-consolidation measures are recommended; the recommended pre-consolidation measures are also anticipated to increase strength of the soils thereby reducing the risk of seismically induced settlement from softening. Therefore, if shallow foundations are to be used, it is recommended that surcharge fills be placed over the building footprint until consolidation of these fine grained soils significantly diminishes.

Surcharge Procedure. Surcharging involves the placement of a uniform thickness of surplus fills extending beyond limits of areas to be surcharged. Based on grading concept and preliminary structural loads for the buildings, we estimate surcharge fills may be on the order of 5 to 8 feet above design grades, depending on timeline allowance for surcharge duration, and rate of consolidation of soils, and settlement monitoring program. The surcharge program should include the following:

- Prepare site surface by stripping surface vegetation and removing all debris. Prepare stripped and grubbed areas in accordance to the recommendations provided in the "Placement of Fill" sections of this report. Stake limits of area to be surcharged.

- Install settlement monitoring instruments or monuments.

- Placement of uniform surcharge fill materials.

- Provide on-going monitoring and readings of settlement measurement. It is estimated that this can be accomplished using the following general procedure: obtain readings weekly for the first month, every two weeks for at least the next 2 months, and monthly thereafter, or until the desired settlement has occurred.

- Determine the completion of the pre-consolidation by surcharge and allow for removal of the surcharge fills based on the monitoring program.

It is our experience that the consolidation may occur relatively rapidly in the low plasticity and sandy fine-grained soils as are on this site; the actual rate of consolidation depends on amount of surcharge load and dissipation of excess pore water pressure which may be variable at this site. Therefore, to refine an overall surcharge program with estimated timelines for project, it may be practical to perform a reduced scale surcharge test. ENGEO should be consulted regarding the recommendations and monitoring of such a test if desired. Also, if it is necessary to accelerate rate of pre-consolidation given schedule constraints to within a few months, added measures may include the use of "wick drains" or vertical drains beneath surcharge fill areas to accelerate consolidations, as deemed necessary.

<u>Surcharge and Settlement Monitoring</u>. In order to develop uniform surcharge pressure, settlement monitoring during surcharge construction is necessary. To establish a uniform stress distribution in the soft compressible material, the surcharge fill should extend beyond the actual building footprints. After the desired degree of consolidation has occurred, the surcharge fill above building pad grades is removed. Once the settlement has occurred, the use of shallow foundation systems, such as spread footing foundations would be appropriate for the planned hospital structures.

It is recommended that temporary settlement monuments or vibrating wire settlement cells be installed to monitor surcharge related consolidation at locations selected by the Geotechnical Engineer. The monuments or cells should be monitored periodically during the placement of surcharge grades and thereafter until the desired degree of settlement has been achieved as determined by the Geotechnical Engineer. All readings of settlement should be tied to bench marks established well beyond the zone of surcharge influence. The settlement data is used to assess when the desirable degree of consolidation is achieved and determine when the surcharge can be removed. Settlement monitoring can be terminated thereafter.

Demolition and Stripping

Begin grading with the removal of existing structures and associated foundations, buried pipes, septic tanks, leach fields, irrigation lines, water well systems, designated fences, trees and associated root systems, and any other deleterious materials. Remove underground structures that will be abandoned or are expected to extend below proposed finished grades from the project site. Remove tree roots to a depth of at least 3 feet below original grades. The organically contaminated materials should not be used in proposed building pads or pavement areas. Strip and stockpile the organics and use in landscape areas subject to the approval of the Landscape Architect or off haul. Remove any debris found within any areas to be graded.

The planned hospital footprint encroaches into the existing waste water treatment plant location. Prior to site grading, the waste water treatment facility should be decommissioned in accordance with regulatory requirements. Additionally, the bottom 11 feet of the ponds should be overexcavated and replaced with engineered fill under observation of the Geotechnical Engineer and/or by a representative of the Geotechnical Engineer. Grading for the pond area should include:

- Temporary dewatering of the ponds and removal of soft material beneath ponds.
- Excavating and off-hauling the soft and liquefiable material at the pond bottom.
- Overexcavating any undocumented fill within the waste water facility area.
- Removing underground pipelines and buried foundations.

A representative of ENGEO should determine the actual removal depth in the field based on conditions encountered during the site grading. Clean excavations resulting from demolition and stripping below design grades to a firm undisturbed, non-yielding soil surface as determined by the Geotechnical Engineer. Following clearing and grubbing, scarify, moisture-condition and backfill all depressions with compacted engineered fill. The requirements for backfill materials and placement procedures are the same as those for engineered fill as described in the "Fill Placement" section.

Remove all existing non-engineered fill, vegetation and soft or compressible soils in areas to be graded, as necessary, for project requirements. The Geotechnical Engineer or qualified representative should determine the material removal depth in the field at the time of grading. Evaluation of unsuitable deposits should be performed during grading and may include sampling and laboratory analyses.

After the site has been properly cleared and stripped, and necessary excavations have been made, scarify the surface at least 12 inches, moisture condition, and compact in accordance with the recommendations presented below in the "Fill Placement" section, prior to replacing and recompacting overlying soils as engineered fill. The compaction requirements for existing soil used for fill placement are the same as those for engineered fill, as described in a subsequent section of this report.

<u>Grading</u>

If surcharging and shallow foundation are used, we recommend that the building envelope areas (including areas 5 feet beyond the building perimeters) be overexcavated to a minimum depth of 5 feet below final floor levels, and then grades restored with properly recompacted engineered fill, per specifications presented in this report. If deep foundations systems are employed, deep overexcavation requirement will not be necessary provided that floor slabs are structurally supported. However, even with a deep foundation and supported floors, the slab should be underlain by non-expansive fill as recommended in a subsequent section of this report titled "Slab on Grade Floors".

Within parking and access roadway areas, it is recommended that overexcavation and recompaction should consist of a minimum of 2 feet below pavement subgrade levels. Additionally, existing undocumented fills encountered within the planned building and site improvement areas should be overexcavated in their entirety and replaced with properly compacted engineered fill.

Notify ENGEO at least 48 hours prior to grading to coordinate our schedule with the grading contractor. Grading operations should meet the requirements of the Guide Contract Specifications included in the Appendix G and must be observed and tested by ENGEO's field representatives. Ponding of stormwater should not be permitted at the site except within engineered sediment detention basins, particularly during cease of work for rainy weather. Before the grading is halted by rain, provide positive slopes to carry the surface runoff to storm drainage structures in a controlled manner to prevent erosion damage.

Materials Selection. With the exception of organic-laden soils, we anticipate engineered fill to consist of the on-site soil materials in connection with the planned grading and site improvements. Organic-laden soils contain more than 3 percent organic content above typical background levels in soil. It is our experience that organic laden soils can be blended with general fill material at a ratio not greater than 10:1.

Import materials must be free of organic material, debris and fragments larger than 6 inches in greatest dimension. Import material should meet the requirements contained in Section 2.02B, Part I of the Guide Contract Specifications in Appendix G. Submit a sample of the proposed import material to the Geotechnical Engineer for evaluation by laboratory testing prior to study area delivery.

Fill Placement. Scarify, moisture-condition and recompact the exposed surface area to 12 inches in depth, to provide adequate bonding with the initial fill lift. Place all fills in thin lifts. Avoid lift thicknesses exceeding 6 inches or the compaction equipment penetration depth, whichever is less. Generally apply the following compaction control requirements to granular fills:

Test Procedure:	ASTM D-1557 (most recent).
Required Moisture Content:	A minimum of 3 percent above optimum moisture content.
Required Relative Compaction:	A minimum of 90 percent for non-expansive soil.

Relative compaction refers to in-place dry density of the fill material expressed as a percentage of the maximum dry density based on ASTM D-1557. Optimum moisture is the moisture content corresponding to the maximum dry density.

Monitoring and Testing. It is important that all site preparations for mass grading be done under the observation of a Geotechnical Engineer or his/her qualified field representative. Allow the Geotechnical Engineer or his/her field representative to observe all graded area preparation, including demolition and stripping, following the recommendations contained in the Guide Contract Specifications in Appendix G. We also recommend the Geotechnical Engineer or his/her qualified representative be present full time during all phases of the mass grading operations to observe grading procedures and test for soil compaction. Submit the final grading plans to the Geotechnical Engineer for review.

Temporary Dewatering

Based on the boring and CPT data, groundwater levels at this site are as shallow as 5 feet below the ground surface in the area of the existing ponds, corresponding to approximate Elevation 153 feet. If excavations extend below groundwater levels temporary construction dewatering measures should be anticipated. We recommend dewatering procedures maintain groundwater at a minimum of 2 feet below the bottom of the excavation.

Foundation Recommendations

As previously discussed, several options for foundation may be suitable for the support the proposed building depending on planned mitigation measures for the project. If surcharging is undertaken along with overexcavation and reworking of the soils are described in this report, then it is anticipated that conventional shallow footing combined with floor slabs on grade would be suitable. Alternatively, if surcharging is not performed then it is recommended that the building be supported on deep foundations systems. Design criteria for the two foundation systems are provided below:

Shallow Foundations. Provided building areas are mitigated as recommended in this report, the use of continuous "strip" and isolated "column" footings are suitable for the support of the proposed buildings. Structural loadings, footing dimensions and embedment depth for the proposed shallow foundation system have not been determined at the time of this report. For planning purposes provided below are preliminary design criteria for typical shallow footings:

Maximum Allowable Bearing Pressure:	3,500 psf for dead plus live loads based on a Factor of Safety of 3. This value can be increased by one third to include seismic or wind loads.
Minimum Depth of Footing:	At least 24 inches below the lowest adjacent grade.

We understand that various footing configuration will be considered to support structural loads, as such, bearing capacity other than those provided above may be considered. Analysis of bearing capacity for propose footings will be conducted during the design phase of this project.

Lateral Loading. An ultimate passive resistance pressure of 400 pounds per cubic foot (pcf), equivalent fluid weight, may be used to evaluate resistance to lateral loading from short duration seismic and wind loading if the area in front of the footing is level for at least 8 feet, where the upper 1 foot of footing embedment should be neglected for passive resistance pressure. A base friction factor of 0.35 may be used. The recommended passive resistance and skin friction are ultimate values; appropriate safety factors should be included. If passive resistance and base friction are combined, it is recommended that base friction resistance be reduced by 50 percent. Foundation plans should be reviewed by the Geotechnical Engineer when they become available. Footing trenches should be cleared of all loose materials, and soils exposed in footing excavations should not be allowed to desiccate prior to placing concrete. The Geotechnical Engineer or his/her field representative should observe the footing trenches prior to concrete placement.

Slab on Grade Floors. Slabs should be underlain with 12 inches of "select fill" consisting of low to non expansive material. For slabs constructed on native, undisturbed material, overexcavate the slab-on-grade subgrade to a minimum 12 inch depth below the subgrade level and replace with "select fill." The overexcavated exposed grades should be scarified a depth of 12 inches, moisture conditioned to at least 4 percentage points above optimum moisture, and recompacted to at least 90 percent relative compaction. Restore grades in the slab area using low- to non-expansive select engineered fill compacted to 90 percent relative compaction at least 2 percentage points above optimum moisture. Import engineered fill should consist of low- to non-expansive soil having a Plasticity Index less than 12. For interior floor slabs on grade abutting strip footing stemwalls, the edge of the slabs do not require thickening; for all other cases the edges of the slab on grade should be increased by 2-inches greater than slab section.

Slab Moisture Vapor Reduction. When buildings are constructed with concrete slabs-on-grade, water vapor from beneath the slab will migrate through the slab and into the building. This water vapor can be reduced but not stopped. Vapor transmission can negatively affect floor coverings and lead to increased moisture within a building. When water vapor migrating through the slab would be undesirable, we recommend the following to reduce, but not stop, water vapor transmission upward through the slab on grade.

1. Install a vapor retarder membrane directly beneath the slab. Seal the vapor retarder at all seams and pipe penetrations. Vapor retarders shall conform to Class A vapor retarder per ASTM E 1745-97 "Standard Specification for Plastic Water Vapor Retarders used in Contact with Soil or Granular Fill under Concrete Slabs."

2. Concrete shall have a concrete water-cement ratio of no more than 0.5.

3. Provide inspection and testing during concrete placement to check that the proper concrete and water cement ratio are used.

4. Consider adequate moist cure of slabs.

The Structural Engineer should be consulted as to the use of a layer of clean sand (less than 5 percent passing the U.S. Standard No. 200 Sieve) placed on top of the vapor retarder membrane to assist in concrete curing. Protect foundation subgrade soils from seepage by providing impermeable plugs within utility trenches as described in the "Utilities" section.

Deep Foundations. If deep foundations are selected, surcharging will not be required. Of the available systems, it is our opinion that driven concrete pre-stressed piles are suitable for the subsurface condition at this site. For planning purposes we have provided parameters for driven 14-inch square pre-cast pre-stressed concrete piles, not to the exclusion of others.

Based on the results of our field exploration, it is recommended that piles extend into the dense gravelly deposits encountered at depths exceeding approximately 45 feet bgs, corresponding to approximate Elevation 113 feet. Practical refusal can be expected when the piles are driven about 5 feet into the gravel layer. It is our opinion that piles driven to practical refusal in this gravel layer can support an allowable capacity of approximately 100 to 120 tons. Based on a transmittal provided to us from HGA, dated September 16, 2008, maximum loading conditions of 210 kips for dead load and 75 kips of live load is expected. Pile spacing should be not less than 3 times the pile diameter, center-to-center.

Typically, 14-inch-square pre-stressed concrete piles may be driven continuously with a hammer developing at least 40,000 foot-pounds of energy until achieving practical refusal. Refusal blow count criteria may be determined during construction given the hammer size and evaluated efficiency. However, for planning purposes, we suggest that the following refusal blow count criteria:

REFUSAL BLOW COUNT CRITERIA

Actual Hammer Energy (foot-lbs/blow)	Practical Refusal Blow Count
40,000	60 blows per foot
60,000	40 blows per foot

If driven piles are selected for foundations of the building, then we recommend driving indicator piles at several locations within the building footprint to determine the actual penetration depth into the supporting stratum, as discussed in the following section. If practical refusal does not occur in the gravel stratum, piles designed as friction piles may be considered. For this condition, we anticipate 14-inch-square piles, penetrating 60 feet below the ground floor of the proposed building structures to develop a design capacity of 60 tons. Additional piles may be required in this situation.

Uplift Resistance. Resistance to uplift loads will be developed in friction along the face of the pile. We recommend an allowable uplift frictional resistance of 200 psf along the sides of the pile. The upper 10 feet of the pile should be neglected in calculating uplift resistance.

Lateral Loading. Lateral resistance to wind and seismic loads can be developed by passive pressure on the soil against the pile caps and grade-beams as well as by bending resistance of the pile foundation. In general, ultimate passive resistance against the pile caps could be evaluated using a triangular pressure distribution modeled as an equivalent fluid weight of 400 pounds per cubic foot provided that the pile cap is embedded in engineered fill material provided that the area in front of the footing is level for at least 8 feet, where the upper 1 foot of footing embedment should be neglected for passive resistance pressure. Based upon our exploration, we were also able to develop representative soil criteria for the required variables used in the L-Pile program for lateral passive pressure calculations. We present a tabular summary of the L-Pile soil parameters below.

Table 1: Generalized L-Pile Soil Parameters

Elevation(ft)	Generalized Soil Profile	L-Pile Soil Type	Soil Strength	Soil Strength	K (pci)	E50 (%)	Effective Unit Weight (pcf)
153 to 158	Silty Clay to Sandy Clay	3. CLAY	---	2,000 psf	500	0.7	115
128 to 153	Sandy Clay / Sandy Silt / Silty Clay	2. CLAY	---	800 psf	100	1.0	37.6
123 to 128	Silty Clay / Gravelly Clay	2. CLAY	---	2,000 psf	800	0.5	47.6
118 to 123	Silty Clay	1. CLAY	---	1,000 psf	100	1.5	47.6
98 to 118	Clayey Gravel / Clayey Silt	4. SAND	26^{o}	5,000psf	125	0.4	67.5

The following tabulated information summarizes our lateral pile analysis results. Additionally, Appendix F provides the relationships between pile displacement and moment with depth for 14-inch-square pre-stressed concrete pile.

Table 2: Ultimate Lateral Capacities (Single Pile)

Pile Diameter (inch)	Axial Loading (tons)	Pile Condition	Ultimate Lateral Capacity (tons)	
			¼-inch Top of Pile Deflection	½-inch Top of Pile Deflection
14	60	Pinned-Head	10	14
		Fixed-Head	19.5	27
14	150	Pinned-Head	10	14
		Fixed-Head	19.5	27

The above lateral capacities represent the probable response of a single pile under short-term loading conditions. The ultimate lateral resistance of the soil can be increased by one-third for the short-term effects of wind or seismic loading provided piles are spaced at least 3 pile diameters on center. The above values provided are considered ultimate capacities. The Structural Engineer should select other suitable factors of safety based on the type of loading.

We estimated maximum bending moments and points of fixity of a 14-inch square pre-cast pre-stressed concrete pile for ¼- and ½-inch pile top deflection given fixed-head and pined-head condition. The Structural Engineer should be consulted to determine the maximum allowable bending moment for the piles. As referenced in Table 3 below, "point of fixity" is defined as a point of zero lateral deflection.

Table 3: Load Deflection Characteristics (14-inch Square Pile)

Pile Head Condition	Deflection Characteristic	Pile Deflection	
		¼-inch	½-inch
Pinned-Head	Maximum Bending Moment (in-kips)	620	900
	*Depth to Maximum Bending Moment (feet)	5.5	5.5
	*1st Point of Fixity (feet)	8.5	9
	*2nd Point of Fixity (feet)	20	20
Fixed-Head	Maximum Bending Moment (in-kips)	425	700
	*Depth to Maximum Bending Moment (feet)	9	10
	*1st Point of Fixity (feet)	12	14
	*2nd Point of Fixity (feet)	23	23

*Below Top of Pile

The foundations should be designed by a licensed Structural Engineer. Once details regarding the structural designs of the hospital building and related development have been determined, ENGEO should review such designs for appropriate changes and/or modifications to these preliminary foundation recommendations as deemed necessary.

Group Pile Affects. Group reduction on axial pile capacity for friction pile groups with individual piles spaced at least 3 pile diameters apart is not considered necessary. If closer pile spacing is required, the following group reduction factors on axial pile capacity can be applied.

Spacing in Pile Diameter (feet)	Group Reduction Factor*
3	1
2.5	0.8
2.0	0.6

* Group reduction factors for 3 by 3 pile group (9 piles)

It should be noted that pile spacing less than 2 pile diameters are not recommended.

Research (Brown, 1988) has shown that the lateral capacity of a group of piles is generally less than that of a single pile for center to center spacing less than 6 to 8 pile diameters. For 3 by 3 pier groups (9 piles) with a spacing of 3 pile diameters, we recommend reducing the single pile allowable lateral capacities by 35 percent.

Indicator Piles. We recommend a minimum of eight indicator piles be installed to determine pile driving resistance characteristics and whether the piles can be driven to the design depths. The piles should be driven at the corners and around the center of the hospital tower and should be located to serve as functional foundation piles. This information will allow us to evaluate the pile load carrying capacity based on the recorded driving resistance. The information obtained during indicator pile driving will be used to confirm the production pile lengths, and provide blow count data to correlate with information obtained from the test borings and CPTs. Indicator piles should be driven with the same equipment that will be used to drive production piles.

During the installation of the indicator piles, we recommend using a Pile Driving Analyzer (PDA) to evaluate pile stresses during driving, soil skin friction, and end bearing. The PDA should be operated by experienced and qualified personnel. If the results indicate driving stresses (tension or compression) could damage the piles, the PDA operator should immediately notify the contractor and Geotechnical Engineer.

We recommend that an indicator pile program be implemented as follows:

- The lengths for the piles to be used for the indicator pile program should include an additional 10 feet to account for variations in driving resistance encountered during indicator pile installation (55 feet).
- The piles should be first driven to the elevation that corresponds to 5 feet of penetration into the dense layer
- If PDA measurements during initial driving do not confirm the design capacities, pile re-strike should take after a week period and the piles should be driven all the way to the final tip elevation .
- The PDA measurements will then be used to develop final pile lengths.

The Geotechnical Engineer should review the final foundation plans when they become available to check for conformance with these recommendations. In addition, all pile-driving operations should be conducted under the observation of a representative of the Geotechnical Engineer, and the blow counts should be recorded by a representative of the Geotechnical Engineer.

Grade Beam Design. All foundation piles supporting bearing walls should be interconnected by well-reinforced grade beams. We do not recommend the use of isolated piers. Based on the near surface soil encountered during our exploration, the follow modulus of subgrade reaction should be used for design of the grade beams:

	Modulus of Subgrade Reaction k, (pci)	
	Static Loads	Total Loads (Seismic and Static)
Founded on at least 2 ft of Engineered Fill	150	200
Founded on Native material	100	150

All grade beams should be reinforced to maximize their moment capacity. The grade-beam reinforcement should be designed by the Structural Engineer.

Due to the expansive potential of some of the soil in the area of the building, design of the grade beam should consider proper reinforcements to resist uplift pressure of up to 1,000 psf. In order to reduce the risk of soil swelling rapid removal of any water that may infiltrate into the soils under the structures should be provided. Place at least 7 inches of soil, and compact soil on the outside of exterior grade beams. Provide a minimum 3 to 5 percent slope away from the foundation at right angles to the grade beams to provide for rapid removal of surface water runoff.

Structural Floor Slab. If pile foundations are selected, the ground floor slab should be designed structurally to span between pile caps and/or grade beams. We recommend floor slab construction consist of a concrete slab at least 6 inches thick underlain by a capillary break consisting of a minimum 6-inch-thick layer of Class 2 Permeable Material. The floor slab reinforcing should be designed by the Structural Engineer.

Exterior Slab-on-Grade

This section provides guidelines for secondary slabs such as walkways, driveways, and steps. Construct secondary slabs-on-grade structurally independent of the foundation system, to allow slab movement to occur with a minimum of foundation distress. Where slabs-on-grade construction is anticipated, care must be exercised in attaining a near-saturation condition of the subgrade soil before concrete placement. Due to the expansion potential of the near surface soils, we recommend that slabs-on-grade be supported on non-expansive fill to reduce the likelihood of slab damage from heave or shrinkage. To reduce the effects of expansive soil on interior slabs, we recommend the following:

1. Provide a minimum concrete thickness of 4 inches.
2. Reinforce slabs with No. 3 rebar on 16-inch centers, each way, placed within the middle third of the slab.
3. Pre-saturate the upper 10 inches of slab subgrade as described above.

The Structural Engineer should provide final design thickness and additional reinforcement, if necessary, for the intended structural loads. As a minimum requirement, reinforce slabs-on-grade to control cracking. Provide frequent control joints to reduce the cracking. In our experience, welded wire mesh is not sufficient to control slab cracking. Provide a thickened edge extending at least 6 inches into compacted soil to minimize water infiltration. Place a 4-inch-thick layer of clean crushed rock or gravel, which conforms to the requirement listed in Section 2.04 of Part I of the Guide Contract Specifications, under all secondary concrete slabs. Slope slabs away from the buildings at a slope of at least 2 percent to prevent water from flowing toward the building.

Retaining Walls Criteria

Conventional retaining walls (i.e. concrete, masonry, etc.) that are drained and less than 10 feet in vertical height should be designed to resist the following earth pressures. Design retaining walls that are free to deflect with active earth pressures and walls not free to deflect with at-rest earth pressures.

LATERAL EARTH PRESSURES

Backfill Slope Condition (horizontal: vertical)	Active Pressure (pcf)	At-Rest Pressure (pcf)
Level	50	85
4:1	55	90
3:1	60	100
2:1	70	110

Because the site is in a seismically active area, the design should be checked for seismic condition, in which the wall pressure is determined by adding the earth pressure due to earthquake shaking to the active earth pressure. The incremental seismic pressure is approximated by a uniform pressure, in psf, of 15 times the height of the wall in feet.

For wall in excess of 10 feet high, ENGEO should work together with the Structural Engineer. Provide backdrainage at the base of the foundation for all walls. Backfill of walls should be performed under the observation and testing of ENGEO and according to the recommendations provided in this and the referenced reports.

Drainage Requirements

Ponding of water under floors or seepage toward foundation systems at any time during or after construction must be prevented.

As a minimum requirement, provide finished grades at a minimum 3 percent slope gradient within 5 feet from exterior walls (perpendicular the wall alignment) to allow surface water to drain positively away from the structures. For paved areas, the slope gradient can be reduced to

1 percent. Ensure that landscape mounds will not interfere with these requirements. Provide sufficient area drains around the buildings to remove excess surface water.

Convey stormwater from roof downspouts in closed drain systems to a drainage facility. If planting adjacent to a building is desired, use drought-tolerant plants that require very little moisture. Avoid sprinkler systems installation which may cause ponding or foundation soil saturation. Such ponding or saturation could result in undesirable soil swell, loss of compaction and consequent foundation and slab movements. Strictly limit landscape area irrigation to that necessary for plant growth.

Preliminary Pavement Design

The following recommendations for preliminary asphalt pavement sections are intended as a conceptual guide for planning. We based the preliminary pavement sections on an estimated R-Value of 5. Actual R-Value samples should be collected for testing after grading to approximate rough grades and installation of underground utilities. The preliminary pavement sections are based on the estimated R-Value, the Caltrans "Design Method for Flexible Pavements", and Traffic Indices (T.I.) ranging from 4 to 8. However, T.I. values should be determined by the Civil Engineer or appropriate public agency.

Traffic Index	Asphalt Concrete (in.) (Type B)	Aggregate Base (in.) (Class 2)
4.0	2½	7½
5.0	3	10
6.0	3½	13
7.0	4	16
8.0	4	17½

Pavement materials and construction should comply with the specifications and requirements of the Standard Specifications by the State of California Division of Highways, City of Santa Rosa requirements and the following minimum requirements.

- Scarify pavement subgrades to a minimum depth of 12 inches below finished subgrade elevation; moisture condition to 3 percent above optimum, and compact to at least 95 percent relative compaction and in accordance with city requirements.
- Subgrade soils should be in a stable, non-pumping condition at the time aggregate baserock materials are placed and compacted.
- Adequate provisions must be made such that the subgrade soils and aggregate baserock materials are not allowed to become saturated.
- Aggregate baserock materials should meet current Caltrans specifications for Class 2 Aggregate Baserock, and should be compacted to at least 95 percent of maximum dry density.
- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.
- All concrete curbs separating pavement and irrigated landscaped areas should extend into the subgrade and below the bottom of adjacent aggregate baserock materials.

Utilities

It is recommended that all utility trench backfill be done under the observation of a Geotechnical Engineer, in accordance with both the City of Santa Rosa and utility agency requirements. Pipe zone backfill (i.e. material beneath and immediately surrounding the pipe) may consist of a well-graded import or native material less than ¾ inch in maximum dimension compacted in accordance with the recommendations provided above for engineered fill. Trench zone backfill (i.e. material placed between the pipe zone backfill and the ground surface) may consist of native soil compacted in accordance with recommendations for engineered fill.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence, but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

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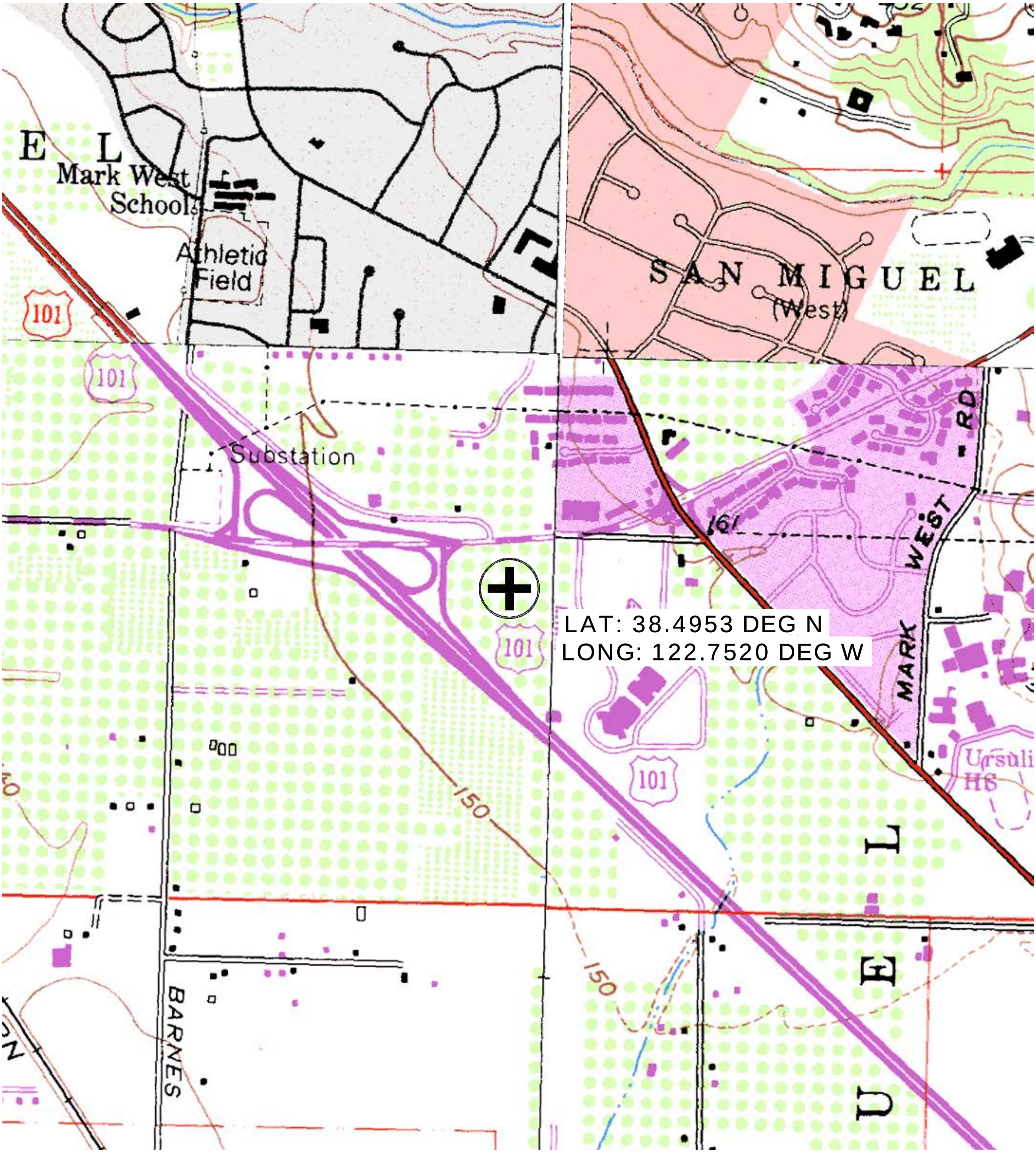

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0 FEET 1000

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BASE MAP SOURCE: USGS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE COORDINATE MAP SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.601			FIGURE NO. 1
	DATE: NOVEMBER 2008			
	DRAWN BY: LC	CHECKED BY: TPB		

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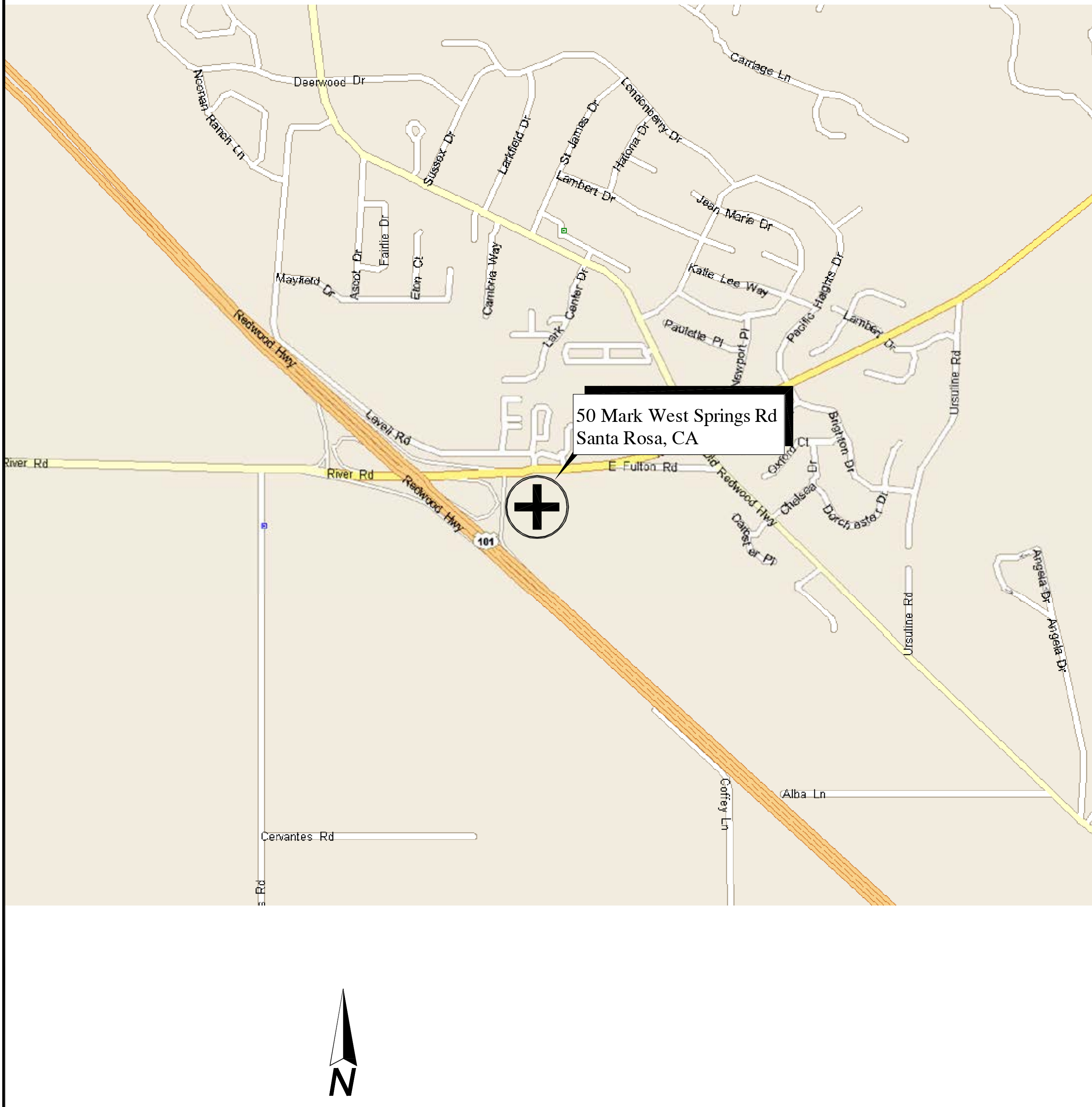

BASE MAP SOURCE: MS STREETS AND TRIPS (10/05)

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ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SITE LOCATION MAP SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.601 DATE: NOVEMBER 2008 DRAWN BY: LC CHECKED BY: TPB	FIGURE NO. 2

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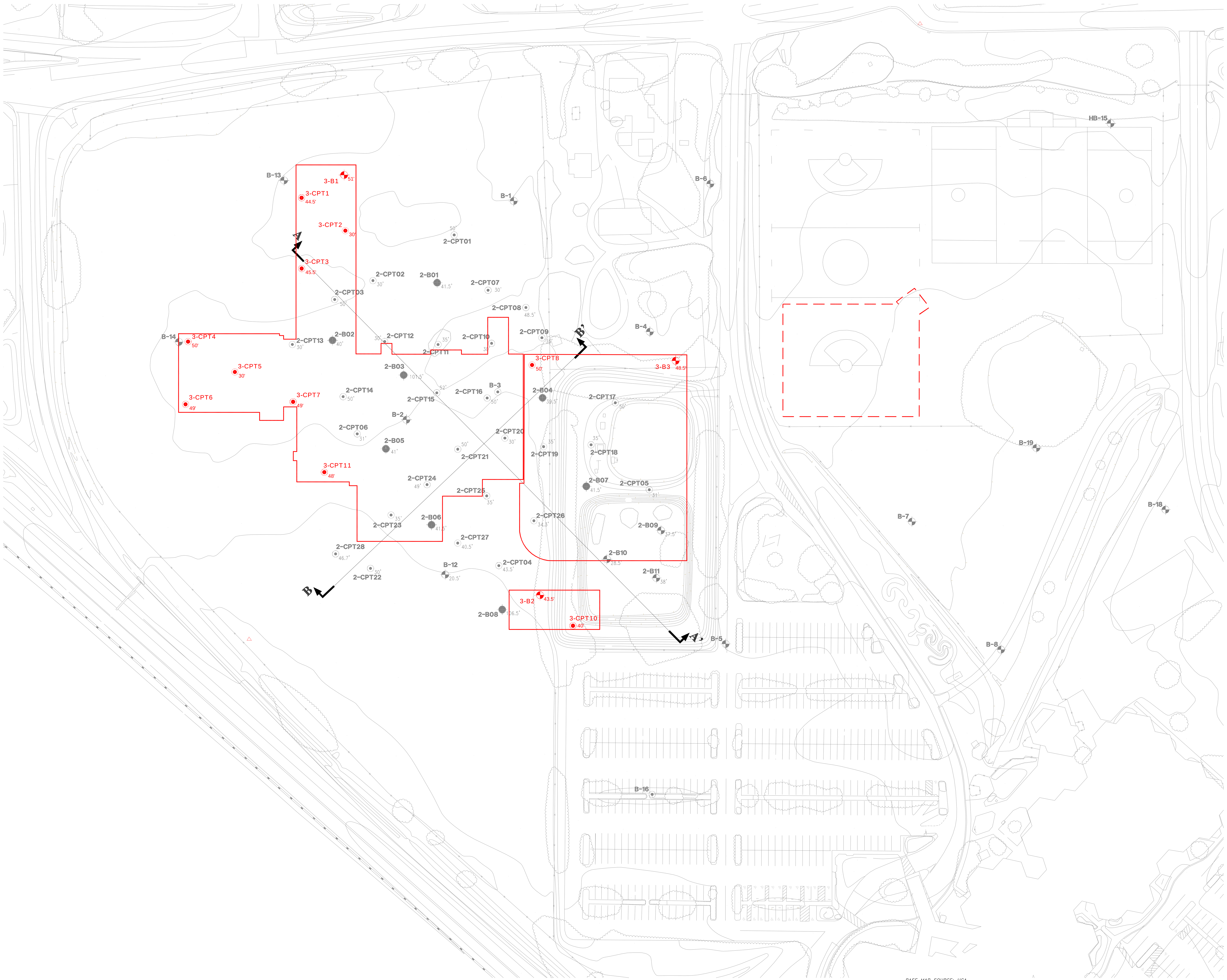

EXPLANATION

2-B08 30' APPROXIMATE LOCATION OF PREVIOUS BORING AND DEPTH IN FEET (ENGEO, 2006)

2-B011 30' APPROXIMATE LOCATION OF PREVIOUS BORING DRILLED ON A BARGE AND DEPTH IN FEET (ENGEO, 2006)

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APPROXIMATE LIMIT OF PROPOSED BUILDING FOOTPRINT PER PLAN PREPARED BY HGA ON 10-10-08

BASE MAP SOURCE: HGA

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE EXPLORATION MAP
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.601	FIGURE NO. 3
DATE: NOVEMBER 2008	
DRAWN BY: LC	CHECKED BY: TPB

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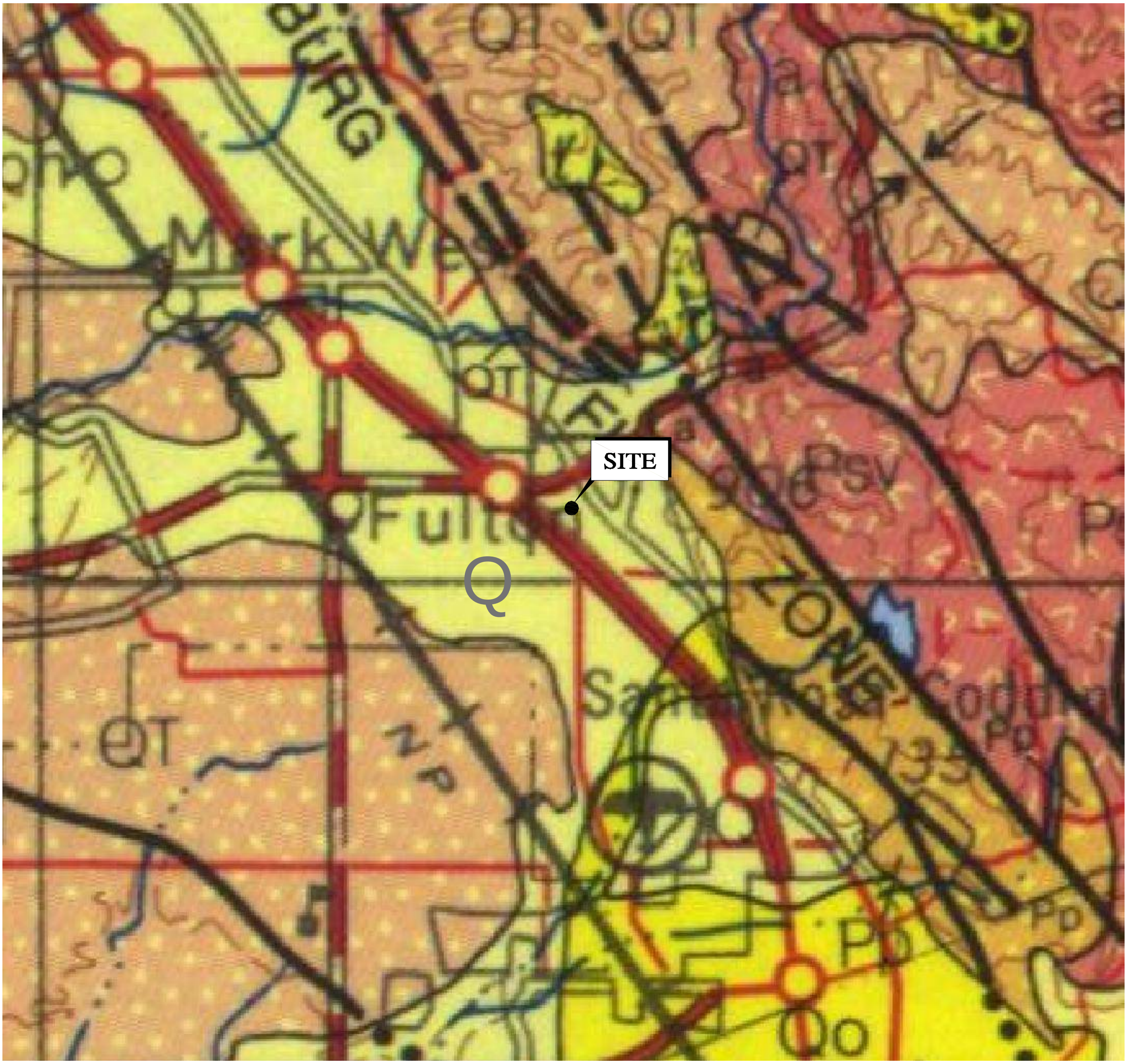


EXPLANATION

Q	ALLUVIUM
Qo	OLDER ALLUVIUM
Qt	TERRACE DEPOSITS
Pp	PETALUMA FORMATION (CLAYSTONE, SILTSTONE, MUDSTONE; MOSTLY NON-MARINE)
Psv	SONOMA VOLCANICS (B-BASALT; A-ANDESITE; R-RHYOLITE; T-TUFF AND OTHER PYROCLASTIC ROCKS)

N

0 MILES 0.5
0 KILOMETERS 1

BASE MAP SOURCE: CALIFORNIA GEOLOGICAL SURVEY, 1980

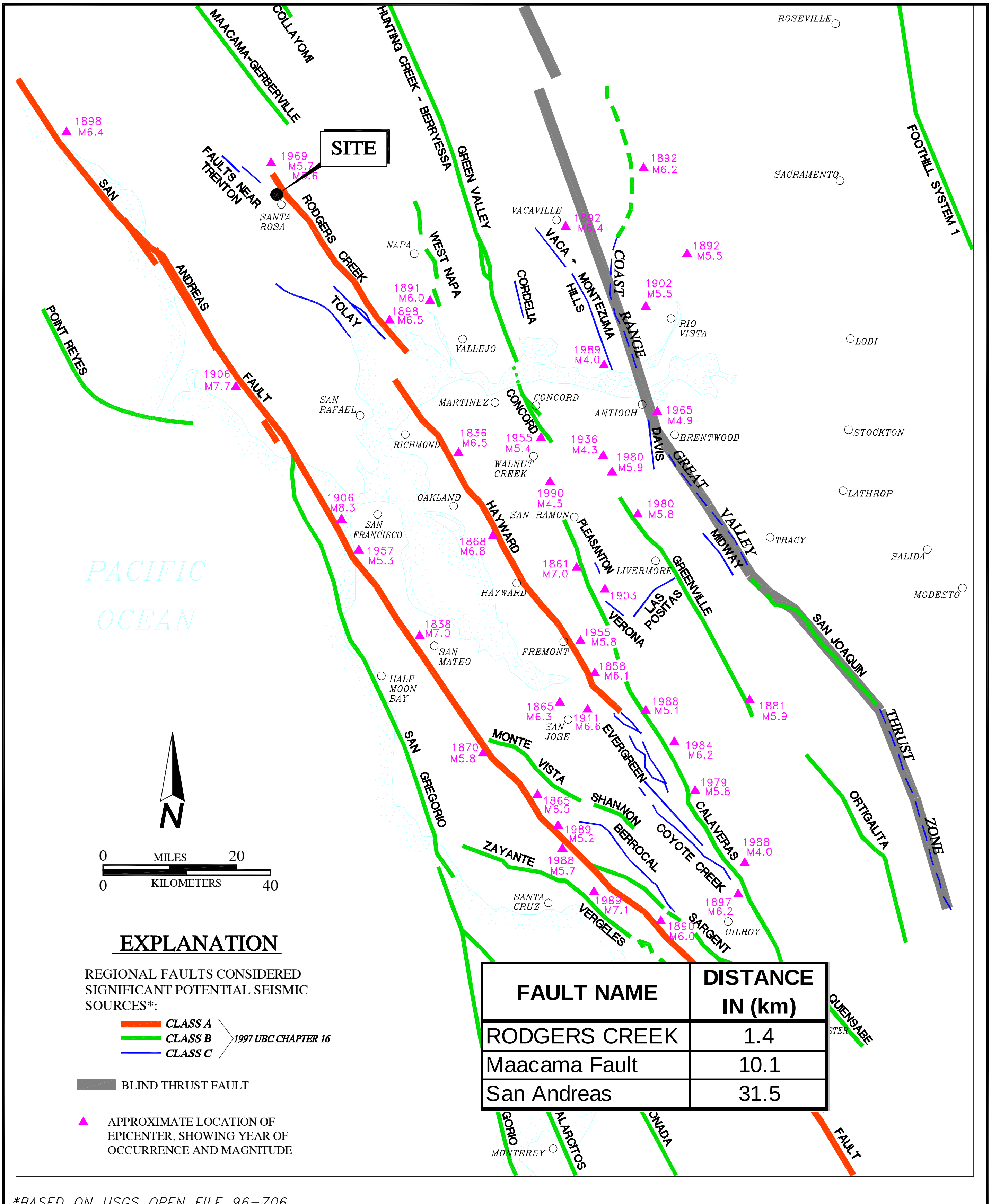
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL GEOLOGIC MAP
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.601
DATE: NOVEMBER 2008
DRAWN BY: DLB
CHECKED BY: TPB
FIGURE NO. 4

G:\Drafting\DRAFTING2_Dwg\6486\200\6486200601-4RegGeoMap-1108.dwg 11-25-08 08:51:15 AM

ORIGINAL FIGURE PRINTED IN COLOR



FAULT NAME	DISTANCE IN (km)
RODGERS CREEK	1.4
Maacama Fault	10.1
San Andreas	31.5

EXPLANATION

REGIONAL FAULTS CONSIDERED SIGNIFICANT POTENTIAL SEISMIC SOURCES*:

- CLASS A
- CLASS B
- CLASS C

1997 UBC CHAPTER 16

BLIND THRUST FAULT

APPROXIMATE LOCATION OF EPICENTER, SHOWING YEAR OF OCCURRENCE AND MAGNITUDE

*BASED ON USGS OPEN FILE 96-706

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL FAULTING MAP

SUTTER MEDICAL CENTER

SONOMA, CALIFORNIA

PROJECT NO.: 6486.200.601

DATE: NOVEMBER 2008

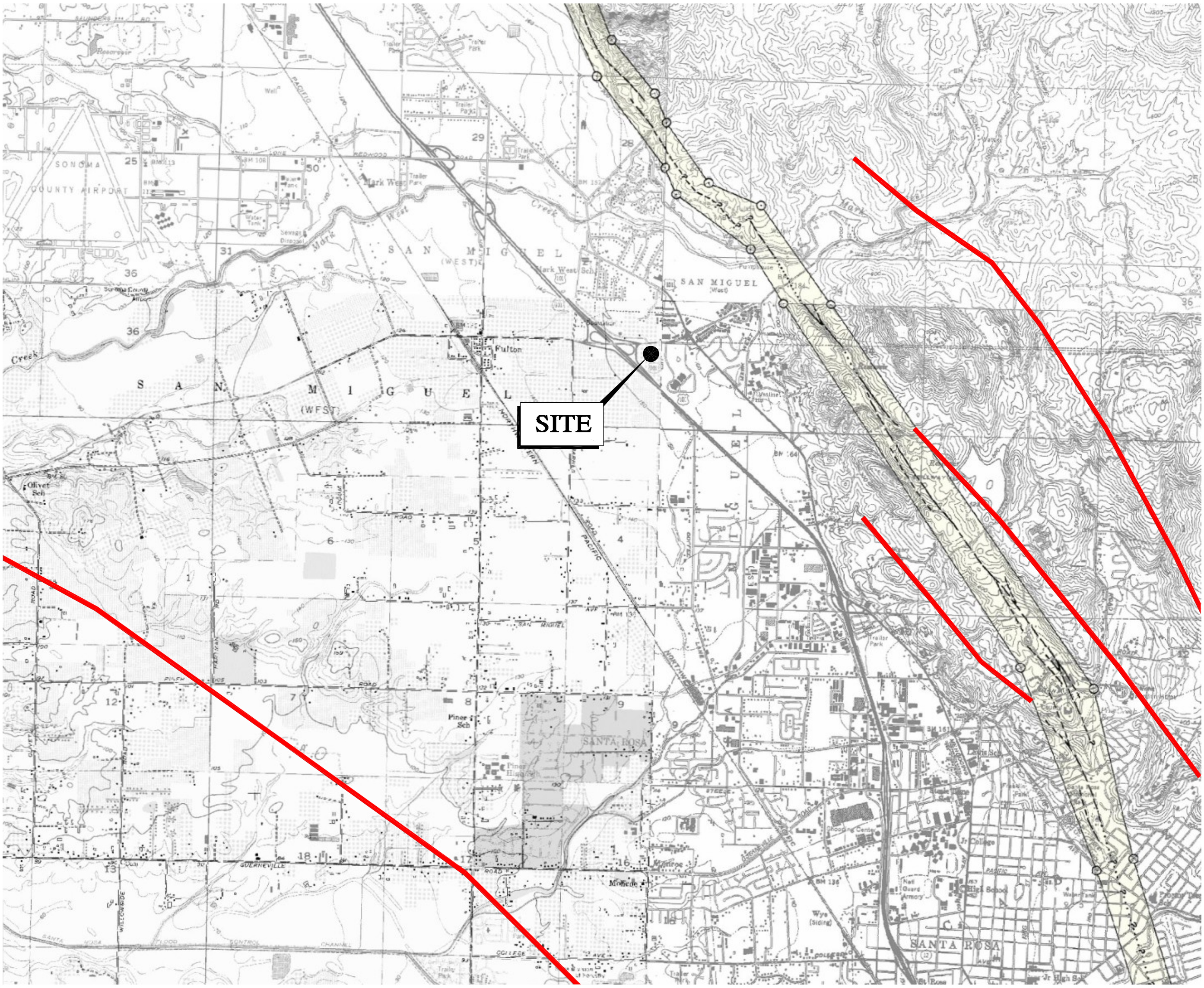
DRAWN BY: LC

CHECKED BY: TPS

FIGURE NO. 5

G:\Drafting\DRAFTING2_Dwg\6486\200\6486200601-5FAULT-1108.dwg 11-25-08 08:57:08 AM

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

Potentially Active Faults

1906 C

Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture, solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed, query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by creep or possible creep

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments

Seaward projection of zone boundary

N

0 FEET 5000

0 METERS 2500

APPROXIMATE LOCATION OF POTENTIALLY ACTIVE FAULTS (SONOMA COUNTY PUBLIC SAFETY ELEMENT)

BASE MAP SOURCE: CGS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

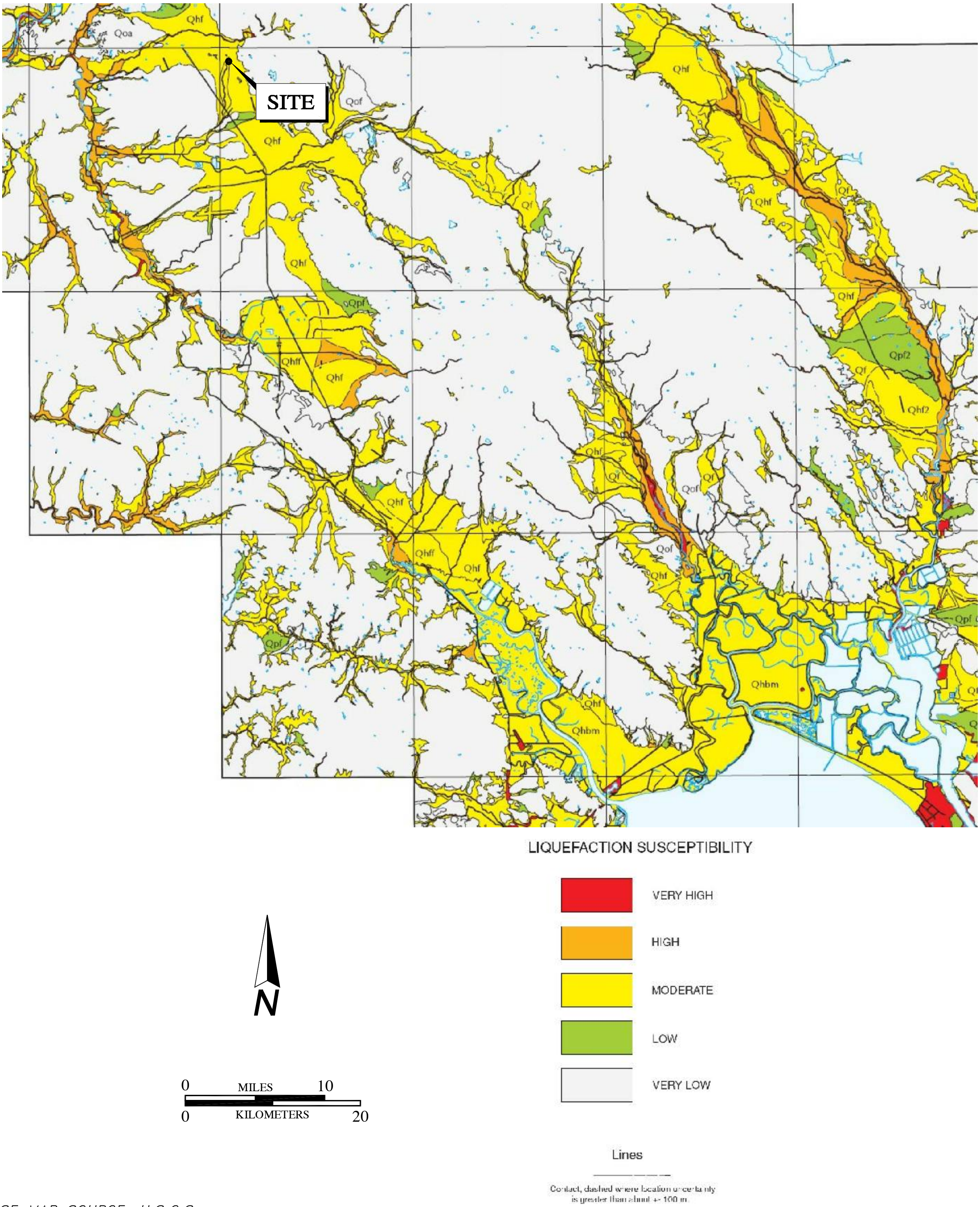
A-P EARTHQUAKE FAULT ZONE AND POTENTIALLY ACTIVE FAULTS (SONOMA COUNTY PUBLIC ELEMENT)

SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.:	6486.200.601
DATE:	NOVEMBER 2008
DRAWN BY: PC	CHECKED BY: TB
FIGURE NO.	5A

G:\Drafting\DRAFTING2_Dwg\6486\200\6486200601-5a-AP Earthquake Flt Zone-1108.dwg 11-25-08 08:54:31 AM

ORIGINAL FIGURE PRINTED IN COLOR



BASE MAP SOURCE: U.S.G.S.

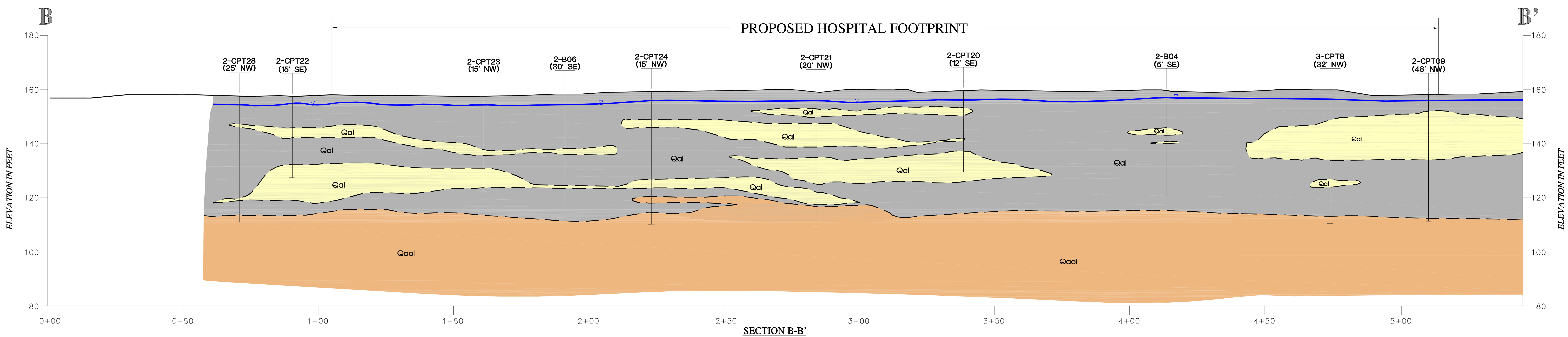
ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	GEOLOGIC HAZARD ZONES SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.601 DATE: NOVEMBER 2008 DRAWN BY: DLB CHECKED BY: TPB	FIGURE NO. 6

G:\Drafting\DRAFTING2_Dwg\6486\200\6486200601-6GeoHazardZones-1108.dwg 11-25-08 08:59:29 AM

ORIGINAL FIGURE PRINTED IN COLOR

SECTION A-A'

1"=20'



SECTION B-B'

1"=20'

EXPLANATION

MANMADE FILL

Qaf	SILTY CLAY AND GRAVELLY CLAY, STIFF, MOIST TO DRY
Qaf	SANDY CLAY, CLAYEY SAND, GRAVELS, LOOSE/SOFT, WET (POTENTIALLY LIQUEFIABLE)

ALLUVIUM

Qal	INTER-LAYERED CLAYEY SAND, SANDY CLAY, SILTY CLAY, AND CLAY, SOFT TO STIFF
Qal	INTER-LAYERED SANDY SILT, SILTY CLAY, CLAY, AND SAND, MEDIUM DENSE, STIFF TO VERY STIFF

OLDER ALLUVIUM

Qaol	INTER-LAYERED CLAYEY SILT AND CLAYEY GRAVELS, VERY DENSE/HARD, WET

2-B06 (30' SE)	APPROXIMATE LOCATION OF CONE PENETRATION TEST (APPROXIMATE DISTANCE PROJECTED FROM SECTION LINE)
2-CPT24 (15' NW)	APPROXIMATE LOCATION OF SOIL BORING (APPROXIMATE DISTANCE PROJECTED FROM SECTION LINE)

0 20

SCALE IN FEET

REGISTERED PROFESSIONAL ENGINEER THEODORE P. BAYHAM 2480 EXP. 9/30/10 GEOTECHNICAL STATE OF CALIFORNIA

SOILS ENGINEER:

THIS PLAN HAS BEEN PREPARED UNDER THE DIRECTION OF AND REVIEWED BY THE UNDERSIGN.

BY: [signature] 11/24/08

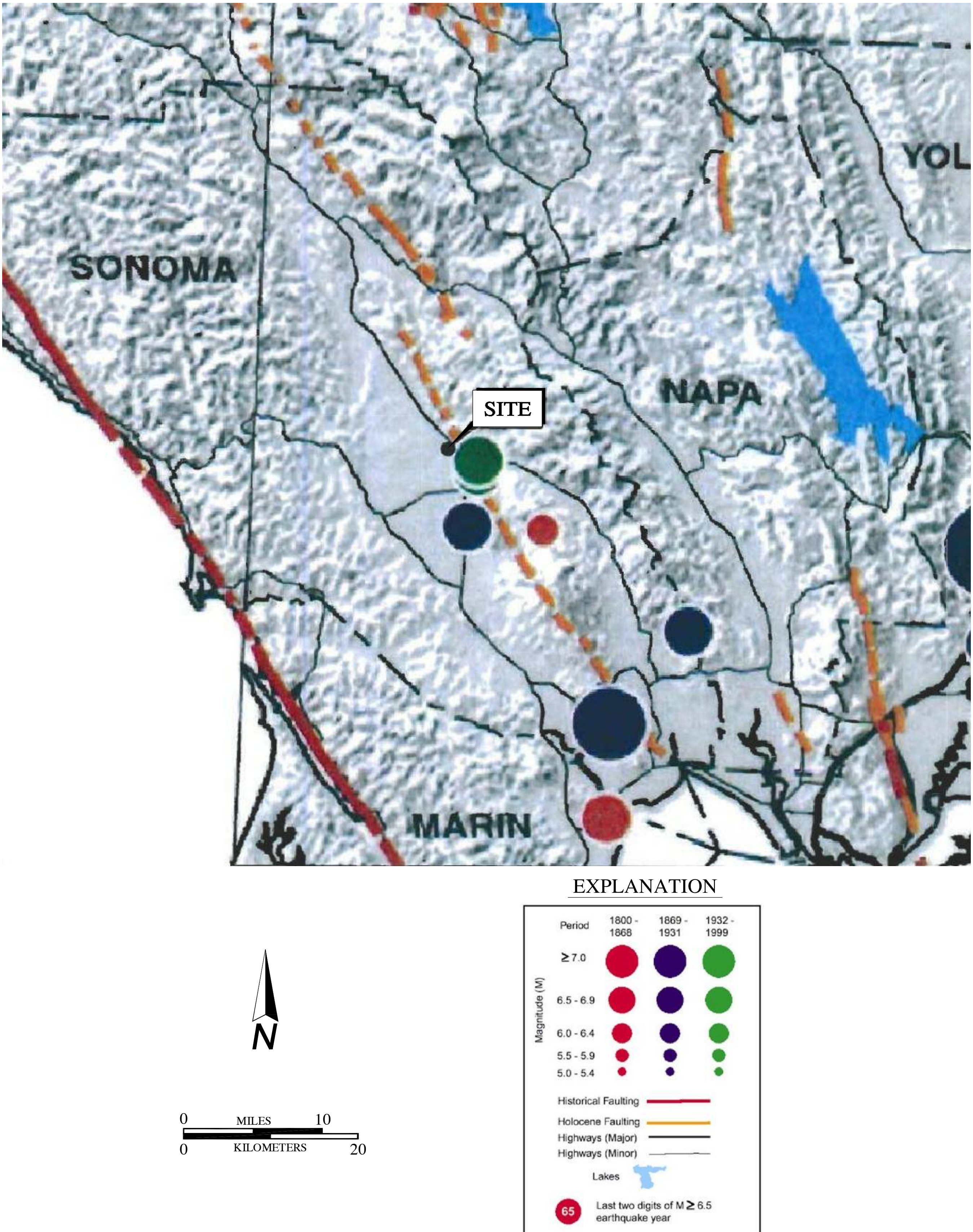
THEODORE P. BAYHAM
RCE 48793, EXPIRES 9-30-10

DATE

THESE CROSS SECTIONS HAVE BEEN DERIVED BASED ON AN INTERPOLATION BETWEEN SIMILAR STRATA ENCOUNTERED AMONG VARIOUS BORING AND CPT LOCATIONS; AS SUCH, VARIATIONS IN ACTUAL SUBSURFACE CONDITIONS SHOULD BE EXPECTED.

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	GEOLOGIC CROSS SECTIONS SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.601 DATE: NOVEMBER 2008 DRAWN BY: SRP CHECKED BY: TPB	FIGURE NO. 7

ORIGINAL FIGURE PRINTED IN COLOR



BASE MAP SOURCE: CAGS MAP SHEET 49

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

HISTORICAL SEISMICITY MAP
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.601	
DATE: NOVEMBER 2008	
DRAWN BY: DLB	CHECKED BY: TPB

FIGURE NO. 8

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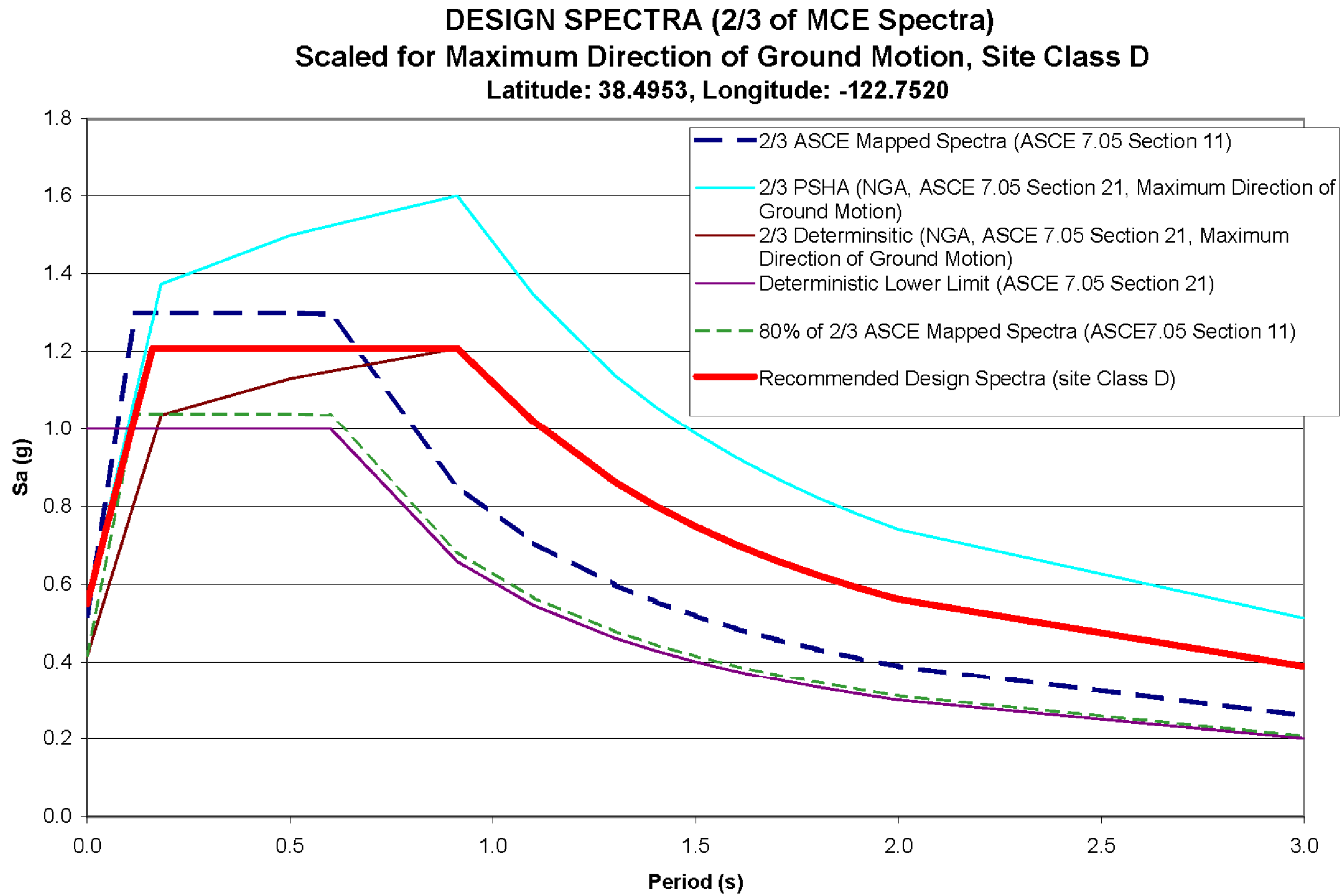
ORIGINAL FIGURE PRINTED IN COLOR



ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	DESIGN SPECTRA SUTTER MEDICAL CENTER SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.601 DATE: NOVEMBER 2008 DRAWN BY: LC CHECKED BY: TPB	FIGURE NO. 9

ORIGINAL FIGURE PRINTED IN COLOR

ENGEO
INCORPORATED

APPENDIX A1

ENGEO INCORPORATED (2008)

Exploratory Boring Logs and Cone Penetration Test Logs

Borings 3-B1 to 3-B3
CPT Logs 3-CPT1 to 3-CPT 9 & 3-CPT10 to 3-CPT11

6486.200.601
November 24, 2008

KEY TO BORING LOGS

MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES	GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES	SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS		ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %		MH - Inorganic silt with high plasticity CH - Inorganic clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS		PT - Peat and other highly organic soils

GRAIN SIZES

U.S. STANDARD SERIES SIEVE SIZE — CLEAR SQUARE SIEVE OPENINGS

	200	40	10	4	3/4 "	3"	12"
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*	BLOWS/FOOT (S.P.T.)
VERY SOFT	0-1/4	0-2
SOFT	1/4-1/2	2-4
MEDIUM STIFF	1/2-1	4-8
STIFF	1-2	8-15
VERY STIFF	2-4	15-30
HARD	OVER 4	OVER 30

MOISTURE CONDITION

DRY	Absence of moisture, dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater
SATURATED	Below the water table

MINOR CONSTITUENT QUANTITIES (BY WEIGHT)

TRACE	Particles are present, but estimated to the less than 5%
SOME	5 to 15%
WITH	15 to 30%
........Y	30 to 50%

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

LINE TYPES

- Solid - Layer Break
- Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- Groundwater level during drilling
- Stabilized groundwater level

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

Expect Excellence

LOG OF BORING 3-B1

Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/16/2008
HOLE DEPTH: Approx. 51 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 158½ ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
0			SILTY CLAY (CL), dark brown, soft, moist to dry, with sand, trace fine gravel.										
5			Becomes medium stiff.			11							1.5*
			Becomes stiff, with fine grained sand.			13							1.5*
10	3		Becomes medium stiff, some sand.			8	41	19	22		34.9	86.1	
	4				∇								
15	5		Becomes brown.			6							
			SILTY SAND (SM), brown, loose, saturated, fine to medium grained sand.				31	32	NP	37			
20	6												
	7	NR	No recovery.			8							
25	8		SANDY CLAY (CL), brown, medium stiff to stiff, wet, trace fine gravel, coarse grained sand.			8				64			
30	9												

LOG - GEOTECHNICAL 6486200601 GINT LOGS.GPJ ENGEO INC.GDT 11/24/08

LOG OF BORING 3-B1

ENGEO — Expect Excellence

Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/16/2008
HOLE DEPTH: Approx. 51 ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 158½ ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	DESCRIPTION	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
		Becomes medium stiff	11	44	22	22		36.3	86	
	10									
35	11	SILTY SAND (SM), brown, loose, wet, fine to medium grained sand.	13	26	26	NP		31.8	91.4	
40	12									
	13	SILTY CLAY (CL), grayish brown, stiff, moist, some fine grained sand.	13							
45	14	Becomes dark gray, very stiff, trace fine gravel.	23							
50	15	SILTY GRAVEL to POORLY GRADED GRAVEL (GM-GP), dark gray, very dense, moist, gravel is fine to coarse 1/4 inch to 1/2 inch subangular to subrounded.	50/4							
		Bottom of boring at 51 feet, groundwater encountered at 13.5 feet.								

LOG OF BORING 3-B2

ENGEO — Expect Excellence

Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/16/2008
HOLE DEPTH: Approx. 43½ ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 157 ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SILTY CLAY (CL), dark brown, medium stiff, moist to dry, some sand, trace fine and coarse gravel.										
	1		Becomes very stiff.			26							
5	2		Becomes brown to dark brown, stiff, with medium grained sand.			21							
10	3		Becomes medium stiff, with fine to medium grained sand.			10				56			
	4				▽								
15	5		Becomes soft to medium stiff, saturated, with medium to coarse grained sand.			6	37	17	20		35	86.5	
										71			
20	6												
	7		Becomes moist to wet.			11	35	20	15		37.7	83.1	
25	8		Becomes stiff, with fine gravel, some sand.			15	26	17	9		22.3	104	
30	9												

LOG - GEOTECHNICAL 6486200601 GINT LOGS.GPJ ENGEO INC.GDT 11/24/08

LOG OF BORING 3-B2

Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/16/2008
HOLE DEPTH: Approx. 43½ ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 157 ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	10		CLAYEY GRAVEL (GC), brown, very dense, moist to wet, with coarse grained sand, gravel consists of fine grained subangular to subrounded, trace 3/4 inch cobbles.			50/5							
35	11												
			Becomes dark yellowish brown with dark reddish brown.			86							
40	12												
	13		Same as above.			50/4							
			Bottom of boring at 43.5 feet, groundwater encountered at 14 feet.										

LOG OF BORING 3-B3

ENGEO
Expect Excellence

Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/15/2008
HOLE DEPTH: Approx. 48½ ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 159 ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SILTY CLAY (CL), dark brown, medium stiff, moist, with fine grained sand.										
	1												
			Becomes dark brown mottled with brown, very stiff.			34							4*
5													
	2		Trace fine gravel.			25							
10	3		Becomes stiff, with medium grained sand, trace coarse gravel.			17				58			
	4												
					∇								
15													
	5		Becomes soft, saturated, with coarse grained sand.			4							
							40	19	21	67			
20	6												
	7		Becomes silty, medium stiff, wet, with fine to medium grained sand.			8	39	21	18		41.3	78.7	
25													
	8												
			Becomes very stiff.			31	37	19	18		26.8	95.7	
30	9												

ENGEO
Expect Excellence

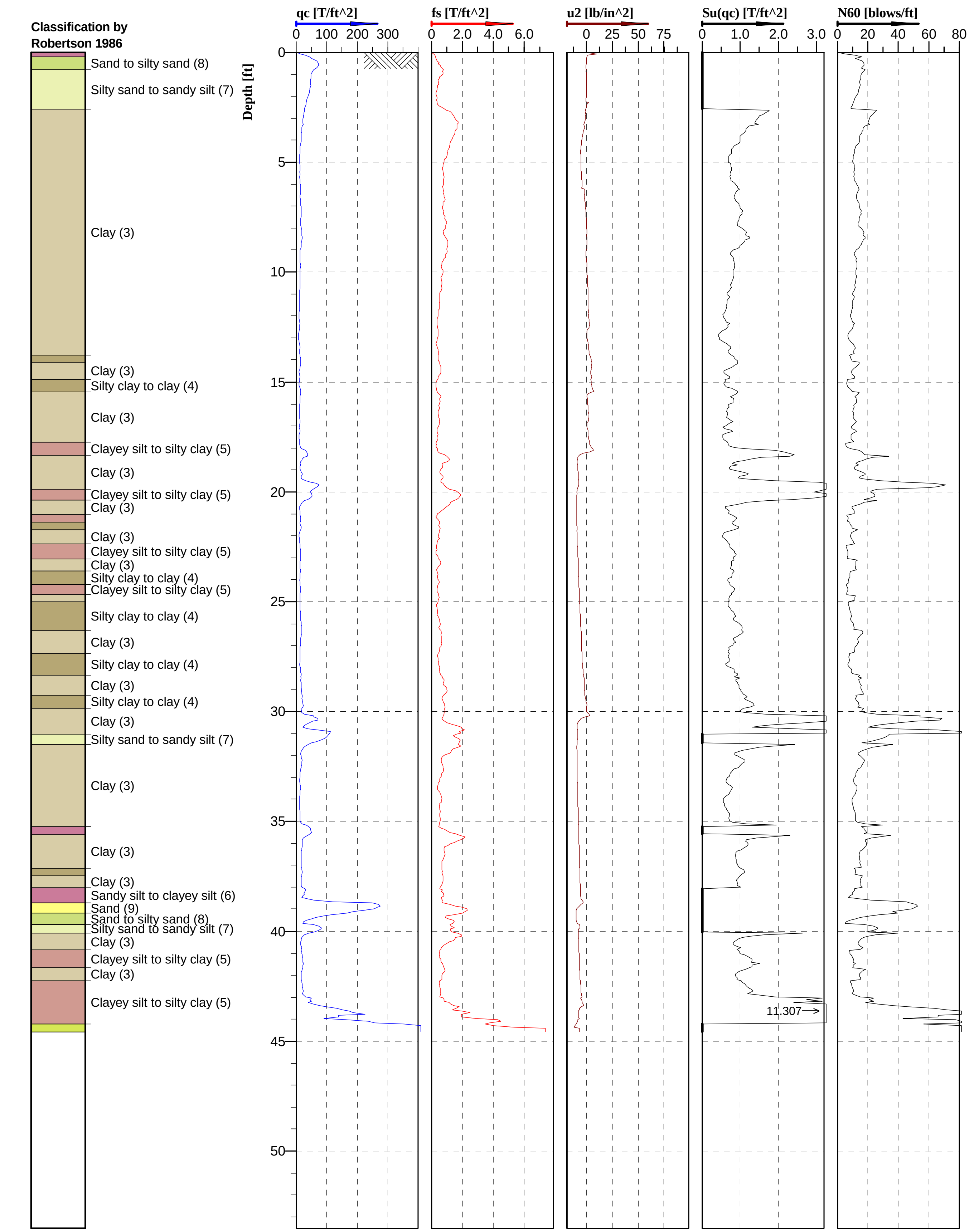
LOG OF BORING 3-B3

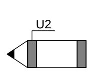
Geotechnical Exploration
Sutter Medical Center
Santa Rosa, California
6486.200.601

DATE DRILLED: 10/15/2008
HOLE DEPTH: Approx. 48½ ft.
HOLE DIAMETER: 6.0 in.
SURF ELEV (msl): Approx. 159 ft.

LOGGED / REVIEWED BY: J. White / TPB
DRILLING CONTRACTOR: Woodward Drilling
DRILLING METHOD: Mud Rotary
HAMMER TYPE: 140 lb. Auto Trip

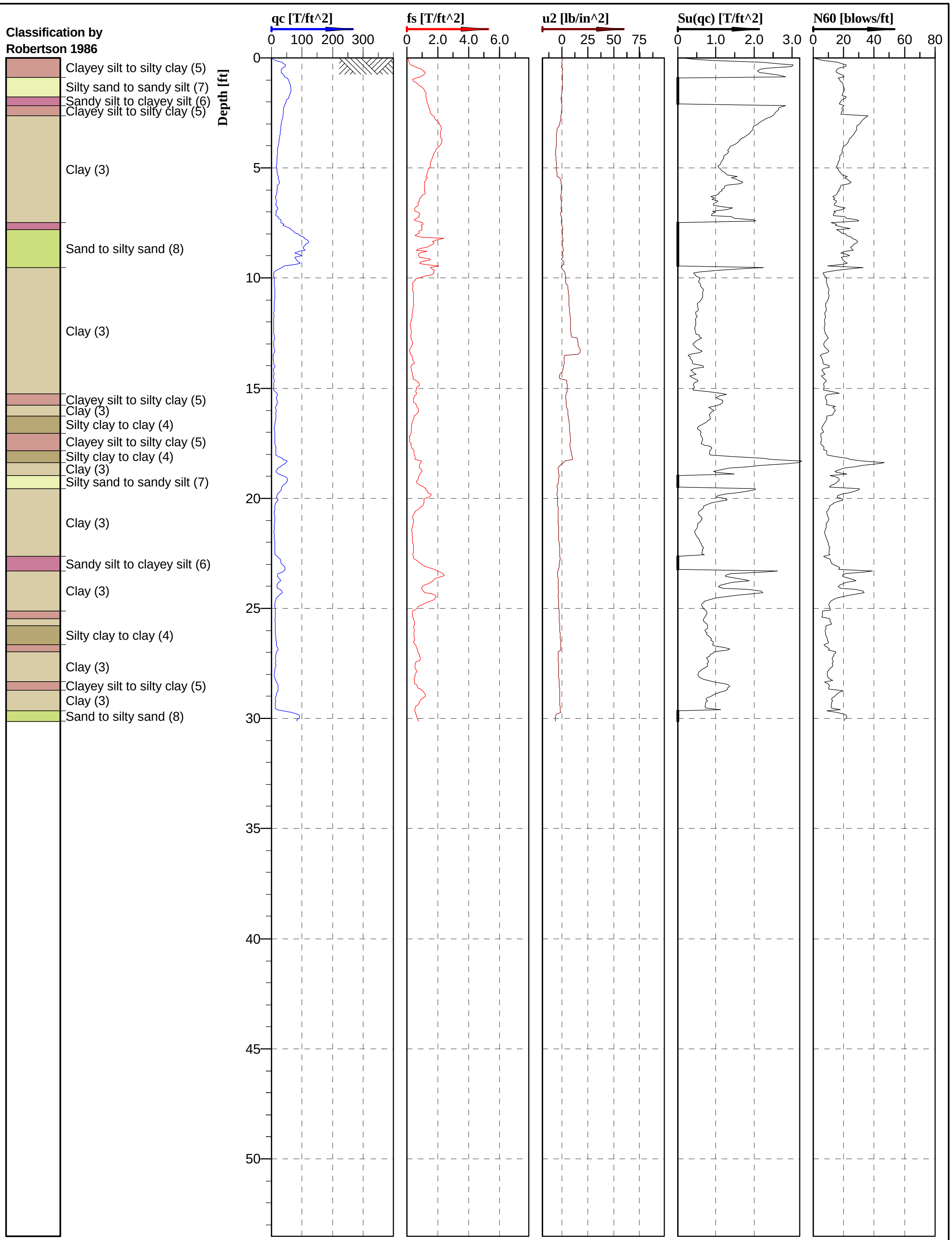
Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			SILTY CLAY (CL), dark brown, medium stiff, moist, with fine grained sand.										
	10		Same as above.			8				92			
			CLAY (CH), dark olive brown, medium stiff, moist, trace fine and coarse grained sand.										
35													
	11												
			Becomes dark gray.			11	60	25	35	97	55.3	67.3	1.5*
	12												
40													
	13		Becomes very stiff, some fine grained sand.			23							3*
45													
	14												
			Becomes medium stiff, with fine grained sand.			11							
			Bottom of boring at 48.5 feet, groundwater encountered at 14.5.										





Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-1
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-1.cpd	



CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-2
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
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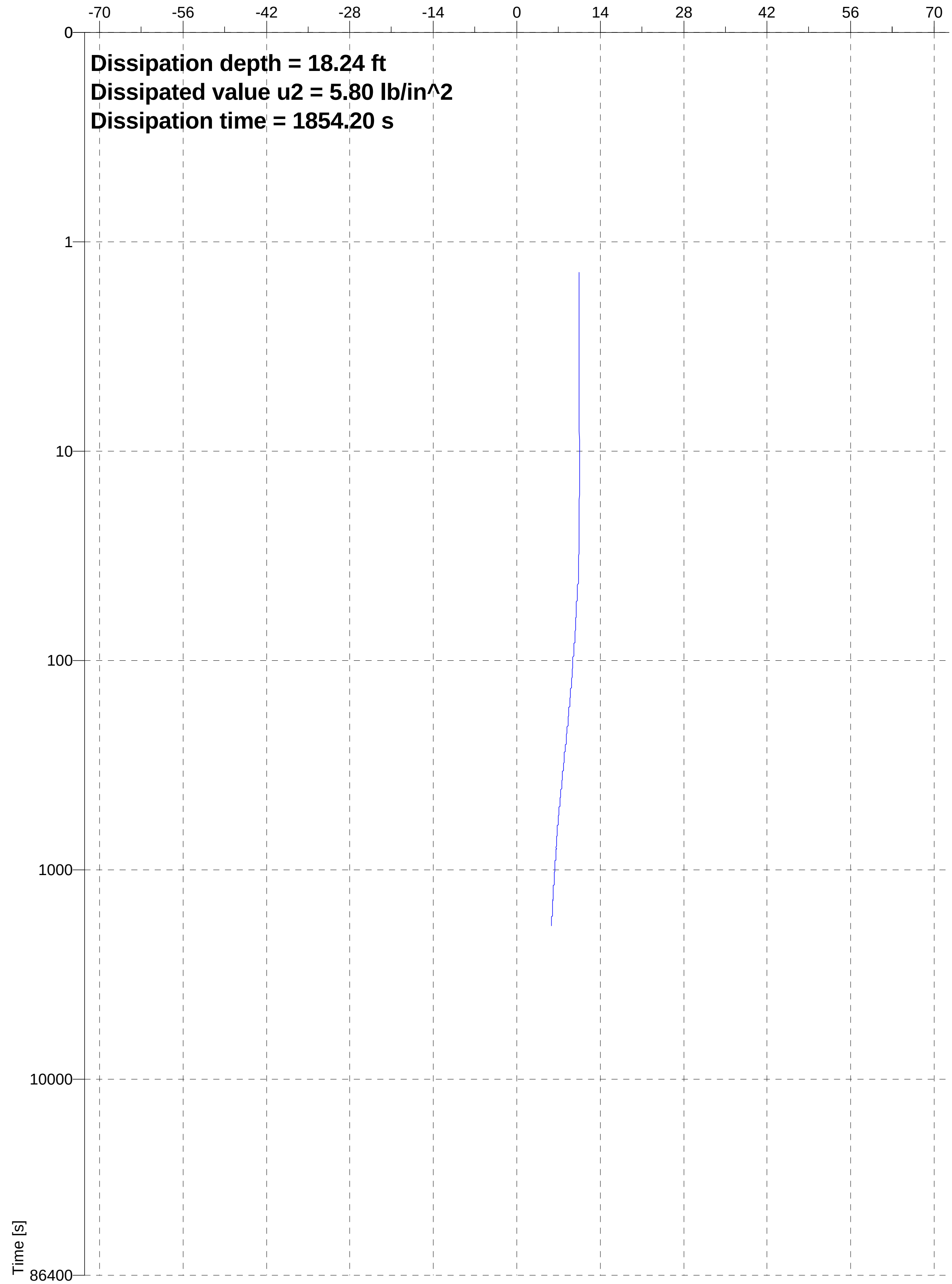
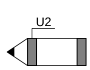
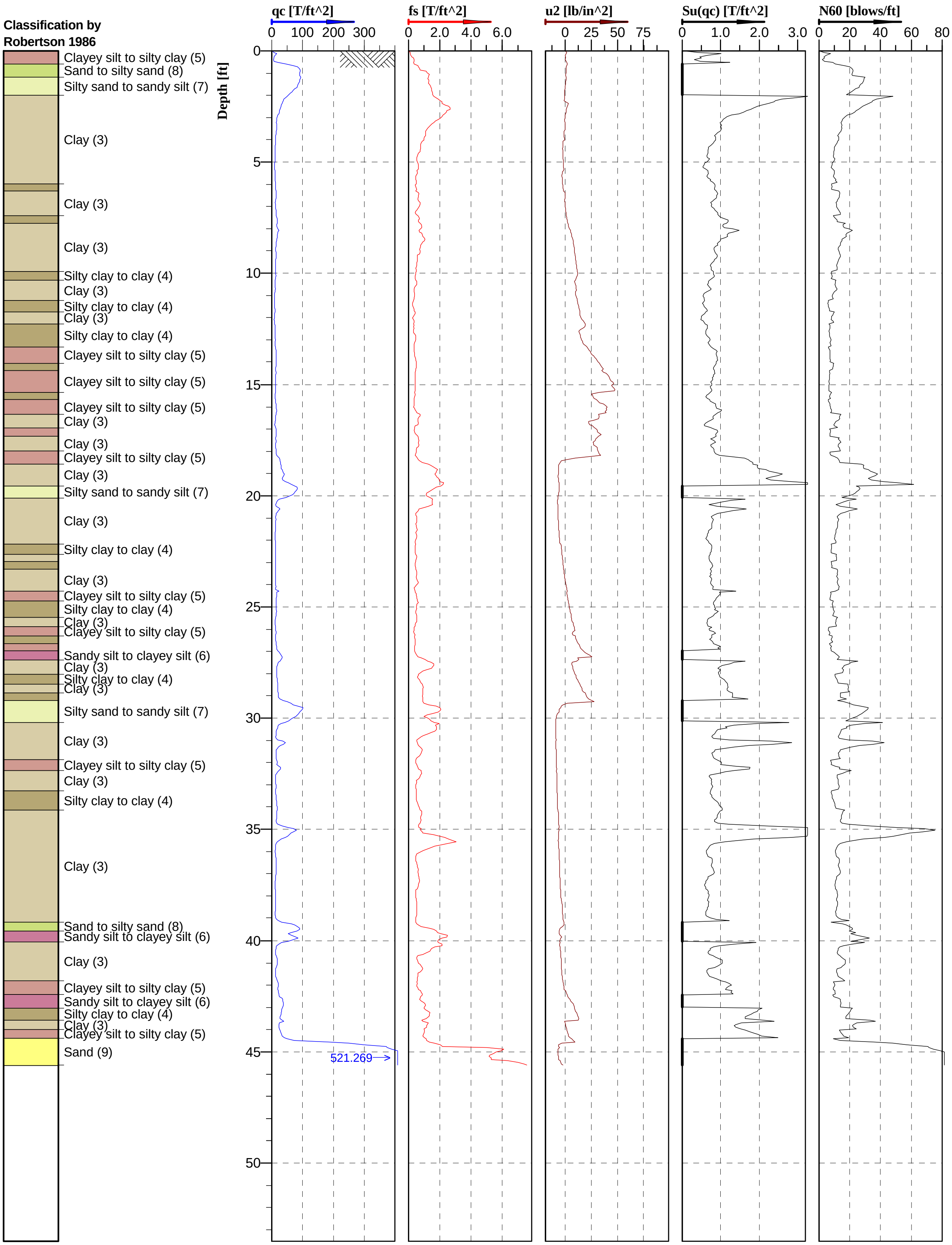




Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-2
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-2.cpd	

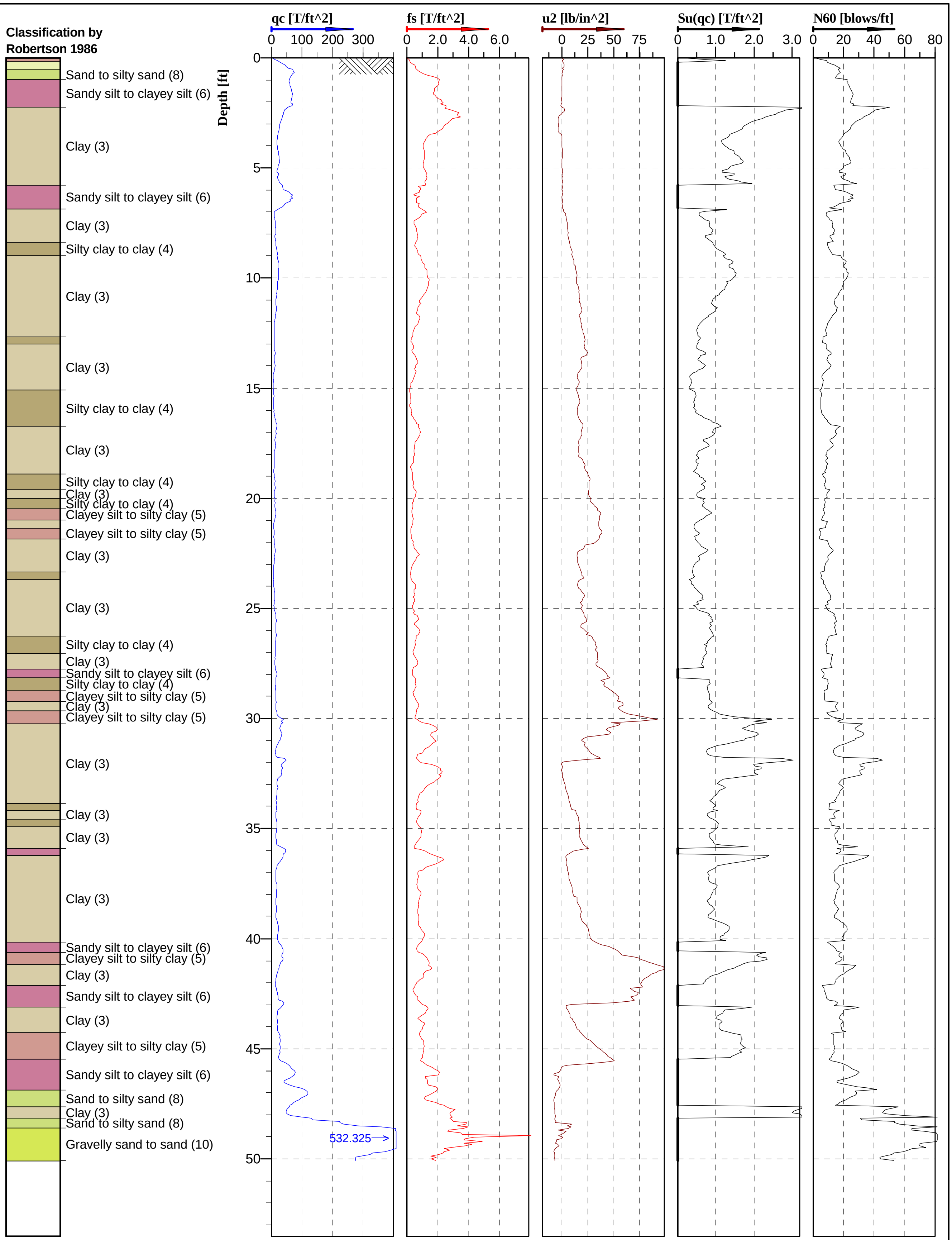


CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-3
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-3.cpd	

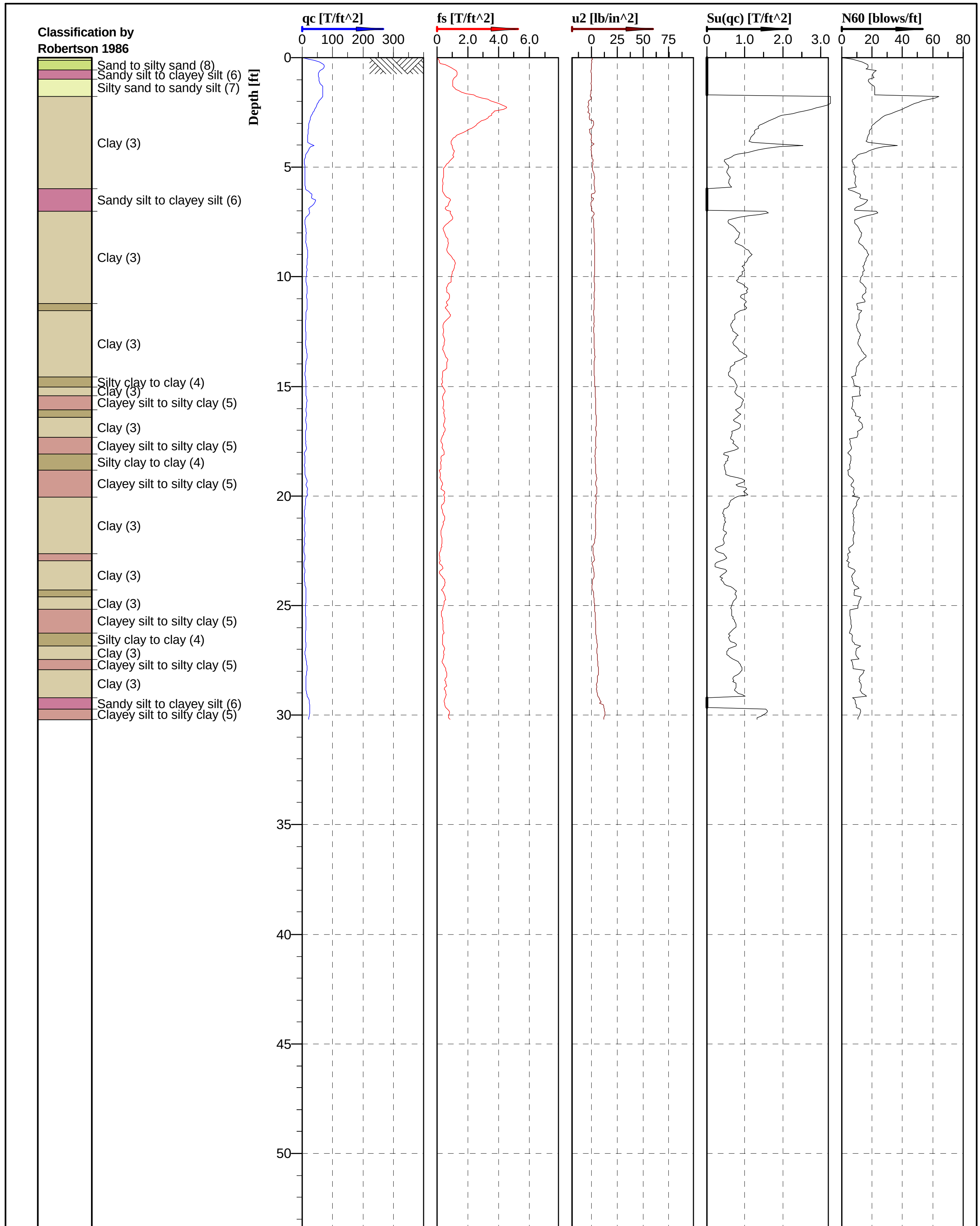


CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

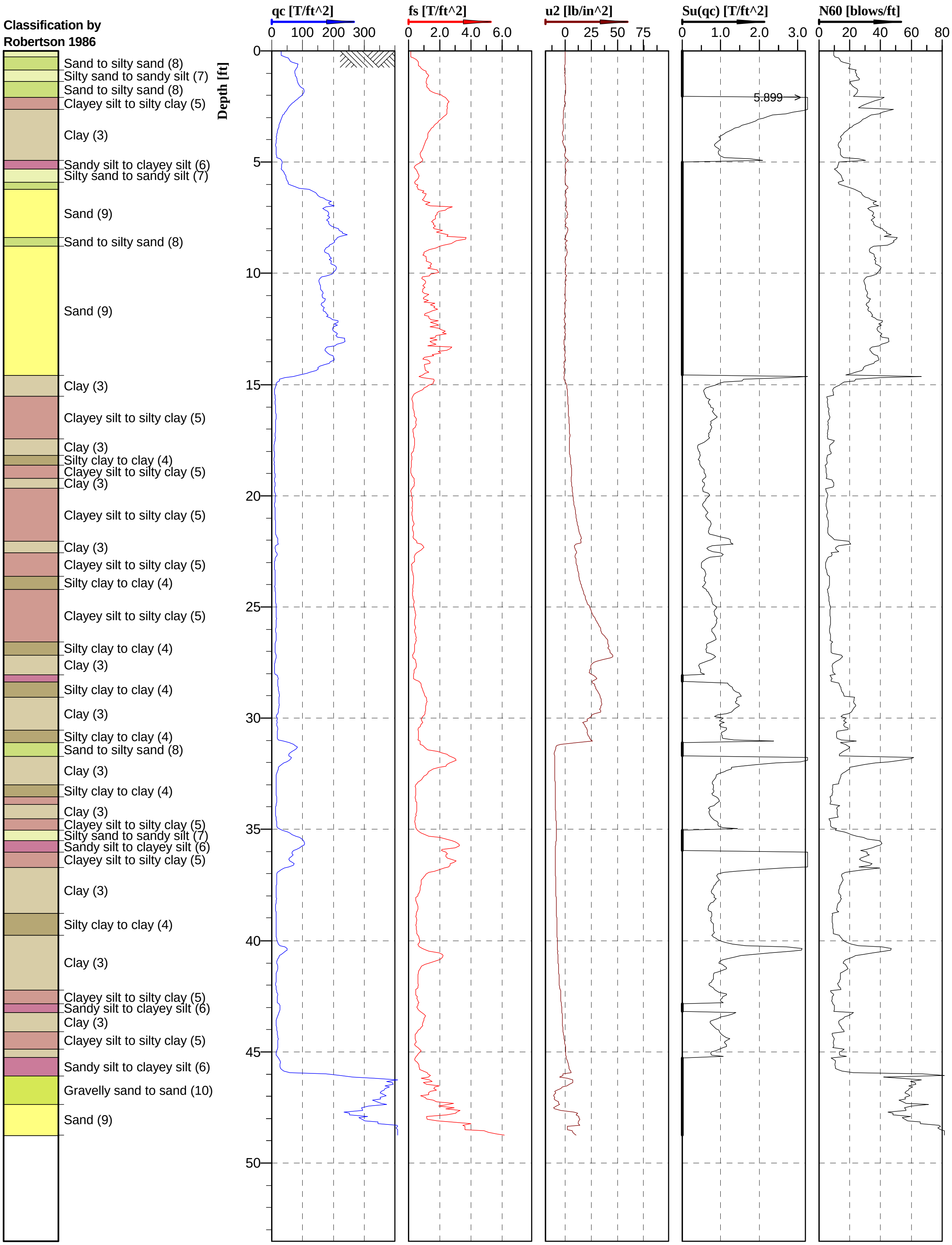
Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-4
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-4.cpd	



U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

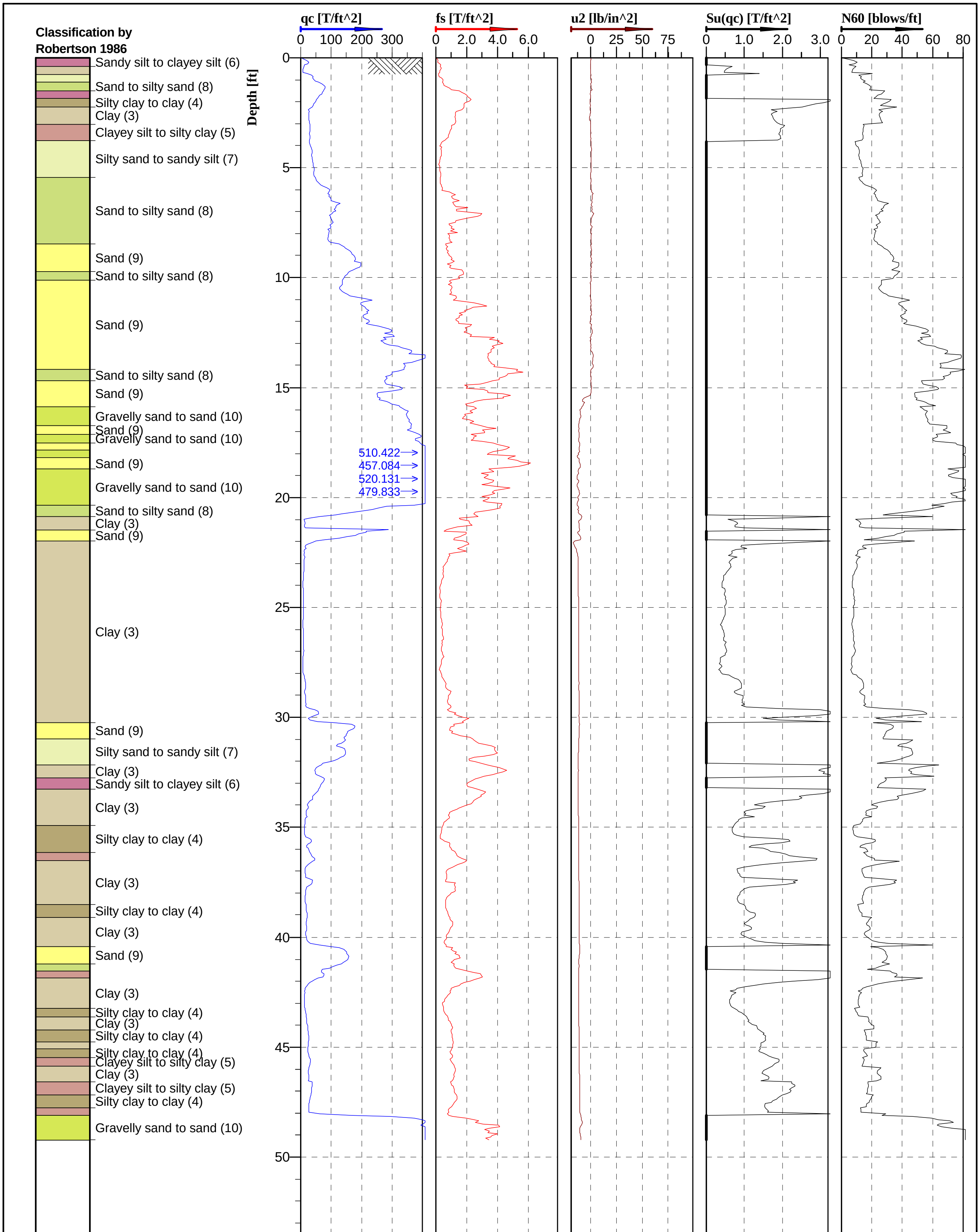
Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-5
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-5.cpd	



CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

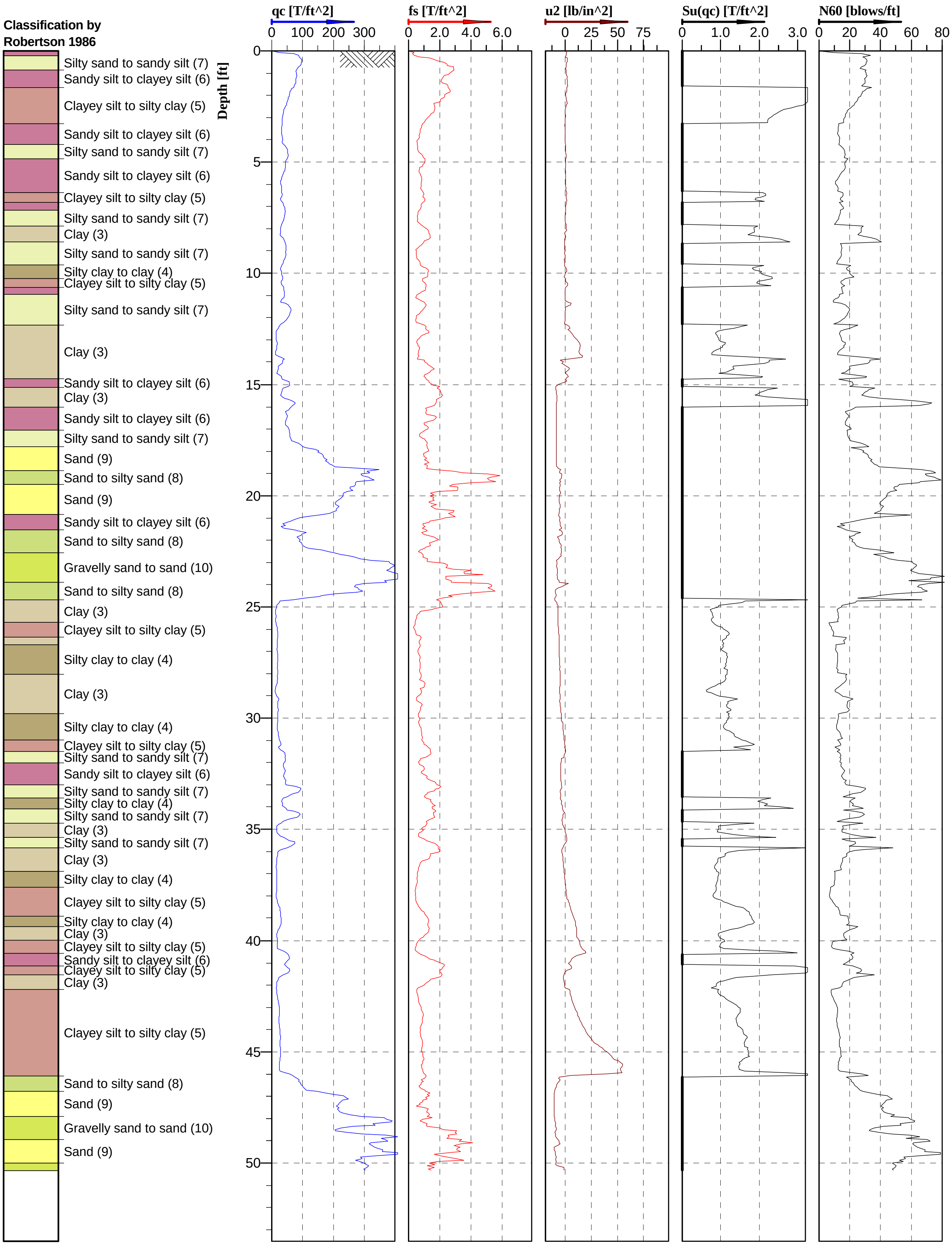
Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-6
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-6.cpd	

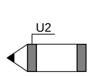


U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-7
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter MedicalCenter		Page: 1/1	Fig:
		File: CPT-7.cpd	

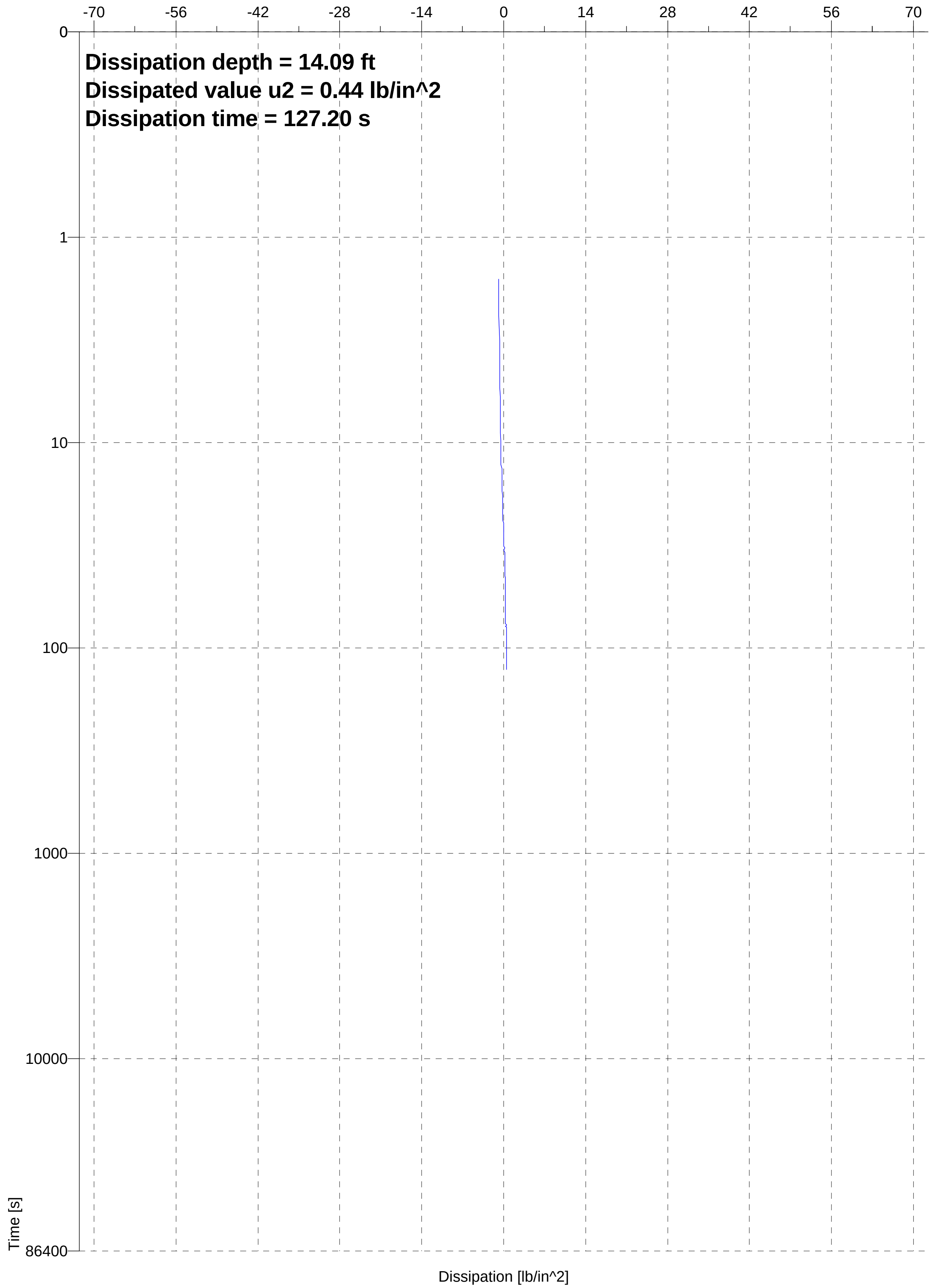




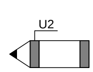
CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-8
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-8.cpd	

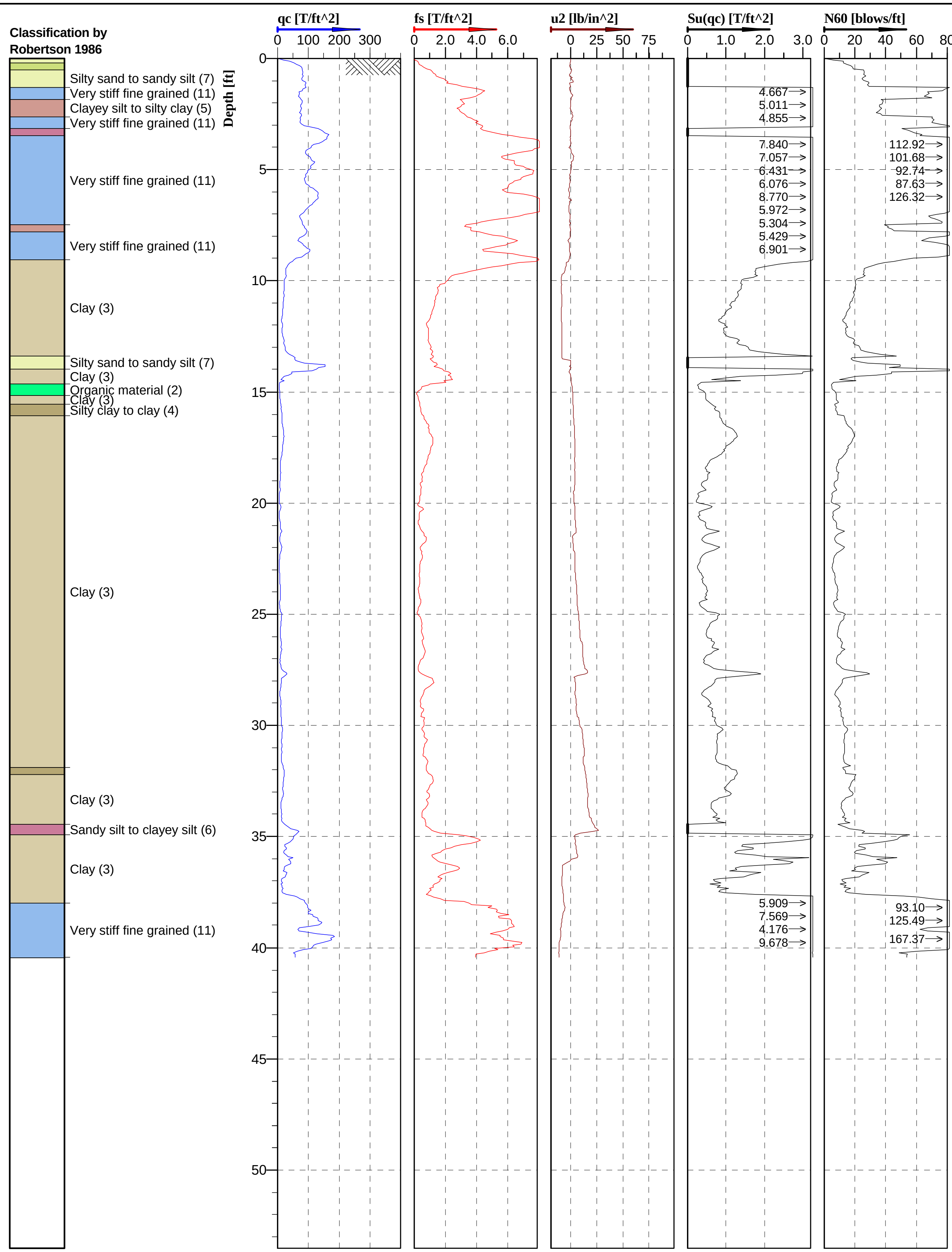


CALIFORNIA PUSH TECHNOLOGIES INCORPORATED



Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-8
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-8.cpd	

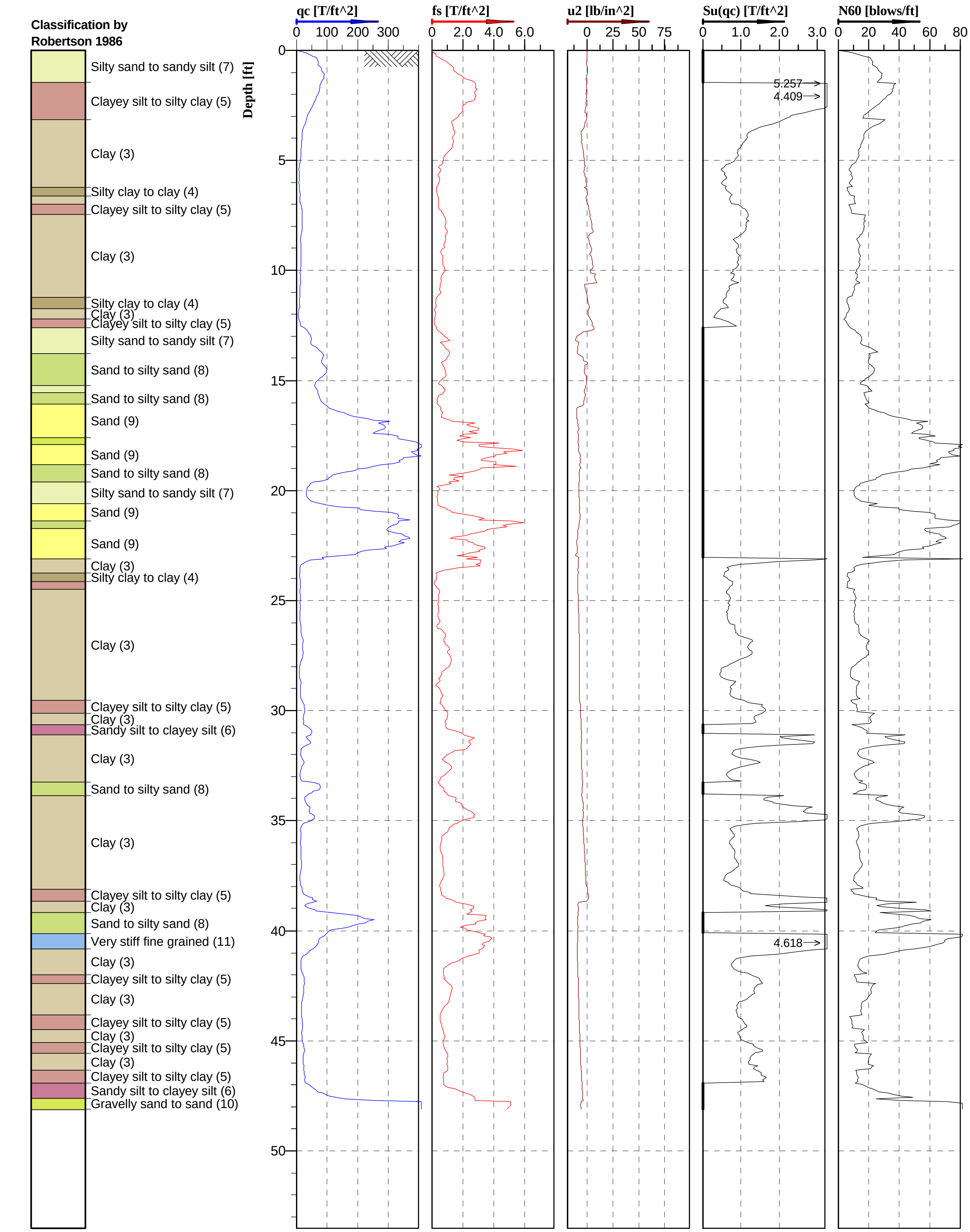


CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-10
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-10.cpd	

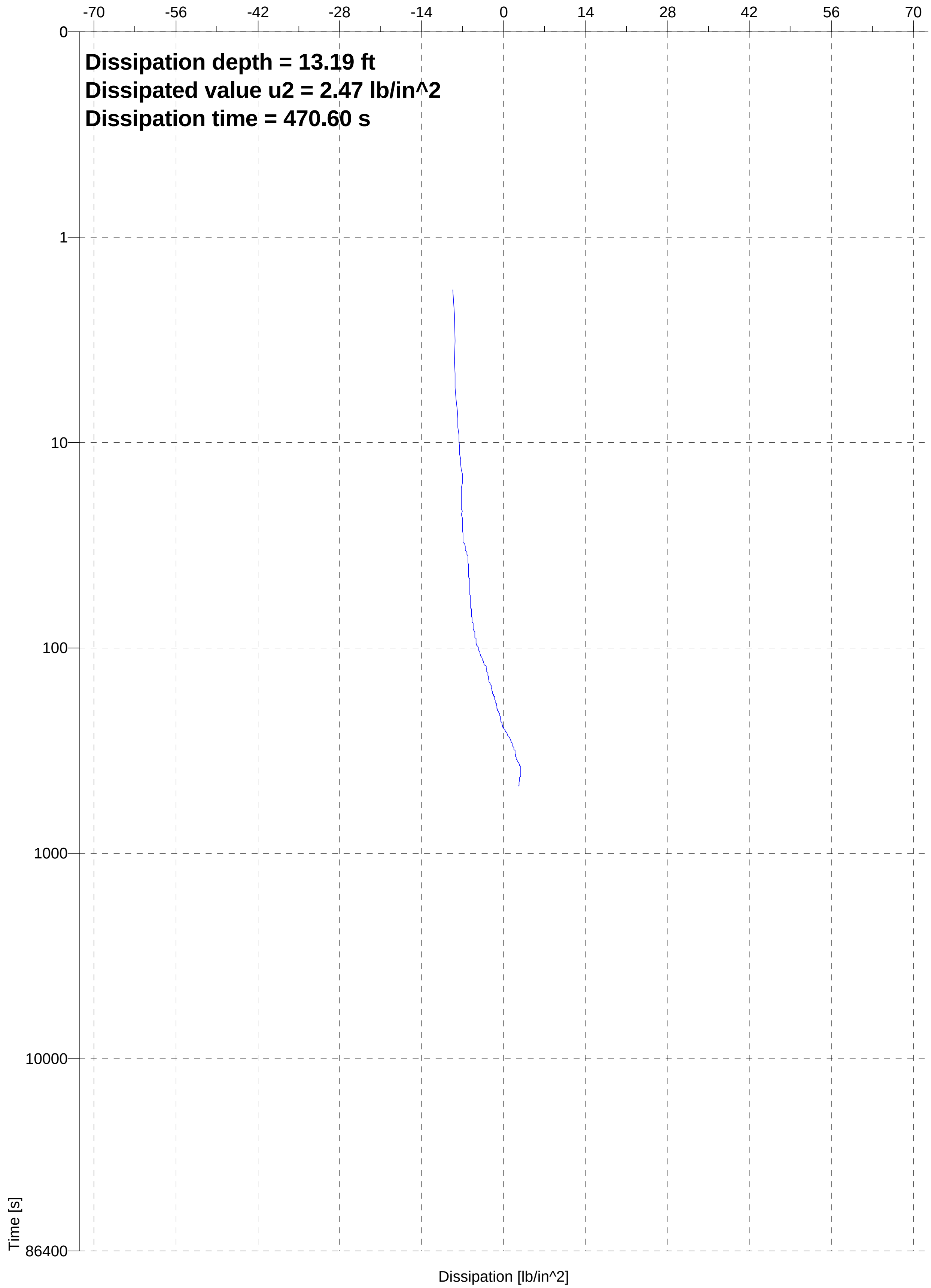


CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

U2

Cone No: 3794
Tip area [cm2]: 10
Sleeve area [cm2]: 150

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-11
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-11.cpd	



CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

Location: Santa Rosa, California	Position:	Ground level:	Test no: CPT-11
Project ID: 6486.2.006.01	Client: Engeo	Date: 10/15/2008	Scale: 1 : 75
Project: Sutter Medical Center		Page: 1/1	Fig:
		File: CPT-11.cpd	

CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

California Push Technologies Inc.
104 Constitution Drive Suite 2
Menlo Park CA 94025
(C-57 License #884827)

office: 650 854 0300
fax: 650 854 0301

www.cptinc.com

Cone penetration testing and soil sampling methods description.

Rig Description

Our services are based on the state-of-the-art, Geoprobe Model 6625CPT rig, a limited-access, self-anchoring, 20-ton push capacity, track-mounted push platform for dedicated Geotechnical CPT applications with the unique and valuable added ability to quickly perform intermittent or continuous soil sampling.

Weight = ~ 9,500 pounds
Surface load = ~ 4.5 psi
Push capacity = ~ 20 tons; self-anchoring achieved using 10- or 15-inch diameter helical soil anchors driven 4- to 10-feet into the soil
Sampling hammer percussion rate = 32 Hz & 20,000 lbs force/blow
Length = ~ 12 feet; Width = ~ 7 feet
Height (folded) = 7 feet; Height (unfolded) = 14 feet

CPT Description

Our Geoprobe 6625CPT incorporates the Swedish-made Geotech AB Cone Penetration Testing tools which meet the ASTM D-5778 Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils. Cones have 10 cm^2 tips and 150 cm^2 friction sleeves, and include a porous filter and pressure sensor located in the u_2 position directly behind the cone. The cone and porous filter are saturated under vacuum with glycerin to promote rapid equilibration with in-situ pore pressures. Cones are advanced at the ASTM standard rate of 2 cm/second. Baseline readings are performed both before and after each push to check for load cell drift. The cone measures bearing (max load = 100 MPa ~ 1044 TSF), friction sleeve (max load = 1.0 MPa ~ 10.4 TSF), and dynamic pore pressure (max load = 2.5 MPa ~ 363 psi) at 2 cm or 4 cm intervals (client's choice) and this data is plotted in real-time and recorded on a laptop computer adjacent to the push platform. Holes are grouted upon completion of each push, or at the end of each day, as site conditions and regulations warrant.

The basic equation to determine the depth to the free water surface from the pore pressure dissipation test is;

Depth to phreatic surface = [Dissipation depth] – [equilibrium pore pressure / unit weight of H2O x unit conversation factor]

…where;

1) Surface elevation is always assumed to be 0 feet
2) Dissipation depth = the depth (feet) below surface elevation where the cone advancement was paused while waiting for equilibrium pore pressure to be achieved
3) Equilibrium pore pressure = the pore pressure after an elapsed time where no increase or decrease in pore pressure is occurring, in pounds per square inch (psi)
4) Unit weight of water = 62.3 pounds per cubic foot (lb/ft^3)
5) Unit conversion factor (for dimensional analysis): 1 psi = 144 lb/ft^3

From the dissipation plots, simply read the dissipation depth and dissipated pressure for the values to plug into the equation above. On the plots, pore pressure (psi) is on the abscissa and log time (seconds) is on the ordinate.

Sampling Description

Geoprobe® brand Dual Tube Sampling Systems are efficient methods of collecting continuous soil cores with the added benefit of a cased hole. Dual tube sampling uses two sets of probe rods to collect continuous soil cores. One set of rods is driven into the ground as an outer casing (2.2 or 3.25 inches in diameter). These rods receive the driving force from the hammer and provide a sealed hole from which soil samples may be recovered without the threat of cross contamination. The second, smaller set of rods are placed inside the outer casing. The smaller rods hold a sample liner in place as the outer casing is driven one sampling interval. The small rods are then retracted to retrieve the filled liner. Soil samples are collected in 1.85-inch diameter or 1.125-inch diameter clear PVC sample sheaths.

Interpretations

Soil behavior type (SBT), SPT N60 energy ratio, undrained shear strength, OCR, and unit weights are calculated and/or are interpretations generated by the CPT-Pro software based on empirical relationships derived in the following references;

P.K. Robertson, R.G. Campanella, D. Gillespie, and J. Greig, 1986, Use of Piezometer Cone Data, Proceedings of the ASCE Specialty Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering; pp. 1263-1280.

P.K. Roberston, 1990, Soil Classification Using the Cone Penetration Test, Canadian Geotechnical Journal, 27(1), pp. 151-158.

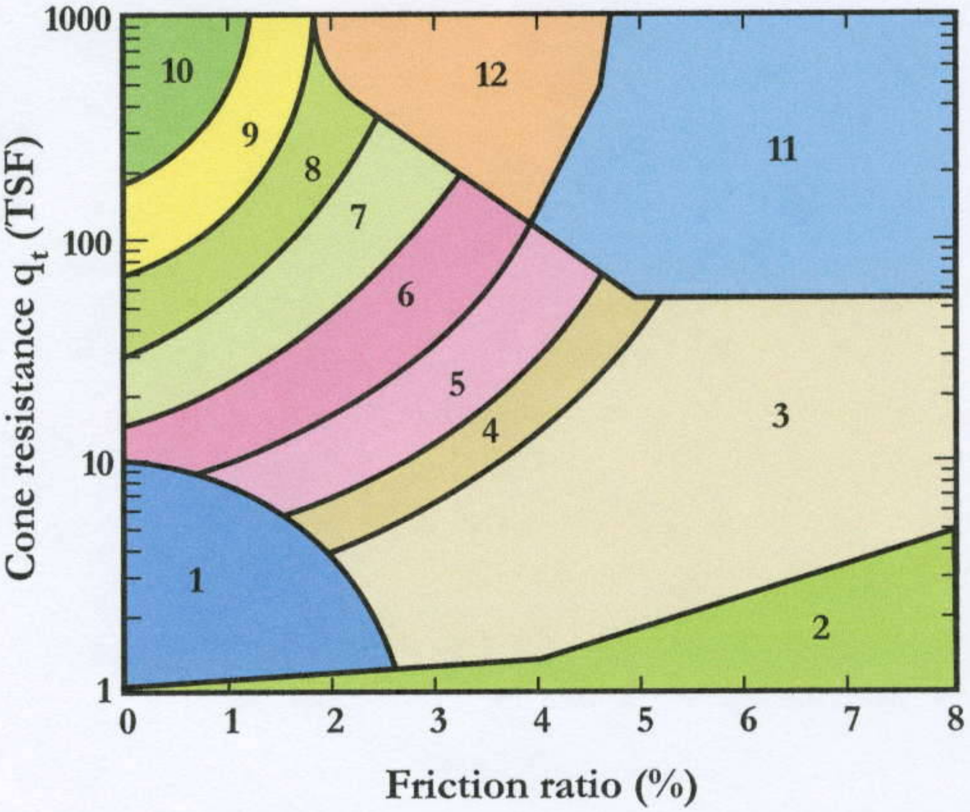
T. Lunne, P.K. Robertson, and J.J.M. Powell, 1997, Cone Penetration in Geotechnical Practice, Taylor and Francis Publishing.

CPT Inc. makes no recommendation on which soil behavior type analysis is "most-correct". The engineer should be aware of the limitations of using CPT data to derive soil behavior type and other engineering parameters and is encouraged to review the above references to better understand the applicability and limitations of CPT data. It is sometimes not possible to determine soil type based solely on tip resistance, sleeve friction, and dynamic pore pressure response, and confirmatory samples may be required.

Please do not hesitate to contact CPT Inc. if you have questions.

Sincerely,
John Rogie

President
California Push Technologies, Inc.



Zone	Soil Behavior Type
1	sensitive fine grained
2	organic material
3	clay
4	silty clay to clay
5	clayey silt to silty clay
6	sandy silt to clayey silt
7	silty sand to sandy silt
8	sand to silty sand
9	sand
10	gravelly sand to sand
11	very stiff fine grained (overconsolidated or cemented)
12	sand to clayey sand (overconsolidated or cemented)

Source: Robertson, P.K., Campanella, R.G., Gillespie, D., and Greig, J., 1986, Use of Piezometer Cone Data. Proceedings of the ASCE Specialty Conference In Situ 86: Use of In Situ Tests in Geotechnical Engineering.

CALIFORNIA PUSH TECHNOLOGIES INCORPORATED

Soil Behavior Type (SBT) Model

APPENDIX A2

ENGEO INCORPORATED (2004 AND 2005)

Exploratory Boring Logs and Cone Penetration Test Logs

Borings B-1 to B21 and Borings 2-B01 to 2-B11
CPT Logs 2-CPT01 to 2-CPT28

6486.200.601
November 24, 2008

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark brown, very stiff, moist, trace fine to coarse grained sand and gravel.				
		1-1-1			28		84	17.9
	1	1-2-2 1-2-1		Clayey SAND (SC), brown, very stiff, moist, with some silt, fine to medium sand.	27			
5	2	1-3-2 1-3-1		Clayey SAND to Sandy CLAY (CL-SC), brown, medium stiff, moist.	13			21.2
10	3	1-4-1		Becomes wet, grades with some silt. ▽	9		87	31.3
	4							
15	5	1-5-1		Sandy CLAY (CL), brown, soft, wet, fine to coarse sand, some fine gravels.	5		80	39.3
20	6	1-6-2 1-6-1		Becomes soft to medium stiff, no gravels.	6			
				Bottom of hole at approximately 20 $^{1}/_{2}$ feet. Groundwater encountered at 12 feet during drilling.				
	7							
25	8							
30	9							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 1

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A1

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark brown, stiff, moist, with fine to coarse grained sand, trace fine to coarse gravel.				
		2-1-2 2-1-1			17			
	1			Clayey SAND (SC), brown, loose to medium dense, moist, fine to medium grained sand, trace fine gravel.				
		2-2-1			15		94	24.4
5				Silty CLAY with sand (CL) dark brown, medium stiff, moist.				
	2	2-3-1			9			
10	3			Clayey SAND (SC), brown, loose, moist to wet, with trace fine to coarce gravel				
		2-4-1			7			
	4							
15				Becomes very loose, increasing gravels, wet.				
	5	2-5-1			5			
20	6			Clayey SAND (SC), brown, loose, wet, fine to coarse grained sand, with fine to coarse grained gravels.				
		2-6-1			5			
	7							
25				CLAY with silt (CL), brown, stiff, moist to wet, trace fine to coarse grained sand and fine gravel.				
	8	2-7-2 2-7-1			13			
30	9			Clayey SAND (SC), dark gray, loose to very loose, wet, fine sand.				
		2-8-2						

ENGEO INCORPORATED
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SUTTER MEDICAL CENTER DEVELOPMENT
SANTA ROSA, CALIFORNIA

BORING NO.: B- 2
LOGGED BY: J. Ollerton
PROJ. NO.: 6486.2.001.01
CHECKED BY JL

FIGURE NO. A2

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		2-8-1			6			
	10			Bottom of boring at approximately 31 1/2 feet. Groundwater encountered at approximately 11 feet during drilling.				
35	11							
40	12							
	13							
45	14							
50	15							
	16							
55	17							
60	18							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 2

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A2

DATE OF BORING: October 25, 2004

SURFACE ELEVATION: Approx. 158.0 feet (48.2 meters)

DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT	qu UNCON STRENGTH (TSF) * FIELD PENET. APPROX.	N S.P.T. BLOWS/FT *MODIFIED FOR 3" O.D. SAMPLER
0		Silty CLAY (CL), dark brown, stiff, moist.				
	3-1-1		96	21		17
		Grades to brown, with fine grained sand.				
	3-2-2					
	3-2-1		96	24		15
5		Clayey SAND (SC), olive brown with red brown mottling, medium stiff, moist, fine to medium grained sand.				
	3-3-1					10
10						
	3-4-1		96	24		15
15		Silty CLAY (CL), brown, stiff, moist to wet, with some fine grained sand.				
	3-5-1					13
20		Clayey SAND (SC), brown, very loose, wet.				
	3-6-1		74	47		4
25		CLAY with silt (CL), dark olive gray, medium stiff, wet.				
	3-7-1					10
30		Sandy CLAY with silt (CL), olive gray with brown mottling, medium stiff, wet.				

ENGEO INCORPORATED

SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

WELL NO.: B- 3

DATE: November 2004

JOB NO.: 6486.2.001.01 JK

FIGURE NO. A3

DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158.0 feet (48.2 meters) DESCRIPTION	MONITORING WELL CONSTRUCTION DETAIL	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT	qu UNCON STRENGTH (TSF) * FIELD PENET. APPROX.	N S.P.T. BLOWS/FT *MODIFIED FOR 3" O.D. SAMPLER
	3-8-1				74	44		11
35			Clayey SAND (SC), dark gray, loose, wet, fine to coarse grained sand, trace fine gravels.					
	3-9-1							13
40			Poorly graded sand with gravel (SP), dark gray, medium dense, wet, with fine to coarse grained sand and fine gravel.					
	3-10-1				92	30		24
			Bottom of boring at approximately 41 $^{1}/_{2}$ feet. Groundwater encountered at approximately 19 feet during drilling.					
45								
50								
55								
60								

ENGEO
INCORPORATED

SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

WELL NO.: B- 3

DATE: November 2004

JOB NO.: 6486.2.001.01 JK

FIGURE NO. A3

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark brown, stiff to very stiff, moist, some fine to medium grained sand.				
		4-1-1			23			
				Increasing sand content.				
	1	4-2-1			26		97	16.5
		4-3-1		Clayey SAND (SC), brown, loose to medium dense, moist, fine to coarse grained sand, some fine grained gravel.			104	15.4
5								
	2							
				Silty CLAY with sand (CL), brown, medium stiff, moist to wet, with fine grained sand.				
10	3	4-4-1			10			
				▽				
	4							
				Clayey SAND (SC), brown, very loose, wet, fine to coarse grained sand, some fine grained gravels.				
15		4-5-1			4			
	5							
				Sandy CLAY (CL), brown, medium stiff, wet, fine to medium grained sand, trace fine gravels.				
20	6	4-6-1			10			
	7							
				Becomes olive gray with olive brown mottling.				
25		4-7-1			9		90	31.6
	8							
	9			Silty CLAY (CL), olive gray, medium stiff, with fine grained sand, wet.				
30		4-8-1			9			

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10							
35		4-9-1			10		73	47.6
	11							
	12	4-10-2		CLAY with silt (CL), dark olive gray, stiff, moist.				
40		4-10-1			13			
				Bottom of boring at approximately 40 $^{1}/_{2}$ feet. Groundwater encountered at approximately 11 feet during drilling.				
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 4

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A4

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

DATE OF BORING: October 25, 2004

SURFACE ELEVATION: Approx. 159 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Asphalt driveway.				
		5-1-1		CLAY with silt (CL), dark brown to dark gray, stiff, moist, with fine to coarse grained sand and trace fine gravel. (FILL)	10			
	1	5-2-1		Sandy CLAY to Clayey SAND (CL-SC), brown, medium stiff to stiff/loose, moist, fine grained sand.	8			20.3
5	2	5-3-1			10			
10	3	5-4-1		Increasing sand content. ∇	8			
	4							
15	5	5-5-1		Poorly graded SAND with gravel (SP), dark brown, medium dense, wet, with fine grained sand, trace medium to coarse grained sand.	21			
20	6	5-6-1		Silty CLAY (CL), olive brown, soft, wet, some fine sand.	4			
	7			Bottom of boring at approximately 21½ feet. Groundwater encountered at approximately 11½ feet during drilling.				
25	8							
30	9							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 5

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY: JK

FIGURE NO. A5

DATE OF BORING: October 26, 2004

SURFACE ELEVATION: Approx. 161 feet (49 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY (CL), dark brown, very stiff, moist. (FILL)				
		6-1-1			16			15.1
				Clayey SAND (SC), brown, medium dense, moist, fine to medium grained.				
	1	6-2-1			16			
5								
	2	6-3-1			12			15.5
10	3			Poorly graded SAND (SP), olive brown, loose, moist, fine to medium grained.				
		6-4-1		∇	9			
	4							
15				Sandy CLAY (CL), brown, soft, wet.				
	5	6-5-1			3			
20	6			Clayey SAND (SC), brown, very loose to loose, wet, fine grained, some medium to coarse sand and fine gravel.				
		6-6-1			4			
	7							
25				Sandy CLAY (CL), dark olive brown, stiff, wet.				
	8	6-7-1			9			
	9							
30				Clayey Sand (SC), olive brown to olive gray, very loose, wet, with interbedded sandy clay; fine grained.				

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 6

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A6

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 12/20/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 26, 2004 SURFACE ELEVATION: Approx. 161 feet (49 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		6-8-1			3			
	10			Bottom of boring at approximately $3\frac{1}{2}$ feet. Groundwater encountered at approximately 12 feet during drilling.				
35	11							
40	12							
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

ENGEO INCORPORATED
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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 6

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A6

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 12/20/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 160 feet (49 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY (CL), dark brown, very stiff, dry to moist. (FILL)				
		7-1-1			37		89	10.2
	1	7-2-2		Clayey SAND with gravel (SC), brown to dark brown, dense, damp, fine to coarse grained, some fine gravels.				
		7-2-1			48		107	10.1
5				Hard drilling encountered between 5 to 15 feet				
	2	7-3-1		Poorly graded SAND with gravel (SP), light brown, very dense, damp.	54			
10	3			Becomes dense and wet.				
		7-4-1		▽	44			11.1
	4							
15				Increasing fines content.				
	5	7-5-1			57			
20	6			CLAY with sand (CL), dark brown, stiff, saturated, with some silt and trace fine gravel.				
		7-6-1			15			
	7			Bottom of boring at approximately 21 1/2 feet. Groundwater encountered at approximately 11 1/2 feet during drilling.				
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 7

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A7

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY with gravel (CL), dark brown, moist, very stiff. (FILL)				
		8-1-1			39			
	1			Clayey SAND (SC), olive brown, medium dense, moist, with fine to coarse grained sand, trace fine gravel.				
		8-2-1			25			
5								
	2			CLAY with sand (CL), dark brown, stiff, moist, with fine to coarse grained sand, and trace fine gravel.				
		8-3-1			20		88	22.8
				Sandy CLAY (CL), olive brown, soft, wet, fine grained sand.				
10	3	8-4-1		▽	5		80	38.5
	4							
				Becomes medium stiff.				
15		8-5-1			7		37	80.6
	5							
				Becomes stiff.				
20	6	8-6-2 8-6-1			14			
	7							
				Grades to medium stiff.				
25		8-7-1			9			
	8							
	9			Poorly gradded SAND (SP), gray, very dense, wet, with fine to coarse grained sand, trace fine gravel, little to no fines.				
30		8-8-1			64			24.4

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 8

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A8

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
				Bottom of boring at approximately 30 $^1/_2$ feet. Groundwater encountered at approximately 11 feet during drilling.				
	10							
35	11							
40	12							
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 8

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A8

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY with gravel (CL), dark brown to brown, stiff, moist. (FILL)				
		9-1-2 9-1-1			18			
	1	NR			21			
5				Sandy CLAY (CL), dark olive brown with gray mottling, some silt, stiff, moist.				
	2	9-2-1			16			
10	3	9-3-2 9-3-1		Clayey SAND to Sandy CLAY (CL-SC), olive brown to dark brown, soft to medium stiff / loose, very moist to wet.	7			
	4							
15	5	9-4-2 9-4-1			5			
20	6	9-5-2 9-5-1		Grades to olive gray with brown mottling, some silt.	10			
	7							
25	8	9-6-2 9-6-1		Clayey SAND with gravel (SC), yellow brown, dense, moist to wet.	34			
30	9	9-7-2		CLAY with silt (CL), yellow brown, very stiff, moist, medium plasticity				

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 9

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A9

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		9-7-1			26			
	10			Bottom of boring at approximately 31 $^{1}/_{2}$ feet. Groundwater encountered at 11 feet during drilling.				
35	11							
40	12							
	13							
45	14							
50	15							
	16							
55	17							
60	18							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B- 9

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A9

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
			DATE OF BORING: October 27, 2004				
			SURFACE ELEVATION: Approx. 157 feet (48 meters)				
0			Silty CLAY (CL), dark grayish brown, with fine sand, trace fine gravels. (FILL)				
		10-1-2 10-1-1	Silty SAND (SM) with clay, brown, fine to medium grained, moist.	15			
	1	10-2-2 10-2-1		23		75	10.5
5	2	10-3-1		16			
10	3	10-4-1	Silty CLAY (CL), olive brown, medium stiff, very moist, with fine grained sand. ▽			73	43.2
15	4	10-5-1					30.6
20	5, 6	10-6-2 10-6-1		24		90	29.8
			Bottom of boring at approximately 20 1/2 feet. Groundwater encountered at approximately 11 feet during drilling.				
25	7, 8						
30	9						

ENGEO_BORELOG 648620010l_SUTTERMEDICALCENTER.GPJ 11/29/04

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-10

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A10

DATE OF BORING: October 26, 2004

SURFACE ELEVATION: Approx. 159.0 feet (48.5 meters)

DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT	qu UNCON STRENGTH (TSF) * FIELD PENET. APPROX.	N S.P.T. BLOWS/FT *MODIFIED FOR 3" O.D. SAMPLER
0		Clayey SAND (SC), yellow brown to dark brown, damp, medium dense, with fine to coarse grained sand and gravel. (FILL)				
	11-1-1			14		22
		Clayey SILT with sand (ML), yellow brown, very stiff, moist.				
	11-2-1					25
5		Poorly gradded SAND and gravel (SP), brown, medium dense, damp, fine to coarse grained sand and gravel.				
	11-3-1					24
10		Sandy CLAY (CL), yellow brown, stiff to very stiff, moist, with silt, fine grained sand.				
	11-4-2					
	11-4-1		96	26		22
15		Sandy CLAY (CL), brown, soft, wet, fine grained sand.				
	11-5-2					
	11-5-1		79	41		5
20		Become olive brown, soft to medium stiff, wet, decreasing sand content.				
	11-6-1					6
25		CLAY with silt (CL), olive gray, very stiff, moist.				
	11-7-2					
	11-7-1		83	34		31
30		Clayey SAND (SC), yellow brown, very dense, very moist to wet, fine to coarse grained sand , some fine to coarse grained gravel.				
	11-8-2					

WELL WITH BORING INFO 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

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SANTA ROSA, CALIFORNIA

WELL NO.: B-11

DATE: November 2004

JOB NO.: 6486.2.001.01 JK

FIGURE NO. A11

DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 26, 2004 SURFACE ELEVATION: Approx. 159.0 feet (48.5 meters) DESCRIPTION	MONITORING WELL CONSTRUCTION DETAIL	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT	qu UNCON STRENGTH (TSF) * FIELD PENET. APPROX.	N S.P.T. BLOWS/FT *MODIFIED FOR 3" O.D. SAMPLER
	11-8-1							92
			Bottom of boring at approximately 31 1/2 feet. Groundwater encountered at approximately 14 feet during drilling.					
35								
40								
45								
50								
55								
60								

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SUTTER MEDICAL CENTER DEVELOPMENT
SANTA ROSA, CALIFORNIA

WELL NO.: B-11
DATE: November 2004
JOB NO.: 6486.2.001.01 JK

FIGURE NO.
A11

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark brown, stiff, moist, some fine sand.				
		12-1-1			17			
		12-2-1					103	20.1
	1							
5		12-3-2 12-3-1		Sandy CLAY (CL), olive brown with brown mottling, medium stiff to stiff, moist, fine grained sand.	12		88	29.3
	2							
10	3	12-4-2 12-4-1		Clayey SAND (SC), brown, loose, moist to wet, fine to medium grained, trace fine gravel. ▽	7		90	31.0
	4							
15		12-5-2 12-5-1		Sandy CLAY (CL), brown, medium stiff, wet, with silt and trace gravel.	8		89	30.5
	5							
20	6	12-6-1		Clayey SAND with gravel (SC), dark brown, medium dense, wet, with silt, fine to coarse grained sand, some fine to coarse grained gravel.	16			
				Bottom of boring at approximately 20 1/2 feet. Groundwater encountered at approximately 10 1/2 feet during drilling.				
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-12

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY JK

FIGURE NO. A12

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY (CL), dark brown, stiff, moist, fine to coarse grained sand, trace fine gravel.				
		13-1-1			16			
	1	13-2-1			14		89	27.3
5								
	2	13-3-1			15			
				Bottom of boring at approximately 6 1/2 feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-13

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A13

ENGEO_BORELOG 648620010I_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 25, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY (CL), brown with red brown mottling, medium stiff, moist.				
		14-1-1			11		86	19.4
	1			Clayey SAND (SC), brown, loose to medium dense, moist.				
		14-2-1			15			
5								
	2	14-3-1			13			
				Bottom of boring at approximately 6 $^{1}/_{2}$ feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-14

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A14

ENGEO_BORELOG 6486200101_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 28, 2004 SURFACE ELEVATION: Approx. 161 feet (49 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Sandy CLAY (CL), dark brown, stiff, moist, with fine to medium grained sand and fine to coarse grained gravel. (FILL)				
	1			Bottom of boring at approximately 2 1/2 feet. Groundwater not encountered during drilling.				
5								
	2							
10	3							
	4							
15								
	5							
20	6							
	7							
25								
	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT
SANTA ROSA, CALIFORNIA

BORING NO.: HB-15
LOGGED BY: J. Ollerton
PROJ. NO.: 6486.2.001.01
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FIGURE NO. A15

ENGEO_BORELOG 648620010l_SUTTERMEDICALCENTER.GPJ 11/29/04

DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	DRY UNIT WEIGHT (PCF)	MOIST. CONTENT % DRY WEIGHT	qu UNCON STRENGTH (TSF) * FIELD PENET. APPROX.	N S.P.T. BLOWS/FT *MODIFIED FOR 3" O.D. SAMPLER
0		Asphalt Concrete				
	16-1-2 16-1-1	Sandy CLAY with gravel, dark brown, soft to medium stiff, very moist, fine to coarse grained sand, fine to coarse gravel, some asphalt fragments. (FILL)		15		6
	16-2-1	Silty CLAY (CL), dark brown, stiff, moist, with some sand and fine grained gravel.	106	21		17
5	16-3-1					
10	16-4-2 16-4-1	Becomes very stiff, no gravels.	96	24		26
		Clayey SAND (SC), brown, very loose, wet, fine to medium sand.				
15	16-5-1	Silty Clay (CL), brown, soft, wet, some fine to coarse grained sand, trace fine gravel.	82	38		5
20	16-6-1	Decreasing silt content, becomes medium stiff, very moist to wet, some fine sand.	90	32		8
		Bottom of boring at approximately 21 1/2 feet. Groundwater encountered at approximately 13 feet during drilling.				
25						
30						

DATE OF BORING: October 26, 2004

SURFACE ELEVATION: Approx. 157.0 feet (47.9 meters)

LOG, LOCATION AND TYPE OF SAMPLE — MONITORING WELL CONSTRUCTION DETAIL — IN PLACE

DATE OF BORING: October 27, 2004

SURFACE ELEVATION: Approx. 162 feet (49 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark grayish brown, stiff, some fine to coarse sand, trace fine gravels, moist.				
		17-1-1		(FILL)	15			
	1	17-2-1		Sandy CLAY (CL), dark brown to black, medium stiff, fine grained sand, moist.	12		95	7.3
5		17-3-2						
	2	17-3-1			13			
				Bottom of boring at approximately 6 $^1/_2$ feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SANTA ROSA, CALIFORNIA

BORING NO.: B-17

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A17

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 160 feet (49 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Silty CLAY (CL), dark brown, stiff, moist, with gravel. (FILL)				
		18-1-1			10			
	1			Clayey SAND (SC), dark brown, dense, moist, fine to coarse grained sand, fine to coarse grained gravels.				
		18-2-1			35			
5				Grades to yellow brown and medium dense.				
		18-3-2 18-3-1			24			
	2			Bottom of boring at approximately 6 1/2 feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-18

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A18

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: October 27, 2004 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE: DRY UNIT WEIGHT (PCF)	IN PLACE: MOIST. CONTENT % DRY WEIGHT
0				CLAY with silt (CL), dark brown, stiff, moist. (FILL)				
		19-1-1			14			
	1			Clayey SAND with gravel (SC), brown, medium dense, damp, fine to coarse grained sand, fine to coarse grained gravels.				
		19-2-1			38			
5				Becomes loose, trace gravels.				
	2	19-3-1			13		103	21.1
				Bottom of boring at approximately 6 ½ feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-19

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A19

ENGEO_BORELOG 648620010l_SUTTERMEDICALCENTER.GPJ 11/29/04

DATE OF BORING: October 27, 2004

SURFACE ELEVATION: Approx. 160 feet (49 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Asphalt parking lot.				
		20-1-1		CLAY (CL), dark gray, very stiff, moist, with fine to coarse grained sand , trace fine to coarse grained grave. (FILL)	29			
	1	20-2-1		Sandy CLAY (CL), dark gray with olive brown mottling, medium stiff to stiff, moist.	11			
5	2	20-3-1			13			
				Bottom of boring at approximately 6 $^1/_2$ feet. Groundwater not encountered during drilling.				

ENGEO_BORELOG 648620010I_SUTTERMEDICALCENTER.GPJ 11/29/04

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-20

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

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FIGURE NO. A20

DATE OF BORING: October 27, 2004

SURFACE ELEVATION: Approx. 160 feet (49 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Asphalt parking lot.				
				CLAY (CL), dark gray, very stiff, moist, with fine to coarse grained sand and gravel.				
		21-1-1		(FILL)	24			
	1	21-2-1			23			
5				Sandy CLAY (CL), dark olive gray, medium stiff, moist, fine to coarse grained sand, trace fine to coarse gravels.				
	2	21-3-1			11			
				Bottom of boring at approximately 6 $^1/_2$ feet. Groundwater not encountered during drilling.				
10	3							
	4							
15	5							
20	6							
	7							
25	8							
30	9							

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SUTTER MEDICAL CENTER DEVELOPMENT

SANTA ROSA, CALIFORNIA

BORING NO.: B-21

LOGGED BY: J. Ollerton

PROJ. NO.: 6486.2.001.01

CHECKED BY Jk

FIGURE NO. A21

ENGEO_BORELOG 648620010l_SUTTERMEDICALCENTER.GPJ 11/29/04

DATE OF BORING: May 25, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0	1			SANDY CLAY (CL), brown.				
5	2	B1@4.5' B1@5'		CLAYEY SAND (SC), brown, loose, subangular to subrounded, trace fine gravels.	9	1.0*	88	33.3
10	3	B1@8.5' B1@9'		SILTY CLAY (CL), olive brown, medium stiff, trace sand, trace pebbles, trace oxidation, small inclusions of organics.	10	0.8	89	32.6
15	4	B1@13.5'		SANDY CLAY (SC), brown, soft, trace gravels.	3	0.5	93	29.1
	5	B1@16.5' B1@17'		SANDY SILT (ML), olive brown, medium stiff, small inclusions of organics.	6	2.0*	80	44.0
20	6, 7	B1@21'		SILTY CLAY (CL), mottled olive brown, soft, some sand, small inclusions of organics.	5	1.0*		43.1
25	8	B1@25'		SANDY CLAY (CL), brown, medium stiff, fine to course sand, subangular to subrounded, small inclusions of organics.	7			
30	9	B1@29'		SILTY SAND (SM), brown, trace gravels.	39		97	27.8

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B1

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A01

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10			SILTY CLAY (CL), mottled blue-brown, stiff, with sand, some trace fine gravels, small inclusions of organics.				
		B1@33'			17	2.25*		
35				Gravels (GP)				
	11			SILTY CLAY (CL), mottled blue-gray, stiff, trace sand, trace fine gravels, small inclusions of organics.				
		B1@37'			6	0.5	74	48.9
40	12			SILTY CLAY (CL), blue-gray, stiff with sand.				
		B1@41'			11			14.4
	13			Bottom of boring at approximately $41^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	14							
50	15							
	16							
55	17							
60	18							

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B1

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A01

ENGEO_BORELOG2 648620030I-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SANDY CLAY (CL), mottled olive-brown, soft, some sand, subangular to subrounded, trace pebbles subrounded.				
	1							
5	2	B2@6'			6		101	25.3
10	3							
	4	B2@13'		SILTY CLAY (CL) with sand, olive-brown, soft, small inclusions of organics.	6	0.5	87	35.1
15	5							
				CLAYEY SAND (SC), brown, very loose.				
		B2@18'		SILTY CLAY (CL) with sand, olive-brown, soft, small inclusions of organics.	5		83	40.3
20	6							
	7	B2@23'		SANDY CLAY (CL), mottled olive-brown, soft, fine sand, subangular to subrounded, small inclusions of organics, trace gravel.	4			
25	8			GRAVEL (GP), gray, blue, red, and brown, loose, subangular to subrounded.				
		B2@28'		GRAVELLY CLAY (CL) with sand, brown, medium stiff, some oxidation.	11		116	14.6
30	9							

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B2

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A02

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
				SILTY CLAY (CL), mottled olive-brown, stiff, small inclusions of organics, trace oxidation.				
	10	B2@33'			11	1.75*		
35	11							
		B2@37.5'		SILTY CLAY (CL), blue-gray, soft, some sand, small inclusions of organics.		1.0	74	47.0
		B2@38'		SAND (SP), olive-brown to blue-gray, subangular to subrounded.	7	1.0*	77	44.7
	12			SILTY CLAY (CL) with sand, blue gray, stiff.				
40		B2@39.5'			20			37.6
				Bottom of boring at approximately 40 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
	13							
45	14							
	15							
50	16							
55	17							
	18							
60								

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B2

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A02

ENGEO BORELOG2 648620030l-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DATE OF BORING: May 25, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SANDY CLAY (CL), brown.				
5	1	B3@6'		CLAYEY SAND (SC), olive-brown, loose, subangular to subrounded, trace oxidation.	6		91	28.0
10	3	B3@10.5' B3@11'		Small inclusions of organics.	5	0.75*	91	30.4
15	4			GRAVELLY SAND (SP), brown, medium dense, subangular to subrounded.				
	5	B3@16'			13			
		B3@17.5'		SANDY CLAY (CL), olive-brown, soft, subangular, trace gravel, subrounded, small inclusions of organics, trace oxidation.	4			30.4
20	6	B3@20'		SILTY CLAY (CL) with sand, mottled olive-brown and orange, soft, some oxidation, small inclusions of organics.				
		B3@21.5'			4		71	42.0
	7			SILTY SAND (SM), brown, subangular to subrounded.				
25	8	B3@26' B3@26.5'		SANDY SILT (ML), blue-grey, soft, trace pebbles, subrounded.	3			
30	9			SILTY SAND (SM), olive-grey, loose, subrounded.				

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

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EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A03

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 / SURFACE ELEVATION: Approx. 158 feet (48 meters) / DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B3@31'			6			29.4
	10							
35				SILTY CLAY (CL) with sand, olive-grey, very stiff, trace gravel, up to 1.5" in diameter, small inclusions of organics, trace oxidation.				
	11	B3@36'		SAND (SP), blue-grey, dense, some gravel, subangular to subrounded.	32	2.0*	126	11.7
40	12			CLAYEY GRAVEL (GC), olive-grey, medium dense, subangular to subrounded.				
		B3@41'		SANDY SILT (ML), blue-grey, stiff, fine sand, subangular to subrounded.	17		93	31.5
	13							
45	14	B3@45.5' B3@46'		SILT (ML), blue-grey, very stiff, trace fine sand, subangular to subrounded, trace oxidation, small inclusions of rootlets.	26		94	28.1
50	15	B3@50.5'		CLAYEY GRAVEL (GC), mottled olive-grey, red, and green, very dense.	50/6"			11.2
	16							
55	17	B3@56'		Grades to mottled green, blue, red, and olive, subangular gravels.	73			8.0
60	18	B3@61'		Grades to mottled olive-grey, brown, red, and green, subangular to subrounded gravels.	71			11.6

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A03

DATE OF BORING: May 25, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
65	19, 20						
			SILTY CLAY (CL), mottled olive-brown, trace sand.				
70	21	B3@70.5' B3@71'	SANDY SILT (ML), blue-green, very stiff.	36	4.5*	79	41.2
75	22, 23						
	24		SILT (ML), blue-green, very stiff, some sand, trace oxidation, small inclusions of rootlets.				
80		B3@80.5' B3@81'	SILTY SAND (SM), brown, dense, trace fine gravel, subangular to subrounded.	55	3.0*	86	35.5
85	25, 26		SILTY CLAY (CL), blue-grey, hard, some sand, some gravel. (Harder drilling.)				
90	27, 28	B3@90.5'		50/3"	4.5+*	100	24.6

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

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PROJ. NO.: 6486.2.003.01

FIGURE NO. A03

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 25, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
95	29							
				SILTY GRAVEL (GM) with sand, olive-brown, very dense, subangular to subrounded, trace oxidation.				
	30							
100								
	31	B3@101'			83			11.0
				Bottom of boring at approximately $101^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
105	32							
	33							
110								
	34							
115	35							
	36							
120								
	37							

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B3

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A03

DATE OF BORING: May 26, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			SILTY CLAY (CL), mottled dark brown and orange, stiff, some organics, trace sand, trace pebbles, trace oxidation.				
	1			15			
5			CLAYEY SAND (SC), mottled brown, blue, and red, very loose.				
	2	B4@6.5' B4@7'	SILTY CLAY (CL), mottled dark brown and olive, soft to medium stiff, some sand, some organics, trace fine gravels.	4		98	24.6
10	3		Grades to with sand, mottled olive-brown.				
		B4@11'		6		94	29.5
	4		SILTY SAND (SM), brown, subangular to subrounded.				
15		B4@14.5' B4@15'	SILTY CLAY (CL), mottled olive-brown, stiff, trace sand, fine to medium, small inclusions of organics, trace oxidation.	11	1.5*	84	36.4
	5						
		B4@18.5'	SILTY SAND (SM), mottled brown, red, and blue, loose, fine to coarse, subangular to subrounded.	6		87	35.0
20	6		SILTY CLAY (CL), mottled olive-brown, medium stiff, some sand, small inclusions of organics.				
	7	B4@23'		8	1.5*	87	37.0
25	8		Grades to with sand, dark brown, becomes stiff.				
		B4@27'		12	0.8	87	35.1
30	9		SILTY CLAY (CL), mottled olive-grey, soft, trace sand, small inclusions of organics, trace oxidation.				

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B4

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A04

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 26, 2005 SURFACE ELEVATION: Approx. 158 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B4@31'			5	1.25*	75	45.3
	10							
35				SILTY CLAY (CL), blue-grey, medium stiff, trace sand, small inclusions of organics, trace oxidation.				
		B4@35'			11			
	11							
	12	B4@39'			6			39.9
40				Bottom of boring at approximately $39\,^{1}/_{2}$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
	13							
45	14							
50	15							
	16							
55	17							
	18							
60								

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B4

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A04

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SILTY CLAY (CL), mottled olive-brown and orange, medium stiff, trace sand, small inclusions of organics.				
	1	B5@4'			6	1.5*	89	31.8
5	2							
				Becomes stiff.				
10	3	B5@9'			13	1.4	82	32.3
				CLAYEY SAND (SC), mottled brown and olive, loose, subangular to subrounded, some silt.				
	4	B5@14'			6		88	33.3
15	5							
				SILTY CLAY (CL), mottled olive-brown and orange, soft, some sand, trace subangular - subrounded pebbles, small inclusions of organics.				
20	6	B5@19'			4			35.5
	7			Grades to with sand, brown, trace oxidation.				
25		B5@24'			3			38.6
	8			SANDY CLAY (CL), mottled olive-brown, medium stiff, some oxidation, small inclusions of organics.				
30	9	B5@29'			8			34.8

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B5

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A05

ENGEO_BORELOG2 648620030I-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 158 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10		SILTY CLAY (CL), blue-grey, stiff, some oxidation, trace sand.				
35	11	B5@34'		11			27.7
		B5@38.5'					
	12	B5@39'	SANDY GRAVEL (GP), blue-grey, medium dense.	18		98	26.9
40		B5@40.5'	SILTY SAND (SM), blue-grey, medium dense, subangular to subrounded.	13			32.3
	13		Bottom of boring at approximately 41 feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	14						
50	15						
	16						
55	17						
	18						
60							

DATE OF BORING: May 23, 2005

SURFACE ELEVATION: Approx. 157 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SILTY CLAY (CL), brown, soft, some sand, trace pebbles.				
	1							
5	2	B6@6'			4	1.0*	95	26.5
	3			CLAYEY SAND (SC), brown, very loose, fine-grained, subangular.				
10	4	B6@11'			2			34.6
15	5	B6@16'		SANDY CLAY (CL), mottled olive-brown and orange, soft, trace pebbles, subangular.	4		87	36.0
20	6	B6@21'		CLAYEY SAND (SC), brown, loose, coarse, subangular.	7		99	26.9
	7			SILTY CLAY (CL), mottled brown, olive, and orange, very stiff, trace sand, trace pebbles, subangular, small inclusions of organics.				
25	8	B6@26'			26	3.0*	82	32.6
30	9			CLAYEY SILT (ML) with sand, mottled olive-brown, medium stiff, some oxidation, small inclusions of organics.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B6

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A06

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 23, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B6@31'			7			
	10	B6@32.5'			8			35.3
35				SAND (SP).				
	11	B6@36'		SILTY CLAY (CL), blue-grey, stiff.	19	2.75*		
40	12			Becomes medium stiff.				
		B6@41'			10	0.7	83	39.6
	13			Bottom of boring at approximately $41^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45	14							
50	15							
	16							
55	17							
	18							
60								

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EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B6

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A06

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 26, 2005 SURFACE ELEVATION: Approx. 165 feet (50 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				CLAYEY GRAVEL (GC). (FILL)				
	1							
5				SILTY CLAY (CL) with gravels, olive, stiff, subangular to subrounded.				
	2	B7@6'			13	0.5*		
				SILTY CLAY (CL), mottled olive-brown, medium stiff, some sand, small inclusions of organics.				
10	3							
		B7@11'			6			
	4							
15				Becomes stiff, trace sand.				
	5	B7@16'			10	1.0	88	33.2
20	6			SANDY CLAY (CL), olive-brown, medium stiff, small inclusions of organics.				
		B7@21'			6	1.5*	83	37.5
	7							
25				SILTY CLAY (CL), mottled olive-brown, soft, trace sand, small inclusions of organics, trace oxidation.				
	8	B7@26'			3			
30	9			Becomes medium stiff, some gravel, some sand.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B7

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A07

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 26, 2005 SURFACE ELEVATION: Approx. 165 feet (50 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
		B7@31'			6			26.7
	10							
35				CLAYEY GRAVEL (GC) with sand, mottled olive-brown, red, orange, and white, dense, subangular to subrounded.				
	11	B7@36'			37			
	12							
40				Becomes very dense.				
		B7@41'			68			10.4
	13			Bottom of boring at approximately $41^1/_2$ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method.				
45								
	14							
	15							
50								
	16							
55								
	17							
	18							
60								

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B7

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A07

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 157 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			SILTY CLAY (CL), mottled olive brown, medium stiff, trace sand, fine to coarse, small inclusions of organics.				
	1						
5	2	B8@6'		6	1.5*		
			CLAYEY SAND (SC), brown, very loose, subangular to subrounded.				
10	3	B8@11'		3			
	4		SANDY CLAY (CL), brown, medium stiff, trace gravel, fine to coarse.				
15	5	B8@15.5' B8@16.5		2		85	36.0
			SANDY GRAVEL (GP/SP), brown, very loose, subangular to subrounded.				
20	6	B8@21'		4			26.8
	7		SILTY CLAY (CL), olive-brown, very stiff.				
25	8	B8@25.5'		25	0.7	84	33.1
			CLAYEY GRAVEL (GC), dark brown, subangular to subrounded, up to 1.5" in diameter.				
30	9		SILTY SAND (SM), mottled orange, brown, and blue, medium dense, trace fine gravel, subangular to subrounded.				

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A08

DATE OF BORING: May 24, 2005

SURFACE ELEVATION: Approx. 157 feet (48 meters)

DEPTH (FEET): 35, 40, 45, 50, 55, 60

DEPTH (METERS): 10, 11, 12, 13, 14, 15, 16, 17, 18

SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
B8@31'		25		77	45.1
	GRAVEL (GP), mottled blue-grey and brown, medium dense, subangular to subrounded, up to 1.5" in diameter, some clay.				
B8@36'		23			
	Becomes mottled black and dark brown.				
B8@41'	CLAYEY GRAVEL (GC) with sand, olive-brown, very dense.	57			12.1
	Becomes mottled orange, brown, olive, and red.				
B8@44'		44			
	CLAYEY SILT (ML) with sand, orange-brown, hard.				
		42			
B8@56'	CLAYEY GRAVEL (GC) with sand, orange-brown, very dense.	68	4.5*	119	15.2
	Become mottled red, brown, green, and blue, medium dense, subangular to subrounded gravels.				
B8@61'		22			15.2

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8

LOGGED BY: J. Wisniewski

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PROJ. NO.: 6486.2.003.01

FIGURE NO. A08

ENGEO BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
65	19 20			CLAYEY SAND (SC), dark brown, medium dense, small inclusions of organics.				
		B8@66'			22			44.7
70	21			SILTY CLAY (CL), blue-grey, hard, some fine sand, subangular. (Harder drilling.)				
		B8@70.5'					75	46.0
		B8@71'			39	4.5+*	85	37.3
75	22 23							
80	24			Becomes very stiff, trace sand.				
		B8@81'			37			
85	25 26							
90	27			Becomes hard, trace subangular pebbles.				
	28	B8@90.5'			50/3"	4.0*	84	32.5

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8

LOGGED BY: J. Wisniewski

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A08

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 24, 2005 SURFACE ELEVATION: Approx. 157 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
95	29			CLAYEY GRAVEL (GC), mottled olive-grey, blue, red, black, green, and orange, very dense, subangular to subrounded.				
	30							
100		B8@100.5'			50/5"			8.7
	31							
105	32			SILTY CLAY (CL), olive-brown, very stiff, trace sand, trace pebbles.				
		B8@106'			21			
	33			Bottom of boring at approximately 106½ feet below ground surface. Groundwater not recorded at time of drilling due to drilling method. Steel casing installed to depth of approximately 65 feet below ground surface due to presence of flowing gravel and sand.				
110	34							
115	35							
	36							
120	37							

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SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B8
LOGGED BY: J. Wisniewski
PROJ. NO.: 6486.2.003.01
CHECKED BY

FIGURE NO. A08

ENGEO_BORELOG2 648620030I-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				▽ Waste Water Treatment Plant Pond				
	1							
5								
	2							
	3			CLAYEY SAND (SC), dark olive brown, medium stiff, wet, fine to medium grained sand, trace coarse subrounded sand, some silt.				
10								
	4							
15		B9@6'			7		96	27.3
	5	B9@7.5'		SILTY CLAY (CL), red brown, soft, wet.	2			
				Becomes yellow brown, medium stiff, trace fine sand.				
		B9@10'			9	0.9	81	39.2
20	6							
		B9@13'			9	1.25*		
	7							
25				SILTY CLAY to CLAYEY SILT (CL-ML), brown, stiff, wet, trace fine sand. Harder drilling.				
	8							
		B9@18'			14	1.5*	85	37.0
	9							
30								

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B9

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A09

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10	B9@24'		SILTY SAND (SM), brown, medium dense, wet, some coarse subangular gravel (2 to 3 inch diameter).	27			
35		NR		CLAYEY SILT (ML), dark grey, hard, wet.	50/6"			
	11	B9@27.5'			50/0.5"		89	31.8
				Bottom of boring at approximately 37 1/2 feet. Water level at time of drilling at surface.				
40	12							
	13							
45	14							
50	15							
	16							
55	17							
60	18							

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EXCELLENT SERVICE SINCE 1971

SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B9

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A09

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DATE OF BORING: May 19, 2005

SURFACE ELEVATION: Approx. 159 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0			▽ Waste Water Treatment Plant Pond.				
5	1, 2						
10	3		SANDY CLAY (CL), red brown, mottled dark grey, wet, soft, fine to medium grained sand.				
		B10@3'		5			
	4		CLAYEY SAND (SC), red brown, medium stiff, wet, find to medium subrounded sand.				
15		B10@6.5'					
	5	B10@7'	SANDY CLAY to SILTY CLAY (CL), yellow brown, soft, wet, fine grained sand	3	0.5*	72	47.1
			Becomes medium stiff, trace medium subrounded sand.				
20	6	B10@11'		9	1.4	89	33.2
	7		SILTY CLAY (CL), red brown, stiff, wet, trace medium subrounded sand.				
		B10@15'		13	2.75*	92	30.5
25	8		CLAYEY SILT (ML), brown, very stiff, wet.				
		B10@19'		43			30.4
30	9		Bottom of boring at approximately 28 $^{1}/_{2}$ feet. Water level at time of drilling at surface.				

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B10

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

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FIGURE NO. A10

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DATE OF BORING: May 19, 2005

SURFACE ELEVATION: Approx. 159 feet (48 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				▽ Waste Water Treatment Plant Pond.				
	1							
5								
	2							
10	3			SILTY CLAY (CL), dark reddish brown, medium stiff, wet, with fine sand.				
		B11@11'					90	29.3
				Becomes olive grey, mottled red brown, trace subrounded medium sand.				
	4	B11@13.5'			5	0*	79	40.7
				Gravel (GP), poorly graded, loose, wet, rounded fine grained gravel.				
15								
	5	B11@18'		SILTY CLAY (CL), dark brown, medium stiff, wet, some subrounded gravel.				
		B11@18.5'			9	1.0*	76	43.6
				SANDY CLAY (CL), brown, medium stiff, brown, coarse grained sand, with coarse subrounded fine gravel.				
20	6	B11@20.5'					78	41.2
		B11@21'			8	1.0*	81	40.6
	7							
				SILTY CLAY (CL) with fine grained sand, reddish brown, very stiff, wet, some black oxidation staining.				
25		B11@26'			23	2.3*	89	32.9
	8			Inter-layered CLAYEY SAND and SANDY CLAY (CL/SC), olive grey, medium stiff, wet, fine grained sand.				
		B11@30'			10			
30	9	B11@31'			7			29.0

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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B11

LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A11

ENGEO_BORELOG2 6486200301-SUTTERMEDICALCENTERB9TOB11.GPJ 10/12/05

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DATE OF BORING: May 19, 2005 SURFACE ELEVATION: Approx. 159 feet (48 meters) DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
	10							
35		B11@35.5'		GRAVELLY SAND (SW), dark grey, very dense, wet, well graded, subrounded fine gravel.				
		B11@36'		SANDY GRAVEL (GP), dark brown, very dense, wet, fine subrounded gravel, medium grained sand, trace clay. Drilling refusal at 37 feet.	67	4.5*	108	21.3
	11	B11@37.5'			64			12.7
				Bottom of boring at approximately 38 feet. Water level at time of drilling at surface.				
	12							
40								
	13							
45								
	14							
	15							
50								
	16							
55								
	17							
	18							
60								

ENGEO INCORPORATED
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SUTTER MEDICAL CENTER

SONOMA COUNTY, CALIFORNIA

BORING NO.: 2-B11

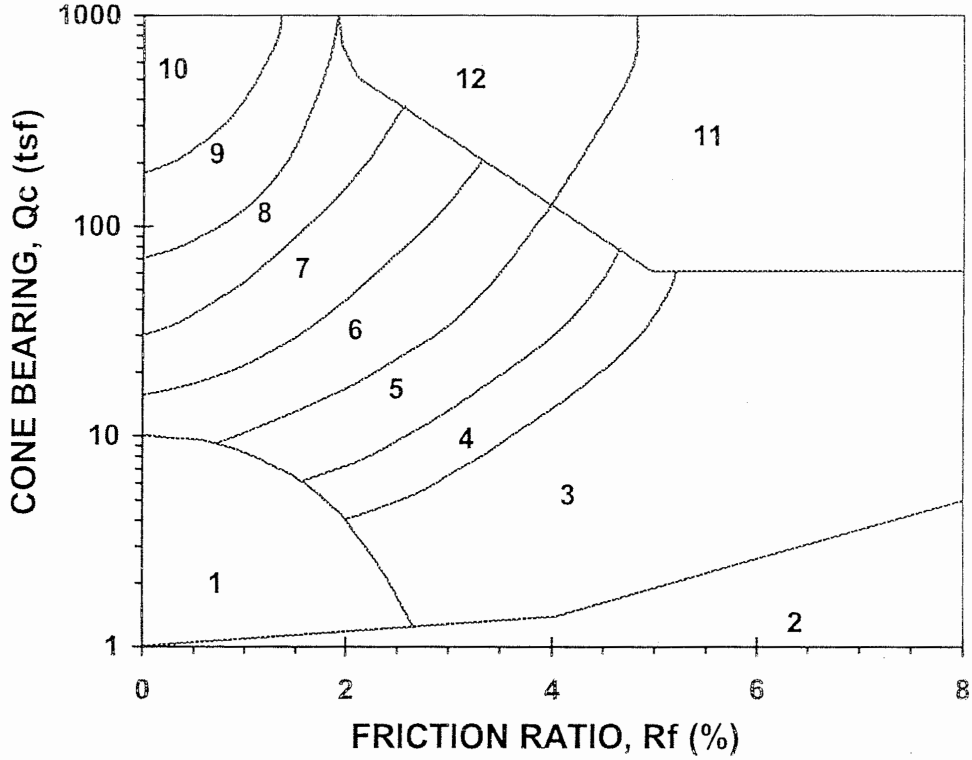
LOGGED BY: L. Chan

PROJ. NO.: 6486.2.003.01

CHECKED BY

FIGURE NO. A11

SIMPLIFIED SOIL BEHAVIOR TYPE CLASSIFICATION FOR STANDARD ELECTRONIC CONE PENETROMETER



ZONE	Qc/N[1]	Su Factor (Nk)[2]	SOIL BEHAVIOR TYPE[1]
1	2		Sensitive Fine Grained
2	1	for Zones 1 to 6	Organic Material
3	1	10 for Qc <= 9 tsf	CLAY
4	1.5	12 for Qc = 9 to 12 tsf	Silty CLAY to CLAY
5	2	15 for Qc > 12 tsf	Clayey SILT to Silty CLAY
6	2.5		Sandy SILT to Clayey SILT
7	3	---	Silty SAND to Sandy SILT
8	4	---	SAND to Silty SAND
9	5	---	SAND
10	6	---	Gravelly SAND to SAND
11	1	15	Very Stiff Fine Grained (*)
12	2	---	SAND to Clayey SAND (*)

(*) Overconsolidated or Cemented

Qc = Tip Bearing
Fs = Sleeve Friction
Rf = Fs/Qc*100 = Friction Ratio

References: [1]Robertson, 1986, Olsen, 1988
[2]Bonaparte & Mitchell, 1979 (young bay mud Qc <= 9)
[2]Estimated from local experience (fine grained soils Qc > 9)

Note: Testing performed in accordance with ASTM D3441

John Sarmiento & Associates

Cone Penetrometer Testing Services

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-01
DATE : 06-01-2005
Groundwater measured at 4.6 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.58	21.10	0.870	4.1	14	23	0.07	----	2.81	Silty CLAY to CLAY	130-140
1.01	16.60	0.950	5.7	17	27	0.12	----	2.21	CLAY	120-130
1.55	19.50	1.120	5.7	20	31	0.19	----	2.59	''	130-140
2.09	20.00	1.610	8.1	20	32	0.27	----	2.65	''	''
3.04	13.40	1.040	7.8	13	21	0.39	----	1.76	''	120-130
3.58	8.00	0.660	8.3	8	13	0.45	----	1.55	''	''
4.01	6.10	0.390	6.4	6	10	0.50	----	1.17	''	110-120
4.55	6.90	0.300	4.3	7	11	0.56	----	1.32	''	100-110
5.10	6.10	0.230	3.8	6	10	0.62	----	1.16	''	''
5.53	5.90	0.250	4.2	6	9	0.66	----	1.11	''	''
6.09	8.00	0.300	3.8	8	13	0.73	----	1.53	''	110-120
6.53	11.00	0.380	3.5	7	12	0.78	----	1.77	Silty CLAY to CLAY	''
7.07	11.90	0.450	3.8	12	19	0.85	----	1.91	CLAY	120-130
7.51	10.50	0.430	4.1	11	17	0.90	----	1.68	''	110-120
8.05	10.70	0.400	3.7	11	17	0.96	----	1.70	''	''
8.59	12.40	0.670	5.4	12	20	1.03	----	1.58	''	120-130
9.03	10.30	0.510	5.0	10	16	1.08	----	1.63	''	''
9.57	7.00	0.260	3.7	7	11	1.14	----	1.29	''	100-110
10.00	7.50	0.250	3.3	8	12	1.18	----	1.38	''	''
10.55	7.90	0.240	3.0	5	8	1.24	----	1.46	Silty CLAY to CLAY	''
11.09	7.90	0.220	2.8	5	8	1.30	----	1.45	''	''
11.52	4.90	0.190	3.9	5	7	1.34	----	0.85	CLAY	90-100
12.06	9.50	0.370	3.9	10	14	1.40	----	1.47	''	110-120
12.53	5.80	0.190	3.3	6	8	1.45	----	1.02	''	100-110
13.08	4.90	0.130	2.7	5	7	1.50	----	0.83	''	90-100
13.51	11.10	0.360	3.2	7	10	1.55	----	1.72	Silty CLAY to CLAY	110-120
14.05	7.60	0.290	3.8	8	11	1.61	----	1.36	CLAY	100-110
14.59	8.30	0.340	4.1	8	11	1.67	----	1.49	''	110-120
15.02	8.80	0.290	3.3	9	12	1.72	----	1.59	''	''
15.54	9.10	0.280	3.1	6	8	1.78	----	1.37	Silty CLAY to CLAY	''
16.07	10.80	0.410	3.8	11	14	1.84	----	1.65	CLAY	''
16.50	22.40	0.780	3.5	11	15	1.89	----	2.86	Clayey SILT to Silty CLAY	120-130
17.04	30.50	0.800	2.6	12	16	1.97	----	3.94	Sandy SILT to Clayey SILT	130-140
17.56	13.20	0.470	3.6	9	11	2.03	----	1.62	Silty CLAY to CLAY	120-130
18.09	28.50	1.100	3.9	19	24	2.10	----	3.66	''	130-140
18.51	15.80	0.500	3.2	8	10	2.16	----	1.96	Clayey SILT to Silty CLAY	120-130
19.02	7.60	0.360	4.7	8	9	2.21	----	1.30	CLAY	110-120
19.56	8.00	0.340	4.3	8	10	2.28	----	1.37	''	''
20.09	10.00	0.370	3.7	10	12	2.34	----	1.47	''	''
20.51	11.30	0.450	4.0	11	14	2.39	----	1.68	''	120-130
21.05	12.20	0.470	3.9	12	14	2.46	----	1.46	''	''
21.58	12.20	0.830	6.8	12	14	2.52	----	1.46	''	''
22.04	11.80	0.510	4.3	12	14	2.58	----	1.75	''	''
22.57	9.70	0.600	6.2	10	11	2.65	----	1.40	''	''
23.53	11.10	0.370	3.3	7	8	2.76	----	1.62	Silty CLAY to CLAY	110-120
24.05	10.40	0.290	2.8	7	8	2.82	----	1.50	''	''
24.58	12.60	0.410	3.3	8	9	2.88	----	1.49	''	120-130
25.04	14.60	0.550	3.8	10	11	2.94	----	1.75	''	''
25.58	12.70	0.500	3.9	13	14	3.01	----	1.49	CLAY	''
26.00	18.00	0.930	5.2	18	19	3.07	----	2.20	''	130-140
26.53	20.20	0.880	4.4	20	21	3.14	----	2.48	''	''
27.06	21.60	1.140	5.3	22	23	3.21	----	2.67	''	''
27.56	82.30	2.440	3.0	33	34	3.28	----	10.75	Sandy SILT to Clayey SILT	''
28.09	18.80	1.040	5.5	19	19	3.35	----	2.28	CLAY	''
28.51	27.10	1.130	4.2	18	18	3.40	----	3.39	Silty CLAY to CLAY	''
29.03	22.00	1.570	7.1	22	22	3.47	----	2.70	CLAY	''
29.52	192.90	4.640	2.4	64	65	3.54	42	----	Silty SAND to Sandy SILT	''
30.02	203.70	2.500	1.2	41	41	3.61	42	----	SAND	''
30.52	74.00	1.460	2.0	25	25	3.68	36	----	Silty SAND to Sandy SILT	''
31.03	14.60	0.570	3.9	10	10	3.74	----	1.70	Silty CLAY to CLAY	120-130
31.53	13.40	0.690	5.1	13	13	3.80	----	1.53	CLAY	''
32.09	16.00	0.570	3.6	11	11	3.87	----	1.88	Silty CLAY to CLAY	''
32.59	15.30	0.610	4.0	10	10	3.94	----	1.78	''	''
33.02	13.80	0.570	4.1	14	14	3.99	----	1.57	CLAY	''
33.55	14.70	0.780	5.3	15	15	4.05	----	1.69	''	''

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-01
DATE : 06-01-2005
Groundwater measured at 4.6 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
34.07	72.40	3.190	4.4	36	36	4.12	----	9.38	Clayey SILT to Silty CLAY	130-140
34.59	17.10	0.720	4.2	17	17	4.19	----	2.00	CLAY	120-130
35.03	19.20	0.680	3.5	13	13	4.24	----	2.28	Silty CLAY to CLAY	''
35.55	11.70	0.460	3.9	12	12	4.31	----	1.59	CLAY	''
36.08	13.70	0.550	4.0	14	14	4.38	----	1.53	''	''
37.01	168.60	2.230	1.3	34	33	4.50	41	----	SAND	130-140
37.52	204.10	4.470	2.2	68	67	4.57	42	----	Silty SAND to Sandy SILT	''
38.00	296.90	4.200	1.4	59	58	4.64	44	----	SAND	''
38.55	233.30	3.770	1.6	47	45	4.71	43	----	''	''
39.02	124.60	5.800	4.7	125	118	4.78	----	16.29	Very Stiff Fine Grained *	>140
39.56	266.00	3.460	1.3	53	50	4.85	43	----	SAND	130-140
40.02	89.50	6.590	7.4	90	83	4.91	----	11.61	Very Stiff Fine Grained *	>140
40.59	23.80	1.780	7.5	24	22	4.99	----	2.84	CLAY	130-140
41.06	17.00	1.070	6.3	17	15	5.05	----	1.93	''	''
41.54	21.70	0.830	3.8	14	13	5.12	----	2.55	Silty CLAY to CLAY	''
42.05	21.10	0.630	3.0	11	9	5.18	----	2.47	Clayey SILT to Silty CLAY	120-130
42.56	30.60	1.990	6.5	31	26	5.25	----	3.73	CLAY	130-140
43.06	35.70	2.720	7.6	36	30	5.32	----	4.41	''	''
43.58	72.70	3.420	4.7	73	61	5.39	----	9.33	Very Stiff Fine Grained *	''
44.09	29.50	2.910	9.9	30	24	5.46	----	3.57	CLAY	''
44.58	201.80	2.330	1.2	40	33	5.52	41	----	SAND	120-130
45.05	237.80	2.810	1.2	48	39	5.58	42	----	''	130-140
45.53	209.00	2.930	1.4	42	34	5.65	41	----	''	''
46.04	353.60	8.130	2.3	71	57	5.72	44	----	''	''
46.53	372.30	7.950	2.1	74	60	5.78	44	----	''	''
47.05	274.70	2.890	1.1	55	44	5.85	43	----	''	120-130
47.52	535.10	11.410	2.1	268	214	5.91	46	----	SAND to Clayey SAND *	130-140
47.59	276.30	12.260	4.4	276	221	5.92	----	36.45	Very Stiff Fine Grained *	>140
48.53	340.00	7.300	2.1	68	54	6.05	44	----	SAND	130-140
49.03	221.30	6.240	2.8	74	58	6.11	41	----	Silty SAND to Sandy SILT	''
49.54	287.10	4.560	1.6	57	45	6.18	43	----	SAND	''
50.01	568.20	15.360	2.7	284	221	6.25	47	----	SAND to Clayey SAND *	>140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-02
DATE : 05-31-2005
Groundwater measured at 4.8 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.53	17.00	0.730	4.3	17	27	0.06	----	2.26	CLAY	120-130
1.08	18.40	1.160	6.3	18	29	0.13	----	2.44	''	130-140
1.50	20.30	1.380	6.8	20	32	0.19	----	2.69	''	''
2.04	13.90	1.090	7.8	14	22	0.26	----	1.84	''	120-130
3.03	12.10	0.860	7.1	12	19	0.38	----	1.59	''	''
3.58	9.20	0.590	6.4	9	15	0.45	----	1.50	''	''
4.01	6.70	0.380	5.7	7	11	0.50	----	1.29	''	110-120
4.55	7.30	0.270	3.7	7	12	0.56	----	1.40	''	100-110
5.09	6.60	0.310	4.7	7	11	0.62	----	1.26	''	''
5.53	9.50	0.420	4.4	10	15	0.67	----	1.53	''	110-120
6.01	5.40	0.220	4.1	5	9	0.72	----	1.01	''	100-110
6.56	7.60	0.280	3.7	8	12	0.77	----	1.44	''	''
7.00	7.20	0.270	3.8	7	12	0.82	----	1.36	''	''
7.54	9.80	0.410	4.2	10	16	0.88	----	1.56	''	110-120
8.08	10.60	0.420	4.0	11	17	0.94	----	1.69	''	''
8.52	12.40	0.610	4.9	12	20	1.00	----	1.59	''	120-130
9.54	8.90	0.320	3.6	9	14	1.12	----	1.67	''	110-120
10.08	8.90	0.280	3.1	6	9	1.18	----	1.66	Silty CLAY to CLAY	''
10.52	8.90	0.290	3.3	6	9	1.23	----	1.66	''	''
11.05	4.80	0.240	5.0	5	7	1.29	----	0.83	CLAY	100-110
11.59	7.30	0.180	2.5	5	7	1.34	----	1.33	Silty CLAY to CLAY	''
12.03	5.20	0.170	3.3	5	8	1.38	----	0.90	CLAY	90-100
12.57	5.20	0.180	3.5	5	8	1.43	----	0.90	''	''
13.00	6.90	0.190	2.8	5	7	1.48	----	1.23	Silty CLAY to CLAY	100-110
13.55	8.30	0.220	2.7	6	8	1.54	----	1.51	''	''
14.09	8.20	0.290	3.5	8	11	1.60	----	1.48	CLAY	110-120
14.52	7.60	0.260	3.4	8	11	1.64	----	1.36	''	100-110
15.05	8.20	0.030	0.4	4	6	1.69	----	1.47	Sensitive Fine Grained	85-90
15.55	13.20	0.350	2.7	7	9	1.75	----	1.64	Clayey SILT to Silty CLAY	110-120
16.09	10.40	0.360	3.5	7	9	1.81	----	1.58	Silty CLAY to CLAY	''
16.53	10.50	0.440	4.2	11	14	1.86	----	1.59	CLAY	''
17.07	20.30	0.760	3.7	14	18	1.93	----	2.58	Silty CLAY to CLAY	120-130
18.01	48.70	0.950	2.0	16	21	2.06	35	----	Silty SAND to Sandy SILT	130-140
18.54	13.10	0.890	6.8	13	17	2.12	----	1.61	CLAY	120-130
19.05	25.50	1.260	4.9	26	32	2.19	----	3.25	''	130-140
19.58	11.70	0.540	4.6	12	14	2.26	----	1.76	''	120-130
20.00	8.00	0.260	3.3	8	10	2.30	----	1.37	''	100-110
20.53	10.80	0.460	4.3	11	13	2.36	----	1.60	''	110-120
21.06	10.20	0.440	4.3	10	12	2.42	----	1.50	''	''
21.59	11.80	0.490	4.2	12	14	2.49	----	1.76	''	120-130
22.06	11.70	0.410	3.5	8	9	2.54	----	1.74	Silty CLAY to CLAY	110-120
22.60	10.80	0.420	3.9	11	13	2.60	----	1.58	CLAY	''
23.00	13.70	0.500	3.6	9	10	2.66	----	1.65	Silty CLAY to CLAY	120-130
23.54	10.60	0.360	3.4	7	8	2.72	----	1.54	''	110-120
24.07	9.70	0.310	3.2	6	7	2.78	----	1.39	''	''
24.60	10.20	0.320	3.1	7	8	2.84	----	1.46	''	''
25.02	10.10	0.470	4.7	10	11	2.89	----	1.44	CLAY	''
25.53	10.00	0.370	3.7	10	11	2.95	----	1.42	''	''
26.06	10.30	0.500	4.9	10	11	3.01	----	1.47	''	120-130
26.60	10.80	0.420	3.9	11	12	3.07	----	1.54	''	110-120
27.02	8.00	0.410	5.1	8	9	3.12	----	1.29	''	''
27.55	13.10	0.570	4.4	13	14	3.19	----	1.53	''	120-130
28.08	14.60	0.710	4.9	15	15	3.26	----	1.73	''	''
28.51	10.00	0.630	6.3	10	10	3.31	----	1.39	''	''
29.04	30.00	1.780	5.9	30	31	3.38	----	3.77	''	130-140
29.56	18.30	0.800	4.4	18	19	3.45	----	2.21	''	120-130
30.09	15.40	0.700	4.5	15	16	3.51	----	1.82	''	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-03
DATE : 06-01-2005
Groundwater measured at 4.3 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	32.70	0.980	3.0	16	26	0.07	----	4.36	Clayey SILT to Silty CLAY	130-140
1.00	27.30	1.040	3.8	14	22	0.13	----	3.63	''	''
1.53	23.10	1.200	5.2	23	37	0.20	----	3.07	CLAY	''
2.06	18.30	1.190	6.5	18	29	0.27	----	2.42	''	''
2.55	19.40	1.090	5.6	19	31	0.33	----	2.56	''	''
3.09	14.50	0.800	5.5	15	23	0.40	----	1.91	''	120-130
3.52	13.60	0.680	5.0	14	22	0.46	----	1.78	''	''
4.06	10.60	0.520	4.9	11	17	0.52	----	1.72	''	''
4.56	11.00	0.490	4.5	11	18	0.59	----	1.78	''	''
5.53	11.30	0.460	4.1	11	18	0.71	----	1.82	''	''
6.07	13.20	0.440	3.3	9	14	0.77	----	1.71	Silty CLAY to CLAY	''
6.50	11.20	0.520	4.6	11	18	0.83	----	1.80	CLAY	''
7.04	9.00	0.400	4.4	9	14	0.89	----	1.43	''	110-120
7.58	10.10	0.420	4.2	10	16	0.95	----	1.60	''	''
8.01	11.10	0.320	2.9	7	12	1.00	----	1.77	Silty CLAY to CLAY	''
8.53	13.30	0.560	4.2	13	21	1.07	----	1.70	CLAY	120-130
9.07	12.40	0.480	3.9	12	20	1.13	----	1.58	''	''
9.50	12.10	0.400	3.3	8	13	1.18	----	1.53	Silty CLAY to CLAY	110-120
10.05	6.20	0.330	5.3	6	10	1.24	----	1.12	CLAY	100-110
10.58	8.10	0.250	3.1	5	8	1.30	----	1.49	Silty CLAY to CLAY	''
11.01	9.70	0.280	2.9	6	10	1.35	----	1.50	''	110-120
11.55	13.20	0.520	3.9	13	19	1.41	----	1.67	CLAY	120-130
12.07	13.10	0.370	2.8	7	9	1.47	----	1.65	Clayey SILT to Silty CLAY	110-120
13.03	12.80	0.470	3.7	9	12	1.59	----	1.60	Silty CLAY to CLAY	120-130
13.57	12.10	0.280	2.3	6	8	1.66	----	1.50	Clayey SILT to Silty CLAY	110-120
14.53	10.20	0.260	2.5	7	9	1.77	----	1.55	Silty CLAY to CLAY	''
15.04	12.00	0.450	3.8	12	16	1.83	----	1.48	CLAY	120-130
15.58	11.60	0.290	2.5	6	8	1.89	----	1.78	Clayey SILT to Silty CLAY	110-120
16.00	12.90	0.450	3.5	9	11	1.95	----	1.59	Silty CLAY to CLAY	120-130
16.54	6.80	0.340	5.0	7	9	2.01	----	1.16	CLAY	110-120
17.08	11.30	0.300	2.7	6	7	2.07	----	1.71	Clayey SILT to Silty CLAY	''
18.03	23.20	1.010	4.4	15	19	2.20	----	2.95	Silty CLAY to CLAY	130-140
18.58	16.00	0.780	4.9	16	19	2.27	----	1.98	CLAY	120-130
19.01	45.90	0.720	1.6	15	18	2.32	35	----	Silty SAND to Sandy SILT	''
19.54	33.40	0.650	1.9	13	16	2.39	----	4.29	Sandy SILT to Clayey SILT	''
20.07	11.10	0.320	2.9	7	9	2.45	----	1.65	Silty CLAY to CLAY	110-120
20.59	13.10	0.340	2.6	7	8	2.51	----	1.58	Clayey SILT to Silty CLAY	''
21.01	11.60	0.390	3.4	8	9	2.56	----	1.72	Silty CLAY to CLAY	''
21.51	11.60	0.450	3.9	12	13	2.62	----	1.72	CLAY	120-130
22.04	11.60	0.370	3.2	8	9	2.68	----	1.71	Silty CLAY to CLAY	110-120
22.55	8.90	0.290	3.3	6	7	2.74	----	1.51	''	''
23.08	9.90	0.270	2.7	7	7	2.80	----	1.42	''	''
23.51	10.30	0.360	3.5	7	8	2.85	----	1.48	''	''
24.04	12.10	0.410	3.4	8	9	2.91	----	1.42	''	''
24.57	9.40	0.500	5.3	9	10	2.97	----	1.32	CLAY	''
25.06	11.80	0.410	3.5	8	8	3.03	----	1.71	Silty CLAY to CLAY	''
25.58	13.70	0.420	3.1	9	10	3.09	----	1.62	''	120-130
26.01	18.20	0.680	3.7	12	13	3.14	----	2.22	''	''
26.55	13.70	0.800	5.8	14	14	3.21	----	1.61	CLAY	''
27.07	63.70	3.090	4.9	64	66	3.28	----	8.27	Very Stiff Fine Grained *	130-140
27.54	94.60	3.940	4.2	95	97	3.35	----	12.39	''	''
28.59	266.60	2.580	1.0	53	54	3.48	44	----	SAND	120-130
29.00	215.30	0.990	0.5	43	43	3.52	42	----	''	100-110
29.60	36.40	1.290	3.5	18	18	3.60	----	4.61	Clayey SILT to Silty CLAY	130-140
30.06	83.80	1.470	1.8	28	28	3.66	37	----	Silty SAND to Sandy SILT	''
30.56	35.90	1.100	3.1	18	18	3.73	----	4.54	Clayey SILT to Silty CLAY	''
31.07	11.20	1.090	9.7	11	11	3.79	----	1.55	CLAY	120-130
31.56	19.10	0.710	3.7	13	13	3.86	----	2.29	Silty CLAY to CLAY	''
32.08	23.80	0.990	4.2	16	16	3.93	----	2.91	''	130-140
33.02	13.50	0.540	4.0	14	13	4.04	----	1.53	CLAY	120-130
33.53	13.00	0.540	4.2	13	13	4.11	----	1.46	''	''
34.05	32.90	1.200	3.6	16	16	4.18	----	4.11	Clayey SILT to Silty CLAY	130-140
34.60	74.40	2.610	3.5	30	30	4.25	----	9.64	Sandy SILT to Clayey SILT	''
35.01	18.70	1.390	7.4	19	19	4.31	----	2.21	CLAY	''
35.52	13.30	0.510	3.8	9	9	4.37	----	1.48	Silty CLAY to CLAY	120-130

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-03
DATE : 06-01-2005
Groundwater measured at 4.3 feet
Terminated at 50.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
36.01	16.50	0.550	3.3	11	11	4.43	----	1.90	''	''
36.53	10.90	0.490	4.5	11	11	4.50	----	1.44	CLAY	''
37.05	10.50	0.430	4.1	11	10	4.56	----	1.37	''	110-120
37.58	13.10	0.500	3.8	9	9	4.62	----	1.44	Silty CLAY to CLAY	120-130
38.02	10.30	0.370	3.6	10	10	4.67	----	1.33	CLAY	110-120
38.54	51.00	2.090	4.1	26	24	4.74	----	6.48	Clayey SILT to Silty CLAY	130-140
39.07	65.80	4.570	6.9	66	62	4.82	----	8.45	Very Stiff Fine Grained *	''
39.57	208.00	3.370	1.6	42	39	4.88	42	----	SAND	''
40.08	35.20	2.210	6.3	35	32	4.95	----	4.36	CLAY	''
40.59	21.70	1.200	5.5	22	20	5.02	----	2.56	''	''
41.04	26.80	1.240	4.6	27	24	5.08	----	3.23	''	''
41.53	54.80	2.530	4.6	37	32	5.15	----	6.96	Silty CLAY to CLAY	''
42.03	52.80	2.390	4.5	35	31	5.21	----	6.69	''	''
42.54	21.20	2.210	10.4	21	18	5.28	----	2.47	CLAY	''
43.04	52.30	3.450	6.6	52	45	5.35	----	6.62	''	''
43.54	47.00	3.680	7.8	47	39	5.42	----	5.91	''	''
44.07	33.90	2.590	7.6	34	28	5.49	----	4.15	''	''
44.56	42.60	1.520	3.6	21	18	5.56	----	5.31	Clayey SILT to Silty CLAY	''
45.05	45.80	1.560	3.4	23	19	5.62	----	5.73	''	''
45.55	29.50	2.350	8.0	30	24	5.69	----	3.55	CLAY	''
46.04	143.80	2.550	1.8	36	29	5.76	39	----	SAND to Silty SAND	''
46.52	253.90	5.990	2.4	85	68	5.82	42	----	Silty SAND to Sandy SILT	''
47.05	207.50	5.740	2.8	69	55	5.89	41	----	''	''
47.53	462.40	7.470	1.6	92	74	5.96	46	----	SAND	''
48.05	572.50	10.550	1.8	115	91	6.03	47	----	''	''
48.54	530.70	6.370	1.2	106	84	6.09	46	----	''	''
49.03	532.30	8.440	1.6	106	83	6.16	46	----	''	''
49.56	303.40	3.900	1.3	61	47	6.23	43	----	''	''
50.04	294.80	7.450	2.5	98	76	6.30	43	----	Silty SAND to Sandy SILT	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-04
DATE : 06-01-2005
Groundwater measured at 2.9 feet
Terminated at 43.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.52	33.50	1.020	3.0	17	27	0.06	----	4.46	Clayey SILT to Silty CLAY	130-140
1.06	18.30	0.600	3.3	9	15	0.13	----	2.43	''	120-130
1.51	9.40	0.310	3.3	6	10	0.18	----	1.55	Silty CLAY to CLAY	110-120
2.04	11.20	0.340	3.0	7	12	0.24	----	1.85	''	''
2.55	12.60	0.410	3.3	8	13	0.30	----	1.66	''	120-130
3.00	15.00	0.580	3.9	10	16	0.36	----	1.98	''	''
3.54	12.80	0.590	4.6	13	20	0.43	----	1.68	CLAY	''
4.09	15.50	0.530	3.4	10	17	0.50	----	2.03	Silty CLAY to CLAY	''
4.53	10.70	0.340	3.2	7	11	0.55	----	1.74	''	110-120
5.07	8.00	0.270	3.4	8	13	0.60	----	1.54	CLAY	100-110
5.52	9.10	0.310	3.4	9	15	0.66	----	1.46	''	110-120
6.05	10.70	0.310	2.9	7	11	0.72	----	1.72	Silty CLAY to CLAY	''
6.51	10.50	0.260	2.5	5	8	0.77	----	1.69	Clayey SILT to Silty CLAY	''
7.04	10.90	0.280	2.6	5	9	0.83	----	1.75	''	''
7.59	9.20	0.280	3.0	6	10	0.89	----	1.46	Silty CLAY to CLAY	''
8.03	10.50	0.300	2.9	7	11	0.94	----	1.67	''	''
8.57	10.10	0.270	2.7	7	11	1.01	----	1.60	''	''
9.07	8.70	0.240	2.8	6	9	1.06	----	1.63	''	100-110
9.52	7.50	0.260	3.5	8	12	1.11	----	1.39	CLAY	''
10.06	8.30	0.170	2.0	4	7	1.16	----	1.54	Clayey SILT to Silty CLAY	''
10.51	8.20	0.210	2.6	5	9	1.21	----	1.52	Silty CLAY to CLAY	''
11.05	5.80	0.130	2.2	4	6	1.26	----	1.03	''	90-100
11.59	6.90	0.190	2.8	5	7	1.32	----	1.25	''	100-110
12.04	8.20	0.240	2.9	5	9	1.36	----	1.50	''	''
12.56	4.30	0.100	2.3	4	7	1.41	----	0.72	CLAY	90-100
13.01	4.90	0.110	2.2	3	5	1.46	----	0.83	Silty CLAY to CLAY	''
13.55	7.20	0.120	1.7	4	6	1.51	----	1.29	Clayey SILT to Silty CLAY	''
14.09	7.50	0.220	2.9	5	8	1.57	----	1.34	Silty CLAY to CLAY	100-110
14.53	9.10	0.280	3.1	6	9	1.62	----	1.38	''	110-120
15.07	7.70	0.270	3.5	8	12	1.67	----	1.37	CLAY	100-110
15.57	3.00	0.210	7.0	3	4	1.72	----	0.43	Organic Material	90-100
16.02	7.40	0.270	3.6	7	11	1.77	----	1.30	CLAY	100-110
16.56	6.30	0.210	3.3	6	9	1.82	----	1.08	''	''
17.01	8.90	0.240	2.7	6	8	1.87	----	1.59	Silty CLAY to CLAY	''
17.54	7.50	0.330	4.4	8	11	1.93	----	1.31	CLAY	110-120
18.08	8.60	0.410	4.8	9	12	1.99	----	1.52	''	''
18.53	11.50	0.660	5.7	12	16	2.05	----	1.75	''	120-130
19.02	15.20	0.540	3.6	10	14	2.11	----	1.89	Silty CLAY to CLAY	''
19.55	25.00	1.360	5.4	25	33	2.18	----	3.19	CLAY	130-140
20.08	21.60	0.600	2.8	11	14	2.25	----	2.73	Clayey SILT to Silty CLAY	120-130
20.53	8.70	0.310	3.6	9	11	2.30	----	1.51	CLAY	110-120
21.05	8.40	0.310	3.7	8	11	2.36	----	1.44	''	''
21.58	8.70	0.340	3.9	9	11	2.42	----	1.50	''	''
22.51	16.40	0.630	3.8	11	14	2.54	----	2.02	Silty CLAY to CLAY	120-130
23.04	13.00	0.420	3.2	9	11	2.61	----	1.56	''	''
23.58	13.70	0.450	3.3	9	11	2.67	----	1.65	''	''
24.02	16.00	0.620	3.9	11	13	2.73	----	1.95	''	''
24.54	17.10	0.690	4.0	11	14	2.79	----	2.09	''	''
25.07	20.90	0.900	4.3	14	16	2.86	----	2.60	''	130-140
25.52	20.80	0.820	3.9	14	16	2.92	----	2.58	''	120-130
26.05	18.50	0.670	3.6	12	14	2.99	----	2.27	''	''
26.58	20.30	1.010	5.0	20	23	3.06	----	2.50	CLAY	130-140
27.02	21.80	0.970	4.4	22	24	3.12	----	2.70	''	''
27.54	16.50	0.370	2.2	8	9	3.18	----	1.99	Clayey SILT to Silty CLAY	120-130
28.07	16.40	0.850	5.2	16	18	3.25	----	1.97	CLAY	''
29.07	74.10	3.880	5.2	74	79	3.38	----	9.65	Very Stiff Fine Grained *	130-140
29.57	73.30	5.420	7.4	73	77	3.45	----	9.54	''	>140
30.04	121.20	6.330	5.2	121	127	3.52	----	15.93	''	''
30.58	74.30	6.680	9.0	74	77	3.59	----	9.67	''	''
31.05	52.80	2.970	5.6	53	54	3.66	----	6.80	CLAY	130-140
31.51	194.70	3.500	1.8	49	50	3.72	42	----	SAND to Silty SAND	''
32.05	216.30	10.910	5.0	216	219	3.80	----	28.59	Very Stiff Fine Grained *	>140
32.56	159.00	9.040	5.7	159	159	3.87	----	20.94	''	''
33.03	118.20	6.950	5.9	118	118	3.93	----	15.50	''	''
33.53	231.70	3.450	1.5	46	46	4.00	43	----	SAND	130-140

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-04
DATE : 06-01-2005
Groundwater measured at 2.9 feet
Terminated at 43.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
34.03	133.60	8.360	6.3	134	133	4.07	----	17.54	Very Stiff Fine Grained *	>140
34.54	106.00	5.070	4.8	106	106	4.14	----	13.86	''	''
35.04	110.90	4.980	4.5	111	110	4.21	----	14.51	''	''
35.57	34.60	2.100	6.1	35	34	4.28	----	4.33	CLAY	130-140
36.06	38.80	2.000	5.2	39	39	4.35	----	4.88	''	''
36.55	39.30	1.860	4.7	26	26	4.42	----	4.95	Silty CLAY to CLAY	''
37.06	45.50	4.030	8.9	46	45	4.49	----	5.77	CLAY	''
37.51	200.80	10.510	5.2	201	199	4.55	----	26.47	Very Stiff Fine Grained *	>140
38.00	25.80	3.110	12.0	26	26	4.61	----	3.13	CLAY	130-140
38.55	131.70	2.290	1.7	33	33	4.69	40	----	SAND to Silty SAND	''
39.04	158.70	2.290	1.4	40	39	4.75	41	----	''	''
39.52	174.50	3.630	2.1	58	57	4.82	41	----	Silty SAND to Sandy SILT	''
40.06	246.80	5.890	2.4	82	80	4.89	43	----	''	''
40.52	224.50	7.980	3.6	112	108	4.96	42	----	SAND to Clayey SAND *	>140
41.03	239.30	10.010	4.2	120	113	5.03	43	----	''	''
41.51	279.60	8.970	3.2	140	131	5.10	44	----	''	''
42.54	561.50	2.050	0.4	94	86	5.20	47	----	Gravelly SAND to SAND	100-110
43.01	596.80	13.450	2.3	298	272	5.27	48	----	SAND to Clayey SAND *	130-140
43.54	331.20	9.570	2.9	166	148	5.34	44	----	''	>140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance   TotStr = Total Stress using est. density**
Fs = Sleeve friction resistance   Phi = Soil friction angle*
Rf = Tip/Sleeve ratio   Su = Undrained Soil Strength*   (Nk=10 for Qc<9 tsf)
SPT = Equivalent Standard Penetration Test*   (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-05
DATE : 06-02-2005
Groundwater measured at 9.9 feet
Terminated at 31.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.50	44.50	2.180	4.9	30	47	0.06	----	5.93	Silty CLAY to CLAY	130-140
1.01	22.70	1.680	7.4	23	36	0.13	----	3.02	CLAY	''
1.54	13.70	0.950	6.9	14	22	0.19	----	1.81	''	120-130
2.07	9.10	0.580	6.4	9	15	0.26	----	1.50	''	''
3.02	18.60	1.180	6.3	19	30	0.39	----	2.45	''	130-140
3.56	10.50	0.760	7.2	11	17	0.45	----	1.71	''	120-130
4.09	12.60	0.790	6.3	13	20	0.52	----	1.65	''	''
4.51	10.40	0.840	8.1	10	17	0.57	----	1.69	''	''
5.05	4.90	0.320	6.5	5	8	0.63	----	0.92	''	100-110
6.02	4.40	0.260	5.9	4	7	0.73	----	0.81	''	''
6.55	6.10	0.450	7.4	6	10	0.79	----	1.14	''	110-120
7.09	13.90	0.750	5.4	14	21	0.86	----	1.80	''	120-130
7.52	31.50	1.970	6.3	32	47	0.92	----	4.14	''	130-140
8.04	21.80	1.270	5.8	22	31	0.99	----	2.84	''	''
8.57	20.50	1.270	6.2	21	28	1.06	----	2.66	''	''
9.03	16.40	1.170	7.1	16	22	1.12	----	2.11	''	''
9.55	18.90	0.950	5.0	19	25	1.19	----	2.44	''	''
10.08	16.40	0.950	5.8	16	21	1.26	----	2.10	''	120-130
10.51	11.50	0.830	7.2	12	15	1.31	----	1.81	''	''
11.04	6.80	0.490	7.2	7	9	1.37	----	1.22	''	110-120
11.57	17.90	1.610	9.0	18	22	1.44	----	2.29	''	130-140
12.07	29.00	0.940	3.2	15	18	1.51	----	3.77	Clayey SILT to Silty CLAY	''
12.57	25.90	0.590	2.3	10	12	1.58	----	3.35	Sandy SILT to Clayey SILT	120-130
13.10	15.40	0.950	6.2	15	18	1.64	----	1.94	CLAY	''
13.52	5.80	0.230	4.0	6	7	1.69	----	0.99	''	100-110
14.05	7.80	0.290	3.7	8	9	1.74	----	1.39	''	''
14.58	12.20	0.440	3.6	8	9	1.81	----	1.51	Silty CLAY to CLAY	120-130
15.10	15.50	0.130	0.8	6	7	1.86	----	1.94	Sandy SILT to Clayey SILT	90-100
15.57	16.70	0.770	4.6	17	19	1.92	----	2.10	CLAY	120-130
16.10	11.10	0.610	5.5	11	12	1.98	----	1.68	''	''
16.52	10.40	0.500	4.8	10	12	2.03	----	1.56	''	''
17.05	8.40	0.350	4.2	8	9	2.10	----	1.47	''	110-120
17.58	6.60	0.280	4.2	7	7	2.15	----	1.10	''	100-110
18.00	5.80	0.170	2.9	6	6	2.19	----	0.94	''	90-100
18.53	5.90	0.190	3.2	6	6	2.25	----	0.96	''	100-110
19.06	5.80	0.140	2.4	4	4	2.30	----	0.93	Silty CLAY to CLAY	90-100
19.60	6.50	0.190	2.9	7	7	2.35	----	1.06	CLAY	100-110
20.02	4.50	0.150	3.3	5	5	2.39	----	0.66	''	90-100
20.56	4.00	0.100	2.5	4	4	2.44	----	0.56	''	''
21.08	11.60	0.690	5.9	12	12	2.51	----	1.72	''	120-130
21.51	33.40	1.700	5.1	33	35	2.57	----	4.28	''	130-140
22.08	20.30	1.000	4.9	20	21	2.64	----	2.53	''	''
23.03	8.00	0.380	4.8	8	8	2.75	----	1.32	''	110-120
23.55	6.50	0.320	4.9	7	7	2.81	----	1.02	''	100-110
24.07	9.10	0.440	4.8	9	9	2.87	----	1.28	''	110-120
24.60	11.40	0.560	4.9	11	11	2.93	----	1.66	''	120-130
25.02	10.60	0.550	5.2	11	11	2.99	----	1.52	''	''
25.56	11.80	0.550	4.7	12	12	3.05	----	1.71	''	''
26.09	10.20	0.490	4.8	10	10	3.12	----	1.44	''	''
26.51	8.50	0.440	5.2	9	8	3.17	----	1.38	''	110-120
27.04	9.50	0.580	6.1	10	9	3.24	----	1.31	''	120-130
27.56	7.20	0.300	4.2	7	7	3.29	----	1.11	''	100-110
28.09	11.40	0.460	4.0	11	11	3.36	----	1.62	''	120-130
28.51	14.30	0.500	3.5	10	9	3.41	----	1.68	Silty CLAY to CLAY	''
29.01	12.20	0.400	3.3	8	8	3.47	----	1.40	''	110-120
29.54	13.00	0.450	3.5	9	9	3.53	----	1.50	''	120-130
30.07	11.90	0.410	3.4	8	8	3.59	----	1.68	''	110-120
30.59	15.20	0.510	3.4	10	10	3.66	----	1.78	''	120-130
31.01	16.50	0.580	3.5	11	11	3.71	----	1.95	''	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-06
DATE : 06-01-2005
Groundwater measured at 4.0 feet
Terminated at 31.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.58	32.40	1.100	3.4	16	26	0.07	----	4.32	Clayey SILT to Silty CLAY	130-140
1.52	24.20	1.140	4.7	24	39	0.20	----	3.21	CLAY	''
2.05	18.80	0.950	5.1	19	30	0.27	----	2.49	''	''
2.55	18.80	1.000	5.3	19	30	0.33	----	2.48	''	''
3.08	11.20	0.620	5.5	11	18	0.40	----	1.83	''	120-130
4.03	9.30	0.390	4.2	9	15	0.51	----	1.51	''	110-120
4.55	15.00	0.660	4.4	15	24	0.58	----	1.96	''	120-130
5.08	20.80	0.860	4.1	14	22	0.65	----	2.73	Silty CLAY to CLAY	130-140
5.51	12.60	0.590	4.7	13	20	0.70	----	1.63	CLAY	120-130
6.00	31.70	0.370	1.2	11	17	0.76	34	----	Silty SAND to Sandy SILT	110-120
6.53	14.30	0.310	2.2	7	11	0.82	----	1.85	Clayey SILT to Silty CLAY	''
7.05	24.40	0.440	1.8	10	16	0.88	----	3.19	Sandy SILT to Clayey SILT	120-130
7.57	37.50	1.000	2.7	15	24	0.95	----	4.94	''	130-140
8.09	19.10	0.700	3.7	13	20	1.02	----	2.48	Silty CLAY to CLAY	120-130
8.51	23.60	1.150	4.9	24	38	1.07	----	3.08	CLAY	130-140
9.07	12.70	0.600	4.7	13	20	1.14	----	1.62	''	120-130
9.58	17.50	0.900	5.1	18	28	1.21	----	2.25	''	''
10.52	19.60	0.910	4.6	20	30	1.33	----	2.52	''	130-140
11.03	24.30	1.100	4.5	24	36	1.40	----	3.15	''	''
11.54	30.60	1.070	3.5	15	22	1.47	----	3.98	Clayey SILT to Silty CLAY	''
12.06	24.00	0.950	4.0	16	23	1.54	----	3.10	Silty CLAY to CLAY	''
12.57	14.50	0.540	3.7	10	13	1.61	----	1.83	''	120-130
13.09	13.30	0.360	2.7	7	9	1.67	----	1.66	Clayey SILT to Silty CLAY	110-120
13.50	8.70	0.230	2.6	6	8	1.71	----	1.57	Silty CLAY to CLAY	100-110
14.02	11.70	0.300	2.6	6	8	1.77	----	1.80	Clayey SILT to Silty CLAY	110-120
14.53	17.80	0.530	3.0	9	12	1.83	----	2.25	''	120-130
15.05	15.10	0.560	3.7	10	13	1.90	----	1.89	Silty CLAY to CLAY	''
15.54	20.80	0.790	3.8	14	18	1.96	----	2.64	''	''
16.06	31.40	0.540	1.7	13	16	2.02	----	4.05	Sandy SILT to Clayey SILT	''
16.58	7.40	0.290	3.9	7	9	2.08	----	1.27	CLAY	100-110
17.10	6.30	0.150	2.4	4	5	2.13	----	1.05	Silty CLAY to CLAY	90-100
17.51	9.70	0.270	2.8	6	8	2.18	----	1.44	''	110-120
18.03	11.80	0.560	4.7	12	15	2.24	----	1.78	CLAY	120-130
18.54	10.00	0.560	5.6	10	12	2.30	----	1.47	''	''
19.05	9.30	0.280	3.0	6	8	2.36	----	1.35	Silty CLAY to CLAY	110-120
19.57	13.20	0.390	3.0	9	11	2.43	----	1.60	''	120-130
20.08	15.00	0.520	3.5	10	12	2.49	----	1.83	''	''
20.60	18.40	0.790	4.3	18	21	2.56	----	2.28	CLAY	''
21.01	27.80	1.180	4.2	19	21	2.61	----	3.53	Silty CLAY to CLAY	130-140
21.53	12.00	0.530	4.4	12	14	2.68	----	1.42	CLAY	120-130
22.58	23.60	1.460	6.2	24	26	2.82	----	2.96	''	130-140
23.09	19.10	1.230	6.4	19	21	2.89	----	2.35	''	''
23.60	18.10	0.880	4.9	18	20	2.95	----	2.22	''	120-130
24.00	15.90	0.780	4.9	16	17	3.00	----	1.92	''	''
24.50	14.20	0.540	3.8	9	10	3.06	----	1.69	Silty CLAY to CLAY	''
25.02	14.80	0.640	4.3	15	16	3.13	----	1.76	CLAY	''
25.53	10.90	0.410	3.8	11	11	3.19	----	1.55	''	110-120
26.03	9.90	0.330	3.3	7	7	3.24	----	1.38	Silty CLAY to CLAY	''
26.55	10.60	0.340	3.2	7	7	3.30	----	1.49	''	''
27.07	13.10	0.440	3.4	9	9	3.37	----	1.52	''	120-130
27.59	11.90	0.410	3.4	8	8	3.43	----	1.70	''	110-120
28.00	13.40	0.570	4.3	13	14	3.48	----	1.55	CLAY	120-130
28.56	17.10	0.810	4.7	17	17	3.55	----	2.04	''	''
29.08	15.30	0.560	3.7	10	10	3.62	----	1.80	Silty CLAY to CLAY	''
29.60	17.70	0.460	2.6	9	9	3.68	----	2.11	Clayey SILT to Silty CLAY	''
30.01	15.40	0.450	2.9	8	8	3.73	----	1.80	''	''
30.53	18.70	0.670	3.6	12	12	3.80	----	2.24	Silty CLAY to CLAY	''
31.04	38.70	1.670	4.3	26	26	3.87	----	4.90	''	130-140

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-07
DATE : 05-31-2005
Groundwater measured at 4.1 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.56	18.20	0.970	5.3	18	29	0.07	----	2.42	''	130-140
1.01	35.60	1.630	4.6	24	38	0.13	----	4.74	Silty CLAY to CLAY	''
1.54	23.30	1.890	8.1	23	37	0.20	----	3.09	CLAY	''
2.07	18.70	1.640	8.8	19	30	0.27	----	2.48	''	''
2.55	17.50	1.450	8.3	18	28	0.33	----	2.31	''	''
3.08	13.90	1.080	7.8	14	22	0.40	----	1.83	''	120-130
3.53	9.80	0.710	7.2	10	16	0.46	----	1.60	''	''
4.07	11.40	0.510	4.5	11	18	0.52	----	1.86	''	''
4.52	7.70	0.410	5.3	8	12	0.58	----	1.48	''	110-120
5.06	4.30	0.210	4.9	4	7	0.63	----	0.80	''	90-100
5.51	6.40	0.270	4.2	6	10	0.67	----	1.21	''	100-110
6.06	5.30	0.290	5.5	5	8	0.73	----	0.99	''	''
6.51	7.10	0.280	3.9	7	11	0.78	----	1.34	''	''
7.06	8.70	0.370	4.3	9	14	0.84	----	1.66	''	110-120
7.51	9.40	0.410	4.4	9	15	0.89	----	1.49	''	''
8.05	9.80	0.460	4.7	10	16	0.96	----	1.55	''	''
8.58	12.00	0.640	5.3	12	19	1.02	----	1.53	''	120-130
9.03	11.40	0.550	4.8	11	18	1.08	----	1.81	''	''
9.50	8.00	0.450	5.6	8	13	1.13	----	1.49	''	110-120
10.05	9.10	0.610	6.7	9	14	1.20	----	1.42	''	120-130
10.59	7.50	0.490	6.5	8	12	1.26	----	1.37	''	110-120
11.03	8.00	0.350	4.4	8	12	1.32	----	1.47	''	''
11.57	9.00	0.300	3.3	9	13	1.38	----	1.39	''	''
12.02	8.40	0.300	3.6	8	12	1.43	----	1.54	''	''
12.57	10.70	0.490	4.6	11	15	1.50	----	1.66	''	120-130
13.01	8.90	0.270	3.0	6	8	1.54	----	1.63	Silty CLAY to CLAY	100-110
13.56	6.50	0.190	2.9	7	9	1.60	----	1.14	CLAY	''
14.01	4.70	0.150	3.2	5	7	1.64	----	0.78	''	90-100
14.54	9.60	0.210	2.2	5	7	1.70	----	1.46	Clayey SILT to Silty CLAY	100-110
15.08	12.10	0.390	3.2	8	11	1.76	----	1.50	Silty CLAY to CLAY	110-120
15.53	11.30	0.570	5.0	11	15	1.82	----	1.73	CLAY	120-130
16.08	8.00	0.330	4.1	8	11	1.88	----	1.41	''	110-120
16.53	8.70	0.300	3.4	9	11	1.93	----	1.55	''	''
17.06	5.30	0.200	3.8	5	7	1.99	----	0.86	''	100-110
17.50	5.10	0.270	5.3	5	7	2.03	----	0.82	''	''
18.03	20.00	0.480	2.4	10	13	2.10	----	2.53	Clayey SILT to Silty CLAY	120-130
18.56	10.00	0.690	6.9	10	13	2.17	----	1.49	CLAY	''
19.06	45.30	1.370	3.0	18	23	2.23	----	5.89	Sandy SILT to Clayey SILT	130-140
19.50	8.80	0.350	4.0	9	11	2.29	----	1.53	CLAY	110-120
20.03	13.40	0.440	3.3	9	11	2.35	----	1.63	Silty CLAY to CLAY	120-130
20.56	11.30	0.430	3.8	11	14	2.41	----	1.68	CLAY	110-120
21.09	11.50	0.410	3.6	8	9	2.47	----	1.71	Silty CLAY to CLAY	''
21.52	10.50	0.430	4.1	11	12	2.52	----	1.54	CLAY	''
22.05	11.50	0.710	6.2	12	13	2.59	----	1.70	''	120-130
22.54	11.90	0.620	5.2	12	14	2.65	----	1.76	''	''
23.08	12.20	0.550	4.5	12	14	2.72	----	1.45	''	''
23.52	14.20	0.550	3.9	9	11	2.77	----	1.71	Silty CLAY to CLAY	''
24.03	24.50	0.910	3.7	16	18	2.84	----	3.08	''	130-140
24.55	14.40	0.590	4.1	14	16	2.91	----	1.73	CLAY	120-130
25.07	14.10	0.450	3.2	9	10	2.97	----	1.68	Silty CLAY to CLAY	''
25.58	12.00	0.450	3.8	12	13	3.04	----	1.40	CLAY	''
26.02	10.40	0.470	4.5	10	11	3.09	----	1.48	''	110-120
26.55	13.80	0.650	4.7	14	15	3.15	----	1.63	''	120-130
27.08	15.40	0.660	4.3	15	16	3.22	----	1.84	''	''
27.51	22.80	0.940	4.1	15	16	3.28	----	2.82	Silty CLAY to CLAY	130-140
28.04	26.40	1.850	7.0	26	27	3.35	----	3.30	CLAY	''
28.56	30.70	2.740	8.9	31	32	3.42	----	3.87	''	''
29.02	140.50	4.390	3.1	56	57	3.48	----	18.50	Sandy SILT to Clayey SILT	''
29.53	172.20	5.540	3.2	69	70	3.55	----	22.72	''	''
30.01	140.60	3.000	2.1	47	47	3.61	40	----	Silty SAND to Sandy SILT	''

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-08
DATE : 06-27-2005
Groundwater measured at 4.8 feet
Terminated at 48.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	44.10	0.380	0.9	15	24	0.07	36	----	Silty SAND to Sandy SILT	110-120
1.02	36.20	0.300	0.8	12	19	0.11	35	----	''	100-110
1.55	25.10	0.890	3.5	13	20	0.18	----	3.33	Clayey SILT to Silty CLAY	130-140
2.01	30.40	1.960	6.4	30	49	0.25	----	4.04	CLAY	''
2.53	29.30	1.980	6.8	29	47	0.32	----	3.89	''	''
3.02	22.50	1.450	6.4	23	36	0.38	----	2.97	''	''
3.56	16.20	0.860	5.3	16	26	0.45	----	2.13	''	120-130
4.09	20.80	0.590	2.8	10	17	0.52	----	2.74	Clayey SILT to Silty CLAY	''
4.53	21.90	0.650	3.0	11	18	0.57	----	2.88	''	''
5.06	13.20	0.400	3.0	9	14	0.64	----	1.72	Silty CLAY to CLAY	''
5.51	6.80	0.140	2.1	5	7	0.68	----	1.29	''	90-100
6.03	7.20	0.170	2.4	5	8	0.74	----	1.37	''	100-110
6.55	7.60	0.190	2.5	5	8	0.79	----	1.44	''	''
7.00	14.90	0.250	1.7	7	12	0.84	----	1.93	Clayey SILT to Silty CLAY	110-120
7.55	7.00	0.160	2.3	5	7	0.90	----	1.31	Silty CLAY to CLAY	100-110
8.09	11.20	0.380	3.4	7	12	0.96	----	1.79	''	110-120
8.53	14.20	0.570	4.0	14	23	1.02	----	1.83	CLAY	120-130
9.07	15.80	0.590	3.7	11	17	1.08	----	2.03	Silty CLAY to CLAY	''
9.54	18.90	0.790	4.2	13	20	1.14	----	2.44	''	''
10.08	17.30	0.560	3.2	9	13	1.21	----	2.23	Clayey SILT to Silty CLAY	''
10.53	19.90	0.600	3.0	10	15	1.27	----	2.57	''	''
11.07	16.00	0.480	3.0	8	12	1.33	----	2.04	''	''
11.52	12.70	0.290	2.3	6	9	1.39	----	1.60	''	110-120
12.05	13.00	0.350	2.7	7	9	1.45	----	1.64	''	''
12.50	13.30	0.440	3.3	9	12	1.50	----	1.67	Silty CLAY to CLAY	120-130
13.04	13.80	0.460	3.3	9	13	1.57	----	1.74	''	''
13.58	12.40	0.340	2.7	6	8	1.63	----	1.54	Clayey SILT to Silty CLAY	110-120
14.03	10.50	0.190	1.8	5	7	1.68	----	1.61	''	100-110
14.57	10.80	0.250	2.3	5	7	1.74	----	1.65	''	110-120
15.01	10.00	0.260	2.6	7	9	1.79	----	1.52	Silty CLAY to CLAY	''
15.55	15.50	0.300	1.9	8	10	1.85	----	1.94	Clayey SILT to Silty CLAY	''
16.08	11.10	0.230	2.1	6	7	1.91	----	1.69	''	100-110
16.53	13.90	0.230	1.7	7	9	1.96	----	1.72	''	''
17.03	13.30	0.350	2.6	7	8	2.02	----	1.64	''	110-120
17.56	12.90	0.300	2.3	6	8	2.08	----	1.58	''	''
18.01	18.80	0.670	3.6	13	16	2.13	----	2.36	Silty CLAY to CLAY	120-130
18.54	23.00	0.570	2.5	12	14	2.20	----	2.92	Clayey SILT to Silty CLAY	''
19.02	10.50	0.240	2.3	5	6	2.25	----	1.56	''	100-110
19.56	9.00	0.210	2.3	6	7	2.31	----	1.31	Silty CLAY to CLAY	''
20.01	9.30	0.200	2.2	5	6	2.35	----	1.35	Clayey SILT to Silty CLAY	''
20.54	9.30	0.150	1.6	5	6	2.41	----	1.35	''	''
21.07	31.90	0.710	2.2	13	15	2.48	----	4.09	Sandy SILT to Clayey SILT	120-130
21.58	39.80	0.940	2.4	16	18	2.54	----	5.14	''	130-140
22.00	11.90	0.510	4.3	12	14	2.60	----	1.77	CLAY	120-130
22.54	10.90	0.340	3.1	7	8	2.66	----	1.60	Silty CLAY to CLAY	110-120
23.07	14.50	0.320	2.2	7	8	2.72	----	1.75	Clayey SILT to Silty CLAY	''
23.51	19.50	0.460	2.4	10	11	2.77	----	2.42	''	120-130
24.04	31.40	0.920	2.9	16	17	2.85	----	4.00	''	130-140
24.57	11.80	0.320	2.7	6	6	2.91	----	1.72	''	110-120
25.01	10.90	0.220	2.0	5	6	2.95	----	1.57	''	100-110
25.58	13.70	0.470	3.4	9	10	3.02	----	1.63	Silty CLAY to CLAY	120-130
26.02	12.60	0.520	4.1	13	13	3.08	----	1.47	CLAY	''
26.55	16.10	0.670	4.2	16	17	3.15	----	1.94	''	''
27.08	18.00	0.620	3.4	12	13	3.21	----	2.19	Silty CLAY to CLAY	''
27.53	18.50	0.660	3.6	12	13	3.27	----	2.25	''	''
28.02	15.50	0.680	4.4	16	16	3.33	----	1.84	CLAY	''
28.54	48.20	1.850	3.8	24	25	3.40	----	6.20	Clayey SILT to Silty CLAY	130-140
29.08	105.00	2.360	2.2	35	36	3.47	38	----	Silty SAND to Sandy SILT	''
29.57	419.30	3.030	0.7	70	70	3.53	46	----	Gravelly SAND to SAND	110-120
30.03	266.90	2.540	1.0	53	53	3.59	44	----	SAND	120-130
30.50	204.10	3.980	2.0	51	51	3.65	42	----	SAND to Silty SAND	130-140
31.01	245.00	2.390	1.0	49	49	3.71	43	----	SAND	120-130
31.54	18.40	0.810	4.4	18	18	3.78	----	2.20	CLAY	''

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-08
DATE : 06-27-2005
Groundwater measured at 4.8 feet
Terminated at 48.5 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
32.06	12.90	0.270	2.1	6	6	3.84	----	1.46	Clayey SILT to Silty CLAY	110-120
32.56	12.20	0.230	1.9	6	6	3.89	----	1.37	''	100-110
33.07	13.50	0.360	2.7	7	7	3.95	----	1.54	''	110-120
33.51	13.70	0.540	3.9	14	14	4.01	----	1.56	CLAY	120-130
34.04	12.80	0.400	3.1	9	8	4.07	----	1.44	Silty CLAY to CLAY	110-120
34.57	38.70	1.560	4.0	19	19	4.14	----	4.88	Clayey SILT to Silty CLAY	130-140
35.01	26.30	1.060	4.0	18	17	4.20	----	3.23	Silty CLAY to CLAY	''
35.55	16.10	0.550	3.4	11	11	4.26	----	1.86	''	120-130
36.06	14.90	0.490	3.3	10	10	4.33	----	1.70	''	''
36.59	14.90	0.500	3.4	10	10	4.39	----	1.69	''	''
37.02	15.20	0.460	3.0	8	8	4.45	----	1.73	Clayey SILT to Silty CLAY	''
37.55	12.70	0.480	3.8	8	8	4.51	----	1.39	Silty CLAY to CLAY	''
38.05	17.80	0.570	3.2	9	9	4.58	----	2.07	Clayey SILT to Silty CLAY	''
38.56	15.20	0.580	3.8	10	10	4.64	----	1.72	Silty CLAY to CLAY	''
39.05	45.30	1.490	3.3	23	22	4.71	----	5.73	Clayey SILT to Silty CLAY	130-140
39.56	53.30	2.410	4.5	36	34	4.78	----	6.79	Silty CLAY to CLAY	''
40.07	69.60	3.710	5.3	70	66	4.85	----	8.96	Very Stiff Fine Grained *	''
40.58	48.50	2.990	6.2	49	45	4.91	----	6.14	CLAY	''
41.07	25.90	1.530	5.9	26	24	4.98	----	3.12	''	''
41.55	24.50	0.160	0.7	8	8	5.03	29	----	Silty SAND to Sandy SILT	90-100
42.04	39.40	1.700	4.3	26	24	5.09	----	4.91	Silty CLAY to CLAY	130-140
42.54	59.90	2.150	3.6	30	27	5.16	----	7.64	Clayey SILT to Silty CLAY	''
43.04	63.80	2.990	4.7	43	38	5.23	----	8.16	Silty CLAY to CLAY	''
43.53	43.70	1.800	4.1	22	19	5.29	----	5.47	Clayey SILT to Silty CLAY	''
44.03	39.40	1.380	3.5	20	17	5.36	----	4.90	''	''
44.55	38.90	1.280	3.3	19	16	5.43	----	4.82	''	''
45.05	30.70	1.380	4.5	20	17	5.50	----	3.73	Silty CLAY to CLAY	''
45.50	28.90	1.340	4.6	19	16	5.56	----	3.48	''	''
46.08	197.10	2.190	1.1	39	32	5.63	41	----	SAND	120-130
46.54	345.80	3.240	0.9	69	57	5.69	44	----	''	''
47.01	640.30	3.650	0.6	107	87	5.74	48	----	Gravelly SAND to SAND	110-120
47.51	488.10	5.090	1.0	98	79	5.81	46	----	SAND	120-130
48.01	363.10	8.000	2.2	73	59	5.87	44	----	''	130-140
48.10	234.50	6.400	2.7	78	63	5.88	42	----	Silty SAND to Sandy SILT	''
48.53	297.90	3.290	1.1	60	48	5.94	43	----	SAND	120-130

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-09
DATE : 06-01-2005
Groundwater measured at 4.7 feet
Terminated at 35.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.60	16.90	0.690	4.1	11	18	0.07	----	2.25	''	120-130
1.03	13.80	0.990	7.2	14	22	0.12	----	1.83	CLAY	''
1.57	24.00	1.810	7.5	24	38	0.20	----	3.19	''	130-140
2.50	18.10	1.520	8.4	18	29	0.32	----	2.39	''	''
3.04	10.70	0.830	7.8	11	17	0.39	----	1.75	''	120-130
3.58	10.70	0.570	5.3	11	17	0.46	----	1.75	''	''
4.01	10.00	0.620	6.2	10	16	0.51	----	1.62	''	''
4.55	24.90	0.610	2.4	10	16	0.58	----	3.28	Sandy SILT to Clayey SILT	''
5.09	25.10	0.420	1.7	10	16	0.65	----	3.30	''	''
5.51	10.80	0.260	2.4	5	9	0.69	----	1.74	Clayey SILT to Silty CLAY	110-120
6.02	33.80	0.250	0.7	11	18	0.75	34	----	Silty SAND to Sandy SILT	100-110
6.56	59.80	0.350	0.6	15	24	0.80	38	----	SAND to Silty SAND	''
7.09	80.80	0.770	1.0	20	32	0.87	39	----	''	120-130
7.52	90.90	1.090	1.2	23	36	0.92	40	----	''	''
8.05	74.70	1.130	1.5	25	40	1.00	39	----	Silty SAND to Sandy SILT	130-140
8.57	111.50	0.720	0.6	22	36	1.06	41	----	SAND	110-120
9.07	128.30	0.590	0.5	26	40	1.11	42	----	''	100-110
9.59	132.70	1.450	1.1	33	51	1.17	42	----	SAND to Silty SAND	120-130
10.00	158.90	1.790	1.1	32	48	1.22	43	----	SAND	''
10.51	149.70	2.030	1.4	37	55	1.29	43	----	SAND to Silty SAND	130-140
11.01	187.00	1.440	0.8	37	54	1.35	44	----	SAND	110-120
11.51	218.80	1.710	0.8	44	62	1.41	45	----	''	''
12.52	202.90	4.090	2.0	51	70	1.55	44	----	SAND to Silty SAND	130-140
13.02	228.50	4.880	2.1	57	77	1.61	45	----	''	''
13.53	224.70	2.750	1.2	45	60	1.68	44	----	SAND	''
14.00	236.40	3.220	1.4	47	62	1.75	45	----	''	''
14.57	177.40	1.970	1.1	35	46	1.82	43	----	''	120-130
15.05	185.20	1.040	0.6	37	48	1.87	43	----	''	110-120
15.60	175.90	4.740	2.7	59	74	1.95	43	----	Silty SAND to Sandy SILT	130-140
16.07	202.80	2.990	1.5	41	51	2.01	43	----	SAND	''
16.57	140.00	3.140	2.2	47	58	2.08	41	----	Silty SAND to Sandy SILT	''
17.07	182.60	4.610	2.5	61	74	2.14	43	----	''	''
17.55	158.10	3.550	2.2	53	63	2.21	42	----	''	''
18.03	247.00	2.200	0.9	49	59	2.27	44	----	SAND	120-130
18.54	277.20	4.250	1.5	55	65	2.34	45	----	''	130-140
19.02	321.90	5.630	1.7	64	74	2.40	46	----	''	''
19.52	180.80	2.870	1.6	45	51	2.47	42	----	SAND to Silty SAND	''
20.07	222.90	3.830	1.7	45	50	2.54	43	----	SAND	''
20.58	367.40	8.620	2.3	184	204	2.61	46	----	SAND to Clayey SAND *	''
21.02	393.00	7.860	2.0	79	86	2.67	46	----	SAND	''
21.53	372.40	9.020	2.4	186	202	2.74	46	----	SAND to Clayey SAND *	''
22.05	316.40	3.870	1.2	63	68	2.81	45	----	SAND	''
22.55	334.30	9.390	2.8	167	177	2.88	45	----	SAND to Clayey SAND *	>140
23.08	351.50	6.350	1.8	70	74	2.95	46	----	SAND	130-140
23.51	420.80	5.730	1.4	84	88	3.01	47	----	''	''
24.03	109.70	4.370	4.0	110	113	3.08	----	14.42	Very Stiff Fine Grained *	''
24.55	16.10	0.350	2.2	8	8	3.14	----	1.94	Clayey SILT to Silty CLAY	110-120
25.52	15.50	0.330	2.1	8	8	3.25	----	1.85	''	''
26.06	14.20	0.420	3.0	7	7	3.32	----	1.67	''	120-130
26.60	15.40	0.380	2.5	8	8	3.39	----	1.83	''	''
27.03	20.30	0.650	3.2	10	10	3.44	----	2.48	''	''
27.57	12.60	0.480	3.8	13	13	3.51	----	1.45	CLAY	''
28.00	16.10	0.540	3.4	11	11	3.56	----	1.91	Silty CLAY to CLAY	''
28.55	10.10	0.400	4.0	10	10	3.63	----	1.38	CLAY	110-120
29.09	13.70	0.320	2.3	7	7	3.69	----	1.58	Clayey SILT to Silty CLAY	''
29.53	18.10	0.630	3.5	12	12	3.74	----	2.16	Silty CLAY to CLAY	120-130
30.08	19.90	0.700	3.5	13	13	3.81	----	2.40	''	''
30.51	21.90	0.950	4.3	15	15	3.87	----	2.66	''	130-140
31.05	20.40	0.710	3.5	10	10	3.94	----	2.46	Clayey SILT to Silty CLAY	120-130
31.59	23.20	0.970	4.2	15	15	4.01	----	2.83	Silty CLAY to CLAY	130-140
32.04	9.80	0.330	3.4	7	6	4.06	----	1.29	''	110-120
32.58	11.50	0.420	3.7	8	8	4.12	----	1.57	''	''
33.09	12.30	0.450	3.7	8	8	4.19	----	1.36	''	120-130
33.52	13.80	0.570	4.1	14	14	4.24	----	1.56	CLAY	''
34.09	12.80	0.430	3.4	9	8	4.31	----	1.42	Silty CLAY to CLAY	''

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-09
DATE : 06-01-2005
Groundwater measured at 4.7 feet
Terminated at 35.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
35.53	14.20	0.001	0.0	6	6	4.43	----	1.60	Sandy SILT to Clayey SILT	<80

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER
LOCATION: Santa Rosa CA
PROJ. NO.: 6486.2.003.01(EGO-92)

CPT NO.: CPT02-10
DATE : 05-31-2005
Groundwater measured at 4.5 feet
Terminated at 30.0 feet

DEPTH (feet)	Qc (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT (N')	TotVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.54	29.70	1.190	4.0	20	32	0.06	----	3.96	Silty CLAY to CLAY	''
1.05	13.90	0.530	3.8	9	15	0.13	----	1.84	''	120-130
1.56	9.50	0.690	7.3	10	15	0.19	----	1.57	CLAY	''
2.07	12.60	0.800	6.3	13	20	0.25	----	1.66	''	''
2.56	10.60	0.810	7.6	11	17	0.32	----	1.74	''	''
3.07	8.00	0.500	6.3	8	13	0.37	----	1.56	''	110-120
3.59	6.90	0.480	7.0	7	11	0.43	----	1.34	''	''
4.00	6.40	0.350	5.5	6	10	0.48	----	1.23	''	''
4.51	6.30	0.260	4.1	6	10	0.54	----	1.21	''	100-110
5.03	5.40	0.210	3.9	5	9	0.59	----	1.02	''	''
5.59	6.60	0.320	4.8	7	11	0.65	----	1.26	''	''
6.00	21.30	0.990	4.6	21	34	0.70	----	2.79	''	130-140
6.52	18.40	1.100	6.0	18	29	0.77	----	2.40	''	''
7.01	54.70	0.550	1.0	18	29	0.83	37	----	Silty SAND to Sandy SILT	120-130
7.52	70.80	0.450	0.6	18	28	0.89	39	----	SAND to Silty SAND	100-110
8.02	88.00	0.970	1.1	22	35	0.95	40	----	''	120-130
8.52	104.90	0.540	0.5	21	34	1.00	41	----	SAND	100-110
9.01	121.80	0.900	0.7	24	39	1.06	42	----	''	110-120
9.51	122.70	1.220	1.0	31	49	1.12	42	----	SAND to Silty SAND	120-130
10.00	142.80	1.060	0.7	29	46	1.18	43	----	SAND	110-120
10.59	150.90	1.330	0.9	30	47	1.25	43	----	''	120-130
11.07	154.10	2.510	1.6	39	59	1.32	43	----	SAND to Silty SAND	130-140
11.55	148.10	1.370	0.9	30	44	1.38	43	----	SAND	120-130
12.04	236.80	2.580	1.1	47	69	1.44	45	----	''	''
12.54	164.00	1.440	0.9	33	47	1.50	43	----	''	''
13.03	131.20	1.300	1.0	26	37	1.56	42	----	''	''
13.52	108.10	0.910	0.8	27	37	1.62	40	----	SAND to Silty SAND	''
14.09	173.10	2.730	1.6	43	59	1.70	43	----	''	130-140
14.56	213.90	2.150	1.0	43	58	1.76	44	----	SAND	120-130
15.02	193.80	0.980	0.5	39	52	1.81	43	----	''	100-110
15.52	134.60	1.490	1.1	34	44	1.87	41	----	SAND to Silty SAND	120-130
16.09	174.80	3.720	2.1	58	76	1.95	43	----	Silty SAND to Sandy SILT	130-140
16.56	183.50	1.910	1.0	37	47	2.00	43	----	SAND	120-130
17.03	191.80	5.260	2.7	64	81	2.07	43	----	Silty SAND to Sandy SILT	130-140
17.57	202.50	1.720	0.8	41	51	2.14	43	----	SAND	120-130
18.01	260.60	6.090	2.3	87	107	2.20	45	----	Silty SAND to Sandy SILT	130-140
18.52	260.40	3.100	1.2	52	63	2.27	45	----	SAND	''
19.07	405.80	7.860	1.9	81	97	2.34	47	----	''	''
19.50	379.60	6.100	1.6	76	90	2.40	47	----	''	''
20.01	356.50	5.740	1.6	71	83	2.47	46	----	''	''
20.51	243.00	4.110	1.7	49	56	2.53	44	----	''	''
21.08	290.20	3.680	1.3	58	66	2.61	45	----	''	''
21.56	334.30	2.130	0.6	56	63	2.67	46	----	Gravelly SAND to SAND	110-120
22.08	343.70	7.550	2.2	69	76	2.74	46	----	SAND	130-140
22.52	206.80	6.070	2.9	69	76	2.79	43	----	Silty SAND to Sandy SILT	''
23.03	94.70	1.420	1.5	24	26	2.86	38	----	SAND to Silty SAND	''
23.56	38.50	0.610	1.6	13	14	2.93	33	----	Silty SAND to Sandy SILT	120-130
24.03	30.80	1.200	3.9	15	16	2.99	----	3.91	Clayey SILT to Silty CLAY	130-140
24.58	182.50	3.300	1.8	46	48	3.07	42	----	SAND to Silty SAND	''
25.05	217.70	1.380	0.6	44	46	3.12	43	----	SAND	110-120
25.51	277.90	4.440	1.6	56	58	3.18	44	----	''	130-140
26.05	337.60	7.380	2.2	68	69	3.26	45	----	''	''
26.52	69.70	3.020	4.3	35	36	3.32	----	9.07	Clayey SILT to Silty CLAY	''
27.02	8.10	0.480	5.9	8	8	3.38	----	1.28	CLAY	110-120
27.59	11.40	0.530	4.6	11	11	3.45	----	1.61	''	120-130
28.07	16.40	0.580	3.5	11	11	3.51	----	1.95	Silty CLAY to CLAY	''
28.57	15.50	0.420	2.7	8	8	3.57	----	1.83	Clayey SILT to Silty CLAY	''
29.08	15.60	0.430	2.8	8	8	3.63	----	1.84	''	''
29.59	20.90	0.940	4.5	21	21	3.70	----	2.54	CLAY	130-140
30.51	41.70	0.001	0.0	10	10	3.78	33	----	SAND to Silty SAND	<80

DEPTH = Sampling interval (2 inches)
Qc = Tip bearing resistance
Fs = Sleeve friction resistance
Rf = Tip/Sleeve ratio
SPT = Equivalent Standard Penetration Test*
TotStr = Total Stress using est. density**
Phi = Soil friction angle*
Su = Undrained Soil Strength* (Nk=10 for Qc<9 tsf) (Nk=12 for Qc=9 to 12 tsf) (Nk=15 for Qc>12 tsf)

References: * Robertson and Campanella, 1988
** Olsen, 1989 *** Durgunoglu & Mitchell, 1975

John Sarmiento & Associates
Cone Penetration Testing Service

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-11
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 14:19:45
Terminated at 35.0 feet Groundwater measured at 4.3 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.59	30.80	49.28	1.190	3.9	15	25	0.07	----	4.10	"	130-140
0.70	30.50	48.80	1.150	3.8	15	24	0.08	----	4.06	"	"
0.81	30.10	48.16	1.100	3.7	15	24	0.10	----	4.01	"	"
0.91	29.90	47.84	1.060	3.5	15	24	0.11	----	3.98	"	"
1.02	29.40	47.04	1.120	3.8	15	24	0.13	----	3.91	"	"
1.13	28.20	45.12	1.240	4.4	19	30	0.14	----	3.75	Silty CLAY to CLAY	"
1.23	25.70	41.12	1.430	5.6	26	41	0.16	----	3.42	CLAY	"
1.34	25.40	40.64	1.560	6.1	25	41	0.17	----	3.38	"	"
1.45	24.90	39.84	1.600	6.4	25	40	0.19	----	3.31	"	"
1.55	24.80	39.68	1.580	6.4	25	40	0.20	----	3.29	"	"
1.66	24.50	39.20	1.530	6.2	25	39	0.21	----	3.25	"	"
1.77	22.60	36.16	1.450	6.4	23	36	0.23	----	3.00	"	"
1.88	22.20	35.52	1.260	5.7	22	36	0.24	----	2.94	"	"
1.98	22.10	35.36	1.270	5.7	22	35	0.26	----	2.93	"	"
2.09	22.00	35.20	1.270	5.8	22	35	0.27	----	2.92	"	"
2.12	22.20	35.52	1.270	5.7	22	36	0.28	----	2.94	"	"
2.22	21.30	34.08	1.310	6.2	21	34	0.29	----	2.82	"	"
2.33	20.10	32.16	1.290	6.4	20	32	0.30	----	2.66	"	"
2.44	17.80	28.48	1.220	6.9	18	28	0.32	----	2.35	"	"
2.55	16.30	26.08	1.110	6.8	16	26	0.33	----	2.15	"	"
2.66	14.60	23.36	1.000	6.8	15	23	0.35	----	1.92	"	120-130
2.77	13.10	20.96	0.920	7.0	13	21	0.36	----	1.72	"	"
2.87	12.20	19.52	0.850	7.0	12	20	0.37	----	1.60	"	"
2.98	10.90	17.44	0.800	7.3	11	17	0.39	----	1.78	"	"
3.09	9.70	15.52	0.740	7.6	10	16	0.40	----	1.58	"	"
3.20	9.10	14.56	0.680	7.5	9	15	0.42	----	1.48	"	"
3.31	8.80	14.08	0.630	7.2	9	14	0.43	----	1.72	"	"
3.42	8.10	12.96	0.570	7.0	8	13	0.44	----	1.58	"	110-120
3.53	7.50	12.00	0.540	7.2	8	12	0.45	----	1.45	"	"
3.64	8.50	13.60	0.560	6.6	9	14	0.47	----	1.65	"	"
3.74	9.30	14.88	0.560	6.0	9	15	0.48	----	1.51	"	120-130
3.85	9.70	15.52	0.550	5.7	10	16	0.49	----	1.58	"	"
3.96	9.80	15.68	0.530	5.4	10	16	0.51	----	1.59	"	"
4.07	7.40	11.84	0.480	6.5	7	12	0.52	----	1.43	"	110-120
4.18	7.10	11.36	0.460	6.5	7	11	0.53	----	1.37	"	"
4.29	7.20	11.52	0.420	5.8	7	12	0.54	----	1.39	"	"
4.39	8.50	13.60	0.390	4.6	9	14	0.55	----	1.64	"	"
4.50	8.50	13.60	0.390	4.6	9	14	0.56	----	1.64	"	"
4.61	10.90	17.44	0.400	3.7	11	17	0.56	----	1.77	"	"
4.72	10.70	17.12	0.370	3.5	7	11	0.57	----	1.73	Silty CLAY to CLAY	"
4.83	10.40	16.64	0.310	3.0	7	11	0.57	----	1.68	"	"
4.94	10.10	16.16	0.260	2.6	7	11	0.58	----	1.63	"	"
5.05	10.70	17.12	0.230	2.1	5	9	0.58	----	1.73	Clayey SILT to Silty CLAY	100-110
5.16	11.40	18.24	0.210	1.8	6	9	0.59	----	1.85	"	"
5.27	12.00	19.20	0.280	2.3	6	10	0.59	----	1.56	"	110-120
5.37	12.60	20.16	0.380	3.0	8	13	0.60	----	1.64	Silty CLAY to CLAY	"
5.44	17.50	28.00	0.430	2.5	9	14	0.60	----	2.29	Clayey SILT to Silty CLAY	120-130

5.55	17.10	27.36	0.490	2.9	9	14	0.61	----	2.23	"	"
5.66	14.90	23.84	0.490	3.3	10	16	0.62	----	1.94	Silty CLAY to CLAY	"
5.77	12.10	19.36	0.450	3.7	8	13	0.62	----	1.57	"	"
5.88	11.00	17.60	0.440	4.0	11	18	0.63	----	1.77	CLAY	110-120
5.99	12.50	20.00	0.480	3.8	13	20	0.64	----	1.62	"	120-130
6.10	15.00	24.00	0.510	3.4	10	16	0.64	----	1.95	Silty CLAY to CLAY	"
6.21	15.30	24.48	0.470	3.1	8	12	0.65	----	1.99	Clayey SILT to Silty CLAY	"
6.32	12.30	19.68	0.440	3.6	8	13	0.66	----	1.59	Silty CLAY to CLAY	"
6.43	10.40	16.64	0.450	4.3	10	17	0.66	----	1.67	CLAY	110-120
6.54	11.10	17.76	0.460	4.1	11	18	0.67	----	1.78	"	120-130
6.65	12.20	19.52	0.480	3.9	12	20	0.68	----	1.57	"	"
6.76	11.50	18.40	0.540	4.7	12	18	0.68	----	1.85	"	"
6.87	10.40	16.64	0.570	5.5	10	17	0.69	----	1.66	"	"
6.98	13.10	20.96	0.550	4.2	13	21	0.70	----	1.69	"	"
7.09	15.00	24.00	0.530	3.5	10	16	0.71	----	1.94	Silty CLAY to CLAY	"
7.20	12.80	20.48	0.560	4.4	13	20	0.71	----	1.65	CLAY	"
7.31	13.80	22.08	0.620	4.5	14	22	0.72	----	1.78	"	"
7.42	18.50	29.60	0.710	3.8	12	20	0.73	----	2.41	Silty CLAY to CLAY	"
7.53	23.60	37.76	0.830	3.5	12	19	0.73	----	3.08	Clayey SILT to Silty CLAY	130-140
7.63	23.80	38.08	0.850	3.6	12	19	0.74	----	3.11	"	"
7.74	23.20	37.12	0.820	3.5	12	19	0.75	----	3.03	"	"
7.85	23.10	36.96	0.810	3.5	12	18	0.76	----	3.01	"	"
7.96	24.50	39.20	0.740	3.0	12	20	0.76	----	3.20	"	"
8.07	26.30	42.08	0.630	2.4	11	17	0.77	----	3.44	Sandy SILT to Clayey SILT	120-130
8.17	29.40	47.04	0.520	1.8	12	19	0.78	----	3.85	"	"
8.28	33.50	53.60	0.410	1.2	11	18	0.78	34	----	Silty SAND to Sandy SILT	"
8.39	34.60	55.36	0.370	1.1	12	18	0.79	35	----	"	110-120
8.50	34.70	55.52	0.380	1.1	12	19	0.80	35	----	"	"
8.61	35.20	56.21	0.450	1.3	12	19	0.80	35	----	"	120-130
8.70	31.30	49.79	0.560	1.8	13	20	0.81	----	4.10	Sandy SILT to Clayey SILT	"
8.73	35.80	56.88	0.600	1.7	14	23	0.81	----	4.70	"	"
8.84	37.90	59.92	0.760	2.0	15	24	0.82	----	4.98	"	130-140
8.95	40.00	62.92	0.890	2.2	16	25	0.83	----	5.26	"	"
9.06	42.50	66.52	0.820	1.9	17	27	0.83	----	5.59	"	"
9.17	43.80	68.26	0.730	1.7	15	23	0.84	36	----	Silty SAND to Sandy SILT	120-130
9.28	42.40	65.80	0.660	1.6	14	22	0.85	36	----	"	"
9.38	39.80	61.45	0.770	1.9	16	25	0.86	----	5.23	Sandy SILT to Clayey SILT	130-140
9.49	38.50	59.14	0.920	2.4	15	24	0.86	----	5.05	"	"
9.60	36.60	55.93	1.040	2.8	15	22	0.87	----	4.80	"	"
9.71	31.90	48.50	1.140	3.6	16	24	0.88	----	4.17	Clayey SILT to Silty CLAY	"
9.81	39.70	60.05	1.040	2.6	16	24	0.89	----	5.21	Sandy SILT to Clayey SILT	"
9.92	49.60	74.64	1.000	2.0	20	30	0.90	----	6.53	"	"
10.03	63.50	95.14	0.860	1.4	21	32	0.90	38	----	Silty SAND to Sandy SILT	120-130
10.11	75.70	113.02	0.890	1.2	19	28	0.91	39	----	SAND to Silty SAND	"
10.22	84.60	125.74	0.790	0.9	21	31	0.91	39	----	"	"
10.32	91.60	135.65	0.650	0.7	23	34	0.92	40	----	"	110-120
10.43	88.50	130.56	0.630	0.7	22	33	0.92	40	----	"	"
10.53	84.00	123.46	0.610	0.7	21	31	0.93	39	----	"	"
10.64	80.30	117.58	0.510	0.6	20	29	0.94	39	----	"	"
10.74	75.80	110.57	0.540	0.7	19	28	0.94	39	----	"	"
10.85	67.60	98.16	0.730	1.1	17	25	0.95	38	----	"	120-130
10.95	68.70	99.30	0.790	1.1	17	25	0.95	38	----	"	"
11.06	64.30	92.45	0.990	1.5	21	31	0.96	38	----	Silty SAND to Sandy SILT	130-140
11.17	51.30	73.37	1.030	2.0	17	24	0.97	36	----	"	"
11.27	36.50	51.92	0.940	2.6	15	21	0.98	----	4.77	Sandy SILT to Clayey SILT	"

11.38	36.20	51.22	0.840	2.3	14	20	0.99	----	4.73	"	"
11.48	32.80	46.15	0.800	2.4	13	18	0.99	----	4.28	"	"
11.59	27.70	38.77	0.890	3.2	14	19	1.00	----	3.60	Clayey SILT to Silty CLAY	"
11.70	22.80	31.82	0.960	4.2	15	21	1.01	----	2.94	Silty CLAY to CLAY	"
11.80	21.50	29.93	0.790	3.7	14	20	1.02	----	2.77	"	120-130
11.91	23.70	32.91	0.730	3.1	12	16	1.02	----	3.06	Clayey SILT to Silty CLAY	"
11.98	21.60	29.95	0.660	3.1	11	15	1.03	----	2.78	"	"
12.09	30.90	42.73	0.550	1.8	12	17	1.03	----	4.02	Sandy SILT to Clayey SILT	"
12.20	30.30	41.79	0.490	1.6	12	17	1.04	----	3.94	"	"
12.30	27.80	38.25	0.460	1.7	11	15	1.05	----	3.60	"	"
12.41	25.90	35.55	0.460	1.8	10	14	1.05	----	3.35	"	"
12.52	23.90	32.72	0.520	2.2	10	13	1.06	----	3.08	"	"
12.62	22.20	30.31	0.610	2.7	11	15	1.07	----	2.85	Clayey SILT to Silty CLAY	"
12.73	20.10	27.37	0.650	3.2	10	14	1.07	----	2.57	"	"
12.84	21.20	28.80	0.620	2.9	11	14	1.08	----	2.72	"	"
12.95	24.50	33.20	0.540	2.2	10	13	1.09	----	3.16	Sandy SILT to Clayey SILT	"
13.06	26.10	35.27	0.470	1.8	10	14	1.09	----	3.37	"	"
13.16	20.60	27.77	0.430	2.1	8	11	1.10	----	2.64	"	"
13.27	15.10	20.30	0.420	2.8	8	10	1.11	----	1.90	Clayey SILT to Silty CLAY	"
13.38	12.80	17.16	0.440	3.4	9	11	1.11	----	1.59	Silty CLAY to CLAY	"
13.49	13.50	18.05	0.520	3.9	9	12	1.12	----	1.69	"	"
13.59	16.90	22.54	0.530	3.1	8	11	1.13	----	2.14	Clayey SILT to Silty CLAY	"
13.70	23.50	31.26	0.450	1.9	9	13	1.13	----	3.02	Sandy SILT to Clayey SILT	"
13.81	28.00	37.17	0.360	1.3	11	15	1.14	----	3.62	"	110-120
13.92	29.60	39.20	0.320	1.1	10	13	1.15	33	----	Silty SAND to Sandy SILT	"
14.03	28.00	36.99	0.420	1.5	11	15	1.15	----	3.62	Sandy SILT to Clayey SILT	120-130
14.13	25.60	33.73	0.500	2.0	10	13	1.16	----	3.30	"	"
14.24	22.80	29.96	0.500	2.2	9	12	1.17	----	2.92	"	"
14.34	20.50	26.87	0.500	2.4	10	13	1.17	----	2.61	Clayey SILT to Silty CLAY	"
14.45	30.10	39.34	0.520	1.7	12	16	1.18	----	3.89	Sandy SILT to Clayey SILT	"
14.56	39.70	51.75	0.550	1.4	13	17	1.19	34	----	Silty SAND to Sandy SILT	"
14.67	46.80	60.84	0.560	1.2	16	20	1.19	35	----	"	"
14.77	53.70	69.60	0.940	1.8	18	23	1.20	36	----	"	130-140
14.88	65.10	84.11	1.080	1.7	22	28	1.21	37	----	"	"
14.99	74.20	95.61	0.840	1.1	19	24	1.21	38	----	SAND to Silty SAND	120-130
15.09	67.90	87.26	0.950	1.4	23	29	1.22	37	----	Silty SAND to Sandy SILT	"
15.20	68.30	87.54	0.900	1.3	23	29	1.23	37	----	"	"
15.26	64.20	82.15	0.810	1.3	21	27	1.23	37	----	"	"
15.37	60.30	76.91	0.960	1.6	20	26	1.24	36	----	"	130-140
15.48	56.20	71.45	1.380	2.5	22	29	1.25	----	7.36	Sandy SILT to Clayey SILT	"
15.59	58.00	73.51	1.530	2.6	23	29	1.26	----	7.60	"	"
15.70	57.00	72.03	1.480	2.6	23	29	1.26	----	7.47	"	"
15.80	63.60	80.13	1.340	2.1	21	27	1.27	37	----	Silty SAND to Sandy SILT	"
15.91	73.50	92.34	1.410	1.9	25	31	1.28	38	----	"	"
16.02	82.30	103.09	1.370	1.7	27	34	1.29	38	----	"	"
16.12	92.60	115.65	1.510	1.6	31	39	1.29	39	----	"	"
16.23	92.70	115.43	1.630	1.8	31	38	1.30	39	----	"	"
16.34	105.80	131.40	1.380	1.3	26	33	1.31	40	----	SAND to Silty SAND	120-130
16.44	117.40	145.43	1.220	1.0	29	36	1.32	40	----	"	"
16.55	131.20	162.11	1.530	1.2	33	41	1.32	41	----	"	"
16.65	158.20	194.98	1.820	1.2	32	39	1.33	42	----	SAND	"
16.75	184.70	226.98	2.970	1.6	46	57	1.34	43	----	SAND to Silty SAND	130-140
16.85	203.70	249.61	3.110	1.5	41	50	1.34	43	----	SAND	"
16.96	242.40	296.18	2.990	1.2	48	59	1.35	44	----	"	"
17.05	241.80	294.73	2.800	1.2	48	59	1.36	44	----	"	120-130

17.15	256.20	311.51	2.830	1.1	51	62	1.36	45	----	"	"
17.25	277.90	337.07	2.640	0.9	56	67	1.37	45	----	"	"
17.35	291.40	352.58	2.730	0.9	58	71	1.38	45	----	"	"
17.45	286.10	345.32	3.200	1.1	57	69	1.38	45	----	"	"
17.55	302.40	364.13	3.360	1.1	60	73	1.39	45	----	"	"
17.65	254.00	304.97	3.200	1.3	51	61	1.39	44	----	"	130-140
17.75	228.80	274.02	2.240	1.0	46	55	1.40	44	----	"	120-130
17.85	205.50	245.49	2.220	1.1	41	49	1.41	43	----	"	"
17.95	190.80	227.36	2.210	1.2	38	45	1.41	43	----	"	"
18.05	167.90	199.56	1.580	0.9	34	40	1.42	42	----	"	"
18.15	122.90	145.69	1.470	1.2	31	36	1.43	40	----	SAND to Silty SAND	"
18.25	120.20	142.06	1.550	1.3	30	36	1.43	40	----	"	130-140
18.36	121.20	142.87	1.520	1.3	30	36	1.44	40	----	"	120-130
18.45	107.60	126.54	1.380	1.3	27	32	1.45	39	----	"	"
18.49	96.30	113.10	1.320	1.4	24	28	1.45	39	----	"	130-140
18.60	87.70	102.73	1.170	1.3	22	26	1.46	38	----	"	120-130
18.70	85.10	99.42	0.830	1.0	21	25	1.46	38	----	"	"
18.80	87.00	101.41	0.660	0.8	22	25	1.47	38	----	"	110-120
18.91	90.40	105.10	0.780	0.9	23	26	1.47	38	----	"	120-130
19.01	92.20	106.90	1.110	1.2	23	27	1.48	38	----	"	"
19.11	99.40	114.89	2.130	2.1	33	38	1.49	39	----	Silty SAND to Sandy SILT	130-140
19.22	102.90	118.56	3.990	3.9	51	59	1.50	----	13.56	Clayey SILT to Silty CLAY	"
19.32	147.60	169.58	3.600	2.4	49	57	1.50	41	----	Silty SAND to Sandy SILT	"
19.43	127.30	145.91	4.370	3.4	51	58	1.51	----	16.81	Sandy SILT to Clayey SILT	"
19.53	130.40	149.09	5.300	4.1	130	149	1.52	----	17.22	Very Stiff Fine Grained *	>140
19.64	125.30	142.91	3.960	3.2	50	57	1.53	----	16.54	Sandy SILT to Clayey SILT	130-140
19.74	122.40	139.27	3.100	2.5	41	46	1.53	40	----	Silty SAND to Sandy SILT	"
19.84	123.10	139.74	2.690	2.2	41	47	1.54	40	----	"	"
19.95	124.10	140.54	2.150	1.7	41	47	1.55	40	----	"	"
20.05	126.40	142.80	2.320	1.8	42	48	1.56	40	----	"	"
20.15	135.10	152.26	2.850	2.1	45	51	1.56	40	----	"	"
20.25	157.30	176.87	4.530	2.9	52	59	1.57	41	----	"	"
20.36	183.60	205.95	5.090	2.8	61	69	1.58	42	----	"	"
20.45	219.50	245.66	5.060	2.3	73	82	1.59	43	----	"	"
20.55	173.30	193.50	4.510	2.6	58	64	1.59	42	----	"	"
20.65	180.40	200.96	3.930	2.2	60	67	1.60	42	----	"	"
20.75	187.00	207.83	2.340	1.3	37	42	1.61	42	----	SAND	"
20.85	190.20	210.89	3.070	1.6	38	42	1.61	42	----	"	"
20.95	206.30	228.20	3.500	1.7	41	46	1.62	43	----	"	"
21.05	218.60	241.24	3.060	1.4	44	48	1.63	43	----	"	"
21.15	182.00	200.38	2.940	1.6	46	50	1.64	42	----	SAND to Silty SAND	"
21.25	192.20	211.11	2.670	1.4	38	42	1.64	42	----	SAND	"
21.35	185.00	202.79	1.940	1.0	37	41	1.65	42	----	"	120-130
21.45	181.60	198.66	1.740	1.0	36	40	1.66	42	----	"	"
21.54	175.10	191.16	1.600	0.9	35	38	1.66	42	----	"	"
21.64	172.00	187.39	1.550	0.9	34	37	1.67	42	----	"	"
21.74	176.30	191.70	1.550	0.9	35	38	1.67	42	----	"	"
21.79	171.40	186.19	1.590	0.9	34	37	1.68	42	----	"	"
21.89	180.80	195.99	1.750	1.0	36	39	1.68	42	----	"	"
21.99	204.60	221.33	1.650	0.8	41	44	1.69	43	----	"	"
22.09	188.90	203.99	1.330	0.7	38	41	1.69	42	----	"	110-120
22.18	154.20	166.23	0.960	0.6	31	33	1.70	41	----	"	"
22.29	120.40	129.56	0.960	0.8	24	26	1.71	39	----	"	"
22.39	75.70	81.29	0.980	1.3	25	27	1.71	37	----	Silty SAND to Sandy SILT	120-130
22.49	42.60	45.63	0.940	2.2	17	18	1.72	----	5.49	Sandy SILT to Clayey SILT	130-140

22.57	28.10	30.04	0.830	3.0	14	15	1.73	----	3.56	Clayey SILT to Silty CLAY	"
22.68	17.70	18.88	0.720	4.1	12	13	1.73	----	2.17	Silty CLAY to CLAY	120-130
22.78	10.30	10.96	0.550	5.3	10	11	1.74	----	1.48	CLAY	"
22.89	8.20	8.71	0.420	5.1	8	9	1.74	----	1.35	"	110-120
22.99	8.40	8.91	0.360	4.3	8	9	1.75	----	1.39	"	"
23.10	7.60	8.05	0.340	4.5	8	8	1.75	----	1.23	"	"
23.20	8.50	8.99	0.340	4.0	9	9	1.76	----	1.41	"	"
23.30	9.00	9.51	0.340	3.8	9	10	1.77	----	1.25	"	"
23.41	10.70	11.29	0.350	3.3	7	8	1.77	----	1.54	Silty CLAY to CLAY	"
23.51	10.90	11.48	0.370	3.4	7	8	1.78	----	1.57	"	"
23.62	12.40	13.05	0.400	3.2	8	9	1.78	----	1.45	"	"
23.72	13.90	14.60	0.470	3.4	9	10	1.79	----	1.65	"	120-130
23.83	13.40	14.06	0.500	3.7	9	9	1.80	----	1.59	"	"
23.94	11.20	11.73	0.520	4.6	11	12	1.80	----	1.61	CLAY	"
24.04	11.70	12.24	0.550	4.7	12	12	1.81	----	1.70	"	"
24.15	14.20	14.83	0.560	3.9	14	15	1.82	----	1.69	"	"
24.25	16.40	17.10	0.610	3.7	11	11	1.82	----	1.98	Silty CLAY to CLAY	"
24.36	17.50	18.22	0.640	3.7	12	12	1.83	----	2.13	"	"
24.47	15.90	16.53	0.630	4.0	11	11	1.84	----	1.91	"	"
24.58	13.80	14.32	0.610	4.4	14	14	1.84	----	1.63	CLAY	"
24.69	12.00	12.44	0.230	1.9	6	6	1.85	----	1.39	Clayey SILT to Silty CLAY	100-110
24.79	12.90	13.35	0.880	6.8	13	13	1.85	----	1.51	CLAY	120-130
24.90	13.50	13.95	0.820	6.1	14	14	1.86	----	1.59	"	"
24.95	13.90	14.36	0.790	5.7	14	14	1.86	----	1.64	"	"
25.05	14.50	14.95	0.690	4.8	15	15	1.87	----	1.72	"	"
25.16	14.00	14.42	0.560	4.0	14	14	1.88	----	1.65	"	"
25.26	12.90	13.26	0.470	3.6	9	9	1.88	----	1.51	Silty CLAY to CLAY	"
25.37	12.40	12.73	0.440	3.5	8	8	1.89	----	1.44	"	"
25.48	12.40	12.71	0.430	3.5	8	8	1.90	----	1.44	"	"
25.59	12.40	12.69	0.430	3.5	8	8	1.90	----	1.44	"	"
25.70	14.70	15.02	0.460	3.1	10	10	1.91	----	1.74	"	"
25.81	16.30	16.62	0.520	3.2	8	8	1.92	----	1.96	Clayey SILT to Silty CLAY	"
25.91	18.50	18.84	0.570	3.1	9	9	1.92	----	2.25	"	"
26.02	17.80	18.10	0.570	3.2	9	9	1.93	----	2.15	"	"
26.13	15.70	15.94	0.530	3.4	10	11	1.94	----	1.87	Silty CLAY to CLAY	"
26.24	14.00	14.19	0.470	3.4	9	9	1.94	----	1.65	"	"
26.35	13.90	14.06	0.440	3.2	9	9	1.95	----	1.63	"	"
26.46	14.90	15.05	0.440	3.0	7	8	1.96	----	1.76	Clayey SILT to Silty CLAY	"
26.57	16.00	16.14	0.480	3.0	8	8	1.96	----	1.91	"	"
26.67	17.20	17.32	0.580	3.4	11	12	1.97	----	2.07	Silty CLAY to CLAY	"
26.78	19.30	19.40	0.690	3.6	13	13	1.98	----	2.35	"	"
26.89	21.50	21.58	0.790	3.7	14	14	1.98	----	2.64	"	"
27.00	22.90	22.94	0.900	3.9	15	15	1.99	----	2.83	"	130-140
27.11	23.20	23.20	0.940	4.1	15	15	2.00	----	2.87	"	"
27.21	23.40	23.40	0.980	4.2	16	16	2.01	----	2.89	"	"
27.32	24.50	24.49	1.000	4.1	16	16	2.02	----	3.04	"	"
27.43	24.80	24.79	1.000	4.0	17	17	2.02	----	3.08	"	"
27.54	23.00	22.99	0.990	4.3	15	15	2.03	----	2.83	"	"
27.64	22.30	22.28	0.970	4.3	15	15	2.04	----	2.74	"	"
27.75	22.60	22.58	0.920	4.1	15	15	2.05	----	2.78	"	"
27.86	23.30	23.27	0.880	3.8	16	16	2.06	----	2.87	"	"
27.97	21.80	21.77	0.900	4.1	15	15	2.06	----	2.67	"	"
28.08	20.40	20.37	0.960	4.7	20	20	2.07	----	2.48	CLAY	"
28.19	20.10	20.07	0.940	4.7	20	20	2.08	----	2.44	"	"
28.29	19.30	19.27	0.920	4.8	19	19	2.09	----	2.33	"	"

28.38	20.10	20.06	0.900	4.5	20	20	2.09	----	2.44	"	"
28.49	19.90	19.86	0.830	4.2	13	13	2.10	----	2.41	Silty CLAY to CLAY	120-130
28.60	19.10	19.06	0.770	4.0	13	13	2.11	----	2.31	"	"
28.71	18.20	18.16	0.700	3.8	12	12	2.11	----	2.18	"	"
28.82	18.50	18.46	0.640	3.5	12	12	2.12	----	2.22	"	"
28.93	18.00	17.95	0.610	3.4	12	12	2.13	----	2.16	"	"
29.03	16.30	16.26	0.560	3.4	11	11	2.13	----	1.93	"	"
29.14	14.60	14.56	0.520	3.6	10	10	2.14	----	1.70	"	"
29.25	13.30	13.26	0.510	3.8	9	9	2.15	----	1.53	"	"
29.36	11.50	11.46	0.500	4.3	12	11	2.15	----	1.61	CLAY	"
29.47	11.60	11.56	0.520	4.5	12	12	2.16	----	1.62	"	"
29.58	11.90	11.86	0.540	4.5	12	12	2.17	----	1.67	"	"
29.69	10.30	10.26	0.500	4.9	10	10	2.18	----	1.40	"	"
29.80	8.20	8.17	0.440	5.4	8	8	2.18	----	1.26	"	110-120
29.91	8.20	8.17	0.360	4.4	8	8	2.19	----	1.26	"	"
30.01	8.10	8.07	0.290	3.6	8	8	2.19	----	1.24	"	"
30.12	8.90	8.86	0.290	3.3	6	6	2.20	----	1.40	Silty CLAY to CLAY	"
30.23	10.20	10.16	0.360	3.5	10	10	2.20	----	1.38	CLAY	"
30.34	12.60	12.55	0.590	4.7	13	13	2.21	----	1.42	"	120-130
30.45	21.30	21.21	0.990	4.6	21	21	2.22	----	2.58	"	130-140
30.55	32.60	32.45	1.230	3.8	16	16	2.23	----	4.09	Clayey SILT to Silty CLAY	"
30.66	30.00	29.86	1.330	4.4	20	20	2.23	----	3.74	Silty CLAY to CLAY	"
30.77	27.20	27.07	1.390	5.1	27	27	2.24	----	3.37	CLAY	"
30.88	29.70	29.55	1.690	5.7	30	30	2.25	----	3.70	"	"
30.98	39.70	39.50	1.970	5.0	40	39	2.26	----	5.03	"	"
31.09	40.60	40.38	1.870	4.6	27	27	2.27	----	5.15	Silty CLAY to CLAY	"
31.20	28.40	28.25	1.590	5.6	28	28	2.27	----	3.52	CLAY	"
31.31	25.30	25.16	1.540	6.1	25	25	2.28	----	3.11	"	"
31.42	23.20	23.07	1.590	6.9	23	23	2.29	----	2.83	"	"
31.52	22.30	22.17	1.690	7.6	22	22	2.30	----	2.71	"	"
31.78	66.40	65.98	1.940	2.9	27	26	2.32	----	8.58	Sandy SILT to Clayey SILT	"
31.89	81.20	80.68	1.860	2.3	27	27	2.32	37	----	Silty SAND to Sandy SILT	"
31.99	64.30	63.88	1.560	2.4	26	26	2.33	----	8.30	Sandy SILT to Clayey SILT	"
32.10	41.40	41.12	1.280	3.1	21	21	2.34	----	5.25	Clayey SILT to Silty CLAY	"
32.21	23.50	23.34	1.000	4.3	16	16	2.35	----	2.86	Silty CLAY to CLAY	"
32.31	19.20	19.06	0.730	3.8	13	13	2.35	----	2.29	"	120-130
32.42	18.90	18.76	0.530	2.8	9	9	2.36	----	2.25	Clayey SILT to Silty CLAY	"
32.53	18.90	18.76	0.500	2.6	9	9	2.37	----	2.24	"	"
32.63	19.00	18.86	0.530	2.8	10	9	2.37	----	2.26	"	"
32.74	18.20	18.06	0.590	3.2	9	9	2.38	----	2.15	"	"
32.85	17.10	16.97	0.670	3.9	11	11	2.39	----	2.00	Silty CLAY to CLAY	"
32.95	19.20	19.05	0.720	3.8	13	13	2.39	----	2.28	"	"
33.06	22.40	22.22	0.750	3.3	11	11	2.40	----	2.71	Clayey SILT to Silty CLAY	"
33.17	20.90	20.73	0.750	3.6	14	14	2.41	----	2.51	Silty CLAY to CLAY	"
33.27	17.70	17.55	0.730	4.1	12	12	2.41	----	2.08	"	"
33.38	16.30	16.16	0.610	3.7	11	11	2.42	----	1.89	"	"
33.48	15.60	15.47	0.530	3.4	10	10	2.43	----	1.80	"	"
33.59	15.20	15.07	0.540	3.6	10	10	2.43	----	1.74	"	"
33.70	14.10	13.98	0.750	5.3	14	14	2.44	----	1.60	CLAY	"
33.80	14.20	14.07	0.930	6.5	14	14	2.45	----	1.61	"	"
33.91	49.80	49.35	1.820	3.7	25	25	2.45	----	6.35	Clayey SILT to Silty CLAY	130-140
34.01	144.20	142.87	2.470	1.7	36	36	2.46	40	----	SAND to Silty SAND	"
34.11	184.90	183.17	2.670	1.4	37	37	2.47	41	----	SAND	"
34.21	197.30	195.43	2.880	1.5	39	39	2.48	42	----	"	"
34.31	180.60	178.86	2.750	1.5	36	36	2.48	41	----	"	"

34.41	172.60	170.91	2.420	1.4	35	34	2.49	41	----	" "	
34.52	157.50	155.93	2.240	1.4	39	39	2.50	41	----	SAND to Silty SAND	"
34.63	136.80	135.18	2.010	1.5	34	34	2.51	40	----	" "	
34.73	123.10	121.33	2.500	2.0	41	40	2.51	39	----	Silty SAND to Sandy SILT	"
34.83	109.90	108.05	2.180	2.0	37	36	2.52	38	----	" "	
34.89	113.50	111.44	1.910	1.7	38	37	2.52	39	----	" "	
35.00	109.90	107.62	1.890	1.7	37	36	2.53	38	----	" "	
35.10	112.60	109.99	1.850	1.6	28	27	2.54	39	----	SAND to Silty SAND	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-12
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 12:10:08
Terminated at 30.0 feet Groundwater measured at 3.8 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.56	17.00	27.20	0.850	5.0	17	27	0.07	----	2.26	CLAY	120-130
0.65	16.20	25.92	0.770	4.8	16	26	0.08	----	2.15	"	"
0.74	16.30	26.08	0.750	4.6	16	26	0.09	----	2.17	"	"
0.83	17.50	28.00	0.800	4.6	18	28	0.10	----	2.33	"	"
0.92	19.00	30.40	0.880	4.6	19	30	0.11	----	2.53	"	"
1.00	19.70	31.52	0.980	5.0	20	32	0.12	----	2.62	"	130-140
1.09	19.40	31.04	1.040	5.4	19	31	0.13	----	2.58	"	"
1.18	18.90	30.24	1.110	5.9	19	30	0.15	----	2.51	"	"
1.27	19.00	30.40	1.160	6.1	19	30	0.16	----	2.52	"	"
1.36	18.60	29.76	1.200	6.5	19	30	0.17	----	2.47	"	"
1.45	19.80	31.68	1.230	6.2	20	32	0.18	----	2.63	"	"
1.54	21.10	33.76	1.290	6.1	21	34	0.19	----	2.80	"	"
1.63	21.70	34.72	1.410	6.5	22	35	0.21	----	2.88	"	"
1.72	21.50	34.40	1.540	7.2	22	34	0.22	----	2.85	"	"
1.81	21.20	33.92	1.630	7.7	21	34	0.23	----	2.81	"	"
1.90	21.30	34.08	1.710	8.0	21	34	0.24	----	2.82	"	"
1.99	19.90	31.84	1.660	8.3	20	32	0.25	----	2.64	"	"
2.21	15.60	24.96	1.320	8.5	16	25	0.28	----	2.06	"	"
2.30	14.50	23.20	1.210	8.3	15	23	0.30	----	1.91	"	"
2.39	13.70	21.92	1.110	8.1	14	22	0.31	----	1.81	"	120-130
2.48	13.30	21.28	1.020	7.7	13	21	0.32	----	1.75	"	"
2.57	13.10	20.96	0.950	7.3	13	21	0.33	----	1.72	"	"
2.66	11.80	18.88	0.910	7.7	12	19	0.34	----	1.94	"	"
2.75	11.10	17.76	0.860	7.7	11	18	0.35	----	1.82	"	"
2.84	10.50	16.80	0.820	7.8	11	17	0.36	----	1.72	"	"
2.93	10.30	16.48	0.770	7.5	10	16	0.38	----	1.69	"	"
3.02	9.90	15.84	0.720	7.3	10	16	0.39	----	1.62	"	"
3.11	10.00	16.00	0.700	7.0	10	16	0.40	----	1.63	"	"
3.20	9.50	15.20	0.670	7.1	10	15	0.41	----	1.55	"	"
3.29	8.90	14.24	0.620	7.0	9	14	0.42	----	1.74	"	"
3.38	8.30	13.28	0.570	6.9	8	13	0.43	----	1.62	"	110-120
3.47	7.60	12.16	0.510	6.7	8	12	0.44	----	1.48	"	"
3.56	6.90	11.04	0.470	6.8	7	11	0.45	----	1.33	"	"
3.65	7.30	11.68	0.450	6.2	7	12	0.46	----	1.41	"	"
3.74	7.80	12.48	0.450	5.8	8	12	0.47	----	1.51	"	"
3.83	7.70	12.32	0.450	5.8	8	12	0.48	----	1.49	"	"
3.92	8.10	12.96	0.440	5.4	8	13	0.48	----	1.57	"	"
4.01	7.20	11.52	0.430	6.0	7	12	0.49	----	1.39	"	"
4.10	7.20	11.52	0.410	5.7	7	12	0.49	----	1.39	"	"
4.19	6.50	10.40	0.390	6.0	7	10	0.50	----	1.25	"	"
4.28	6.60	10.56	0.370	5.6	7	11	0.50	----	1.27	"	"
4.37	7.80	12.48	0.350	4.5	8	12	0.51	----	1.51	"	"
4.46	7.50	12.00	0.340	4.5	8	12	0.51	----	1.44	"	"
4.55	6.50	10.40	0.310	4.8	7	10	0.51	----	1.24	"	100-110
4.64	6.20	9.92	0.300	4.8	6	10	0.52	----	1.18	"	"
4.73	5.80	9.28	0.280	4.8	6	9	0.52	----	1.10	"	"
4.82	6.20	9.92	0.260	4.2	6	10	0.53	----	1.18	"	"

4.91	6.40	10.24	0.270	4.2	6	10	0.53	----	1.22	"	"
5.00	7.20	11.52	0.280	3.9	7	12	0.53	----	1.38	"	"
5.09	7.20	11.52	0.280	3.9	7	12	0.54	----	1.38	"	"
5.18	7.60	12.16	0.290	3.8	8	12	0.54	----	1.46	"	"
5.27	7.50	12.00	0.300	4.0	8	12	0.55	----	1.44	"	110-120
5.36	6.60	10.56	0.290	4.4	7	11	0.55	----	1.25	"	100-110
5.59	7.00	11.20	0.230	3.3	7	11	0.56	----	1.33	"	"
5.68	7.00	11.20	0.250	3.6	7	11	0.56	----	1.33	"	"
5.77	7.50	12.00	0.240	3.2	8	12	0.57	----	1.43	"	"
5.86	7.90	12.64	0.240	3.0	5	8	0.57	----	1.51	Silty CLAY to CLAY	"
5.95	6.70	10.72	0.230	3.4	7	11	0.57	----	1.27	CLAY	"
6.04	5.90	9.44	0.220	3.7	6	9	0.58	----	1.11	"	"
6.13	6.00	9.60	0.230	3.8	6	10	0.58	----	1.13	"	"
6.22	6.90	11.04	0.240	3.5	7	11	0.59	----	1.31	"	"
6.31	8.00	12.80	0.230	2.9	5	9	0.59	----	1.52	Silty CLAY to CLAY	"
6.40	8.10	12.96	0.220	2.7	5	9	0.59	----	1.54	"	"
6.49	6.20	9.92	0.210	3.4	6	10	0.60	----	1.16	CLAY	"
6.59	6.00	9.60	0.190	3.2	6	10	0.60	----	1.12	"	"
6.68	6.00	9.60	0.160	2.7	6	10	0.60	----	1.12	"	90-100
6.77	5.60	8.96	0.150	2.7	6	9	0.61	----	1.04	"	"
6.86	5.80	9.28	0.160	2.8	6	9	0.61	----	1.08	"	"
6.95	6.00	9.60	0.170	2.8	6	10	0.61	----	1.12	"	"
7.04	6.40	10.24	0.200	3.1	6	10	0.62	----	1.20	"	100-110
7.13	6.90	11.04	0.220	3.2	7	11	0.62	----	1.30	"	"
7.22	7.10	11.36	0.250	3.5	7	11	0.62	----	1.34	"	"
7.31	8.40	13.44	0.280	3.3	8	13	0.63	----	1.59	"	"
7.40	9.50	15.20	0.310	3.3	6	10	0.63	----	1.51	Silty CLAY to CLAY	110-120
7.49	10.70	17.12	0.370	3.5	7	11	0.64	----	1.71	"	"
7.58	12.70	20.32	0.440	3.5	8	14	0.64	----	1.63	"	120-130
7.67	14.30	22.88	0.500	3.5	10	15	0.65	----	1.85	"	"
7.76	14.70	23.52	0.570	3.9	10	16	0.65	----	1.90	"	"
7.85	14.70	23.52	0.630	4.3	15	24	0.66	----	1.90	CLAY	"
7.94	15.20	24.32	0.660	4.3	15	24	0.67	----	1.96	"	"
8.03	15.60	24.96	0.650	4.2	16	25	0.67	----	2.02	"	"
8.12	15.60	24.96	0.640	4.1	16	25	0.68	----	2.02	"	"
8.21	15.50	24.80	0.630	4.1	16	25	0.68	----	2.00	"	"
8.30	15.20	24.32	0.630	4.1	15	24	0.69	----	1.96	"	"
8.39	14.60	23.36	0.620	4.2	15	23	0.69	----	1.88	"	"
8.48	14.20	22.72	0.630	4.4	14	23	0.70	----	1.83	"	"
8.57	13.30	21.28	0.640	4.8	13	21	0.71	----	1.71	"	"
8.66	13.60	21.76	0.640	4.7	14	22	0.71	----	1.75	"	"
8.74	13.10	20.96	0.630	4.8	13	21	0.72	----	1.68	"	"
8.83	12.60	20.16	0.590	4.7	13	20	0.72	----	1.61	"	"
8.92	11.60	18.56	0.550	4.7	12	19	0.73	----	1.85	"	"
9.01	11.80	18.88	0.510	4.3	12	19	0.73	----	1.88	"	"
9.10	11.50	18.40	0.480	4.2	12	18	0.74	----	1.83	"	"
9.19	11.30	18.08	0.460	4.1	11	18	0.74	----	1.79	"	"
9.28	11.70	18.72	0.450	3.8	12	19	0.75	----	1.86	"	"
9.37	11.60	18.56	0.440	3.8	12	19	0.76	----	1.84	"	"
9.46	11.50	18.40	0.440	3.8	12	18	0.76	----	1.82	"	"
9.55	11.30	18.08	0.440	3.9	11	18	0.77	----	1.79	"	110-120
9.64	11.50	18.40	0.440	3.8	12	18	0.77	----	1.82	"	120-130
9.73	12.40	19.84	0.420	3.4	8	13	0.78	----	1.58	Silty CLAY to CLAY	"
9.82	11.30	18.08	0.410	3.6	8	12	0.78	----	1.79	"	110-120
9.91	11.30	18.08	0.400	3.5	8	12	0.79	----	1.79	"	"

10.00	12.00	19.20	0.380	3.2	8	13	0.79	----	1.52	"	"
10.09	11.90	19.04	0.380	3.2	8	13	0.80	----	1.88	"	"
10.18	10.30	16.47	0.390	3.8	10	16	0.80	----	1.62	CLAY	"
10.27	9.10	14.51	0.380	4.2	9	15	0.81	----	1.42	"	"
10.36	8.50	13.51	0.350	4.1	9	14	0.81	----	1.58	"	"
10.45	9.10	14.42	0.310	3.4	9	14	0.82	----	1.41	"	"
10.54	9.00	14.22	0.280	3.1	6	9	0.82	----	1.40	Silty CLAY to CLAY	"
10.63	9.00	14.19	0.260	2.9	6	9	0.82	----	1.40	"	100-110
10.72	8.60	13.52	0.260	3.0	6	9	0.83	----	1.59	"	"
10.81	8.50	13.33	0.260	3.1	6	9	0.83	----	1.57	"	"
10.90	8.10	12.67	0.260	3.2	8	13	0.84	----	1.49	CLAY	"
10.99	7.90	12.33	0.270	3.4	8	12	0.84	----	1.45	"	"
11.08	7.90	12.30	0.270	3.4	8	12	0.84	----	1.45	"	"
11.17	7.10	11.03	0.260	3.7	7	11	0.85	----	1.29	"	"
11.26	6.70	10.38	0.270	4.0	7	10	0.85	----	1.21	"	"
11.35	7.20	11.13	0.300	4.2	7	11	0.85	----	1.31	"	"
11.44	9.20	14.18	0.340	3.7	9	14	0.86	----	1.42	"	110-120
11.53	10.50	16.13	0.370	3.5	7	11	0.86	----	1.64	Silty CLAY to CLAY	"
11.62	12.00	18.37	0.440	3.7	8	12	0.87	----	1.51	"	120-130
11.71	12.60	19.21	0.530	4.2	13	19	0.88	----	1.59	CLAY	"
11.80	13.30	20.21	0.570	4.3	13	20	0.88	----	1.68	"	"
11.88	14.70	22.25	0.590	4.0	15	22	0.89	----	1.87	"	"
11.94	16.60	25.07	0.600	3.6	11	17	0.89	----	2.12	Silty CLAY to CLAY	"
12.03	14.60	21.97	0.600	4.1	15	22	0.90	----	1.85	CLAY	"
12.12	14.30	21.44	0.600	4.2	14	21	0.90	----	1.81	"	"
12.21	14.50	21.66	0.610	4.2	15	22	0.91	----	1.84	"	"
12.30	15.10	22.47	0.630	4.2	15	22	0.91	----	1.92	"	"
12.39	16.60	24.61	0.690	4.2	17	25	0.92	----	2.12	"	"
12.48	18.10	26.73	0.730	4.0	12	18	0.92	----	2.32	Silty CLAY to CLAY	"
12.57	18.60	27.36	0.730	3.9	12	18	0.93	----	2.38	"	"
12.66	18.90	27.70	0.720	3.8	13	18	0.93	----	2.42	"	"
12.75	18.70	27.30	0.720	3.9	12	18	0.94	----	2.39	"	"
12.84	19.00	27.63	0.730	3.8	13	18	0.95	----	2.43	"	"
12.93	17.70	25.64	0.710	4.0	12	17	0.95	----	2.26	"	"
13.02	18.10	26.12	0.710	3.9	12	17	0.96	----	2.31	"	"
13.11	16.80	24.15	0.670	4.0	11	16	0.96	----	2.14	"	"
13.20	18.30	26.20	0.640	3.5	12	17	0.97	----	2.34	"	"
13.29	16.70	23.81	0.560	3.4	11	16	0.97	----	2.12	"	"
13.38	16.10	22.87	0.490	3.0	8	11	0.98	----	2.04	Clayey SILT to Silty CLAY	"
13.47	15.30	21.64	0.420	2.7	8	11	0.99	----	1.93	"	"
13.56	14.40	20.29	0.370	2.6	7	10	0.99	----	1.81	"	"
13.65	14.90	20.93	0.340	2.3	7	10	1.00	----	1.88	"	110-120
13.74	14.20	19.88	0.310	2.2	7	10	1.00	----	1.79	"	"
13.83	13.60	19.00	0.280	2.1	7	10	1.00	----	1.70	"	"
13.91	13.20	18.41	0.290	2.2	7	9	1.01	----	1.65	"	"
14.00	14.10	19.64	0.320	2.3	7	10	1.01	----	1.77	"	"
14.09	13.40	18.63	0.320	2.4	7	9	1.02	----	1.68	"	"
14.18	12.40	17.21	0.320	2.6	6	9	1.02	----	1.54	"	"
14.27	11.40	15.79	0.310	2.7	8	11	1.03	----	1.76	Silty CLAY to CLAY	"
14.36	10.80	14.93	0.330	3.1	7	10	1.03	----	1.66	"	"
14.45	12.10	16.70	0.360	3.0	8	11	1.04	----	1.50	"	"
14.53	13.80	19.01	0.400	2.9	7	10	1.04	----	1.73	Clayey SILT to Silty CLAY	120-130
14.62	14.00	19.25	0.400	2.9	7	10	1.05	----	1.75	"	"
14.71	14.30	19.62	0.440	3.1	10	13	1.05	----	1.79	Silty CLAY to CLAY	"
14.80	14.70	20.12	0.480	3.3	10	13	1.06	----	1.84	"	"

14.89	14.40	19.67	0.490	3.4	10	13	1.07	----	1.80	"	"
14.98	13.60	18.54	0.490	3.6	9	12	1.07	----	1.70	"	"
15.07	14.10	19.18	0.490	3.5	9	13	1.08	----	1.76	"	"
15.10	15.80	21.47	0.480	3.0	8	11	1.08	----	1.99	Clayey SILT to Silty CLAY	"
15.19	15.50	21.02	0.440	2.8	8	11	1.08	----	1.95	"	"
15.28	14.80	20.03	0.390	2.6	7	10	1.09	----	1.85	"	"
15.37	13.60	18.37	0.360	2.6	7	9	1.09	----	1.69	"	110-120
15.46	14.70	19.82	0.350	2.4	7	10	1.10	----	1.84	"	"
15.54	14.50	19.51	0.370	2.6	7	10	1.10	----	1.81	"	120-130
15.63	14.20	19.07	0.380	2.7	7	10	1.11	----	1.77	"	"
15.72	13.30	17.82	0.400	3.0	9	12	1.12	----	1.65	Silty CLAY to CLAY	"
15.81	12.60	16.85	0.380	3.0	8	11	1.12	----	1.56	"	110-120
15.90	11.40	15.22	0.370	3.2	8	10	1.12	----	1.74	"	"
15.99	10.00	13.33	0.360	3.6	10	13	1.13	----	1.51	CLAY	"
16.08	10.90	14.50	0.340	3.1	7	10	1.13	----	1.66	Silty CLAY to CLAY	"
16.17	11.00	14.60	0.350	3.2	7	10	1.14	----	1.67	"	"
16.25	12.20	16.17	0.380	3.1	8	11	1.14	----	1.50	"	"
16.34	12.50	16.53	0.410	3.3	8	11	1.15	----	1.54	"	120-130
16.43	11.40	15.05	0.430	3.8	11	15	1.15	----	1.74	CLAY	110-120
16.52	9.90	13.04	0.420	4.2	10	13	1.16	----	1.49	"	"
16.61	9.00	11.84	0.400	4.4	9	12	1.16	----	1.34	"	"
16.70	8.50	11.16	0.390	4.6	9	11	1.17	----	1.50	"	"
16.79	9.70	12.71	0.390	4.0	10	13	1.17	----	1.45	"	"
16.87	10.80	14.12	0.420	3.9	11	14	1.18	----	1.63	"	"
16.96	11.30	14.75	0.470	4.2	11	15	1.18	----	1.72	"	120-130
17.05	12.20	15.89	0.500	4.1	12	16	1.19	----	1.49	"	"
17.14	13.70	17.80	0.520	3.8	9	12	1.19	----	1.69	Silty CLAY to CLAY	"
17.23	17.20	22.30	0.530	3.1	9	11	1.20	----	2.16	Clayey SILT to Silty CLAY	"
17.31	17.20	22.25	0.480	2.8	9	11	1.20	----	2.16	"	"
17.40	14.00	18.07	0.420	3.0	7	9	1.21	----	1.73	"	"
17.49	12.80	16.49	0.370	2.9	9	11	1.21	----	1.57	Silty CLAY to CLAY	110-120
17.58	11.20	14.40	0.350	3.1	7	10	1.22	----	1.69	"	"
17.66	10.70	13.73	0.370	3.5	7	9	1.22	----	1.61	"	"
17.75	11.90	15.25	0.410	3.4	8	10	1.23	----	1.81	"	"
17.84	12.70	16.23	0.480	3.8	8	11	1.23	----	1.55	"	120-130
17.93	12.20	15.56	0.540	4.4	12	16	1.24	----	1.49	CLAY	"
18.01	9.70	12.34	0.590	6.1	10	12	1.25	----	1.44	"	"
18.10	10.00	12.70	0.600	6.0	10	13	1.25	----	1.49	"	"
18.19	11.20	14.19	0.650	5.8	11	14	1.26	----	1.69	"	"
18.28	12.50	15.81	0.700	5.6	13	16	1.26	----	1.52	"	"
18.37	12.40	15.65	0.720	5.8	12	16	1.27	----	1.51	"	"
18.59	20.00	25.08	0.990	4.9	20	25	1.28	----	2.52	"	130-140
18.68	24.60	30.77	1.000	4.1	16	21	1.29	----	3.13	Silty CLAY to CLAY	"
18.76	21.80	27.21	1.000	4.6	22	27	1.30	----	2.76	CLAY	"
18.85	18.20	22.66	0.960	5.3	18	23	1.30	----	2.28	"	"
18.94	15.20	18.88	0.820	5.4	15	19	1.31	----	1.88	"	120-130
19.03	14.90	18.47	0.690	4.6	15	18	1.31	----	1.84	"	"
19.11	15.00	18.56	0.650	4.3	15	19	1.32	----	1.85	"	"
19.20	12.70	15.68	0.620	4.9	13	16	1.32	----	1.54	"	"
19.29	11.10	13.67	0.560	5.0	11	14	1.33	----	1.66	"	"
19.38	10.80	13.27	0.480	4.4	11	13	1.34	----	1.61	"	"
19.46	10.10	12.39	0.470	4.7	10	12	1.34	----	1.49	"	110-120
19.55	10.80	13.22	0.540	5.0	11	13	1.35	----	1.61	"	120-130
19.64	15.70	19.18	0.550	3.5	10	13	1.35	----	1.94	Silty CLAY to CLAY	"
19.73	14.20	17.31	0.580	4.1	14	17	1.36	----	1.74	CLAY	"

19.82	11.70	14.23	0.580	5.0	12	14	1.36	----	1.75	"	"
19.91	11.10	13.47	0.510	4.6	11	13	1.37	----	1.65	"	"
20.00	10.80	13.08	0.440	4.1	11	13	1.37	----	1.60	"	110-120
20.08	10.40	12.58	0.410	3.9	10	13	1.38	----	1.53	"	"
20.17	10.10	12.19	0.390	3.9	10	12	1.38	----	1.48	"	"
20.26	10.40	12.53	0.390	3.8	10	13	1.39	----	1.53	"	"
20.35	10.30	12.39	0.420	4.1	10	12	1.39	----	1.51	"	"
20.44	11.30	13.56	0.450	4.0	11	14	1.40	----	1.68	"	120-130
20.53	12.30	14.73	0.460	3.7	8	10	1.40	----	1.48	Silty CLAY to CLAY	"
20.61	12.50	14.93	0.470	3.8	8	10	1.41	----	1.50	"	"
20.70	11.80	14.06	0.460	3.9	12	14	1.41	----	1.76	CLAY	"
20.79	11.20	13.32	0.430	3.8	11	13	1.42	----	1.66	"	110-120
20.88	10.80	12.82	0.400	3.7	11	13	1.42	----	1.59	"	"
20.96	9.90	11.73	0.380	3.8	10	12	1.43	----	1.44	"	"
21.05	8.80	10.41	0.400	4.5	9	10	1.43	----	1.51	"	"
21.14	9.90	11.69	0.460	4.6	10	12	1.44	----	1.44	"	"
21.23	13.10	15.43	0.540	4.1	13	15	1.44	----	1.58	"	120-130
21.32	12.50	14.69	0.680	5.4	13	15	1.45	----	1.50	"	"
21.41	10.40	12.20	0.720	6.9	10	12	1.45	----	1.52	"	"
21.49	9.60	11.23	0.600	6.3	10	11	1.46	----	1.39	"	"
21.66	9.90	11.54	0.410	4.1	10	12	1.47	----	1.43	"	110-120
21.74	10.50	12.22	0.370	3.5	7	8	1.47	----	1.53	Silty CLAY to CLAY	"
21.83	11.10	12.89	0.360	3.2	7	9	1.48	----	1.63	"	"
21.92	10.70	12.41	0.380	3.6	7	8	1.48	----	1.57	"	"
22.01	10.50	12.15	0.390	3.7	11	12	1.49	----	1.53	CLAY	"
22.10	10.40	12.01	0.400	3.8	10	12	1.49	----	1.51	"	"
22.19	10.90	12.56	0.400	3.7	11	13	1.49	----	1.60	"	"
22.28	11.60	13.34	0.400	3.4	8	9	1.50	----	1.71	Silty CLAY to CLAY	"
22.36	11.20	12.86	0.400	3.6	7	9	1.50	----	1.64	"	"
22.45	11.20	12.85	0.400	3.6	7	9	1.51	----	1.64	"	"
22.54	11.10	12.71	0.390	3.5	7	8	1.51	----	1.63	"	"
22.63	11.50	13.15	0.390	3.4	8	9	1.52	----	1.69	"	"
22.72	11.10	12.68	0.400	3.6	7	8	1.52	----	1.62	"	"
22.81	11.80	13.45	0.400	3.4	8	9	1.53	----	1.74	"	"
22.90	12.50	14.23	0.400	3.2	8	9	1.53	----	1.48	"	"
22.99	12.80	14.55	0.430	3.4	9	10	1.54	----	1.52	"	120-130
23.08	12.60	14.29	0.440	3.5	8	10	1.54	----	1.50	"	"
23.17	12.00	13.59	0.410	3.4	8	9	1.55	----	1.42	"	110-120
23.25	10.60	11.99	0.370	3.5	7	8	1.55	----	1.54	"	"
23.34	10.60	11.97	0.350	3.3	7	8	1.56	----	1.53	"	"
23.43	10.10	11.39	0.320	3.2	7	8	1.56	----	1.45	"	"
23.52	10.20	11.49	0.280	2.7	7	8	1.57	----	1.47	"	"
23.61	10.60	11.92	0.250	2.4	5	6	1.57	----	1.53	Clayey SILT to Silty CLAY	"
23.69	10.20	11.46	0.250	2.5	5	6	1.57	----	1.47	"	100-110
23.78	10.60	11.89	0.250	2.4	5	6	1.58	----	1.53	"	110-120
23.87	10.30	11.53	0.280	2.7	7	8	1.58	----	1.48	Silty CLAY to CLAY	"
23.96	10.80	12.08	0.300	2.8	7	8	1.59	----	1.56	"	"
24.05	11.10	12.39	0.330	3.0	7	8	1.59	----	1.61	"	"
24.14	11.50	12.82	0.380	3.3	8	9	1.60	----	1.68	"	"
24.22	11.80	13.13	0.510	4.3	12	13	1.60	----	1.73	CLAY	120-130
24.31	13.90	15.44	0.600	4.3	14	15	1.61	----	1.66	"	"
24.40	17.10	18.96	0.630	3.7	11	13	1.61	----	2.09	Silty CLAY to CLAY	"
24.49	15.20	16.82	0.640	4.2	15	17	1.62	----	1.83	CLAY	"
24.57	12.80	14.14	0.730	5.7	13	14	1.63	----	1.51	"	"
24.66	11.70	12.90	0.750	6.4	12	13	1.63	----	1.71	"	"

24.75	11.40	12.55	0.620	5.4	11	13	1.64	----	1.65	"	"
24.84	11.70	12.86	0.560	4.8	12	13	1.64	----	1.70	"	"
24.90	12.10	13.28	0.550	4.5	12	13	1.65	----	1.42	"	"
24.98	14.10	15.45	0.520	3.7	9	10	1.65	----	1.68	Silty CLAY to CLAY	"
25.07	13.80	15.09	0.490	3.6	9	10	1.66	----	1.64	"	"
25.16	12.50	13.65	0.450	3.6	8	9	1.66	----	1.47	"	"
25.25	12.40	13.52	0.410	3.3	8	9	1.67	----	1.45	"	110-120
25.33	11.00	11.97	0.380	3.5	7	8	1.67	----	1.58	"	"
25.42	10.50	11.41	0.380	3.6	11	11	1.68	----	1.50	CLAY	"
25.51	11.10	12.04	0.400	3.6	7	8	1.68	----	1.60	Silty CLAY to CLAY	"
25.60	12.90	13.97	0.420	3.3	9	9	1.69	----	1.52	"	120-130
25.67	12.90	13.95	0.420	3.3	9	9	1.69	----	1.52	"	"
25.76	11.70	12.63	0.420	3.6	8	8	1.69	----	1.69	"	110-120
25.84	10.80	11.64	0.440	4.1	11	12	1.70	----	1.54	CLAY	"
25.93	11.90	12.81	0.500	4.2	12	13	1.71	----	1.73	"	120-130
26.02	13.60	14.61	0.530	3.9	14	15	1.71	----	1.61	"	"
26.11	17.00	18.23	0.530	3.1	9	9	1.72	----	2.06	Clayey SILT to Silty CLAY	"
26.20	16.50	17.66	0.540	3.3	11	12	1.72	----	1.99	Silty CLAY to CLAY	"
26.28	15.70	16.77	0.590	3.8	10	11	1.73	----	1.88	"	"
26.37	14.90	15.89	0.610	4.1	15	16	1.73	----	1.78	CLAY	"
26.46	15.30	16.28	0.580	3.8	10	11	1.74	----	1.83	Silty CLAY to CLAY	"
26.55	14.00	14.87	0.590	4.2	14	15	1.74	----	1.66	CLAY	"
26.64	13.40	14.21	0.630	4.7	13	14	1.75	----	1.57	"	"
26.72	12.00	12.71	0.580	4.8	12	13	1.75	----	1.39	"	"
26.81	9.00	9.52	0.510	5.7	9	10	1.76	----	1.23	"	110-120
26.90	7.50	7.93	0.440	5.9	8	8	1.76	----	1.18	"	"
26.99	6.50	6.86	0.340	5.2	7	7	1.77	----	0.98	"	100-110
27.08	5.60	5.91	0.290	5.2	6	6	1.77	----	0.80	"	"
27.16	6.20	6.53	0.290	4.7	6	7	1.78	----	0.92	"	"
27.25	8.70	9.16	0.290	3.3	9	9	1.78	----	1.42	"	110-120
27.34	11.60	12.20	0.330	2.8	8	8	1.78	----	1.66	Silty CLAY to CLAY	"
27.42	13.60	14.29	0.420	3.1	9	10	1.79	----	1.60	"	120-130
27.50	14.30	15.01	0.480	3.4	10	10	1.79	----	1.69	"	"
27.58	15.60	16.35	0.520	3.3	10	11	1.80	----	1.86	"	"
27.67	13.00	13.61	0.500	3.8	13	14	1.81	----	1.51	CLAY	"
27.76	10.60	11.08	0.450	4.2	11	11	1.81	----	1.49	"	110-120
27.85	10.20	10.65	0.380	3.7	10	11	1.81	----	1.42	"	"
27.93	10.10	10.54	0.380	3.8	10	11	1.82	----	1.41	"	"
28.02	10.90	11.36	0.490	4.5	11	11	1.82	----	1.54	"	120-130
28.11	11.40	11.87	0.550	4.8	11	12	1.83	----	1.62	"	"
28.19	11.30	11.75	0.600	5.3	11	12	1.84	----	1.60	"	"
28.27	13.20	13.71	0.580	4.4	13	14	1.84	----	1.54	"	"
28.36	11.70	12.13	0.520	4.4	12	12	1.85	----	1.67	"	"
28.45	9.60	9.94	0.460	4.8	10	10	1.85	----	1.32	"	110-120
28.54	9.40	9.73	0.400	4.3	9	10	1.86	----	1.28	"	"
28.63	9.00	9.30	0.360	4.0	9	9	1.86	----	1.22	"	"
28.71	10.10	10.43	0.370	3.7	10	10	1.86	----	1.40	"	"
28.80	9.40	9.70	0.470	5.0	9	10	1.87	----	1.28	"	"
28.89	10.80	11.13	0.770	7.1	11	11	1.87	----	1.51	"	120-130
28.98	18.10	18.62	0.950	5.2	18	19	1.88	----	2.18	"	130-140
29.07	26.30	27.01	1.090	4.1	18	18	1.89	----	3.28	Silty CLAY to CLAY	"
29.16	26.50	27.17	1.140	4.3	18	18	1.89	----	3.30	"	"
29.25	23.50	24.06	1.130	4.8	24	24	1.90	----	2.90	CLAY	"
29.34	21.20	21.67	1.190	5.6	21	22	1.91	----	2.59	"	"
29.42	23.40	23.89	1.250	5.3	23	24	1.91	----	2.89	"	"

29.51	23.80	24.26	1.330	5.6	24	24	1.92	----	2.94	"	"
29.60	24.00	24.43	1.470	6.1	24	24	1.93	----	2.96	"	"
29.69	25.80	26.22	1.510	5.9	26	26	1.93	----	3.20	"	"
29.78	28.00	28.41	1.470	5.3	28	28	1.94	----	3.50	"	"
29.87	26.60	26.95	1.510	5.7	27	27	1.95	----	3.31	"	"
29.95	26.90	27.21	1.510	5.6	27	27	1.95	----	3.35	"	"
30.04	26.30	26.57	1.380	5.2	26	27	1.96	----	3.27	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-13
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 13:14:29
Terminated at 30.0 feet Groundwater measured at 4.2 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.56	18.20	29.12	0.970	5.3	18	29	0.07	----	2.42	"	"
0.65	27.80	44.48	1.200	4.3	19	30	0.08	----	3.70	Silty CLAY to CLAY	"
0.74	31.20	49.92	1.370	4.4	21	33	0.09	----	4.15	"	"
0.83	34.10	54.56	1.500	4.4	23	36	0.10	----	4.54	"	"
0.92	35.50	56.80	1.540	4.3	24	38	0.11	----	4.73	"	"
1.01	35.60	56.96	1.630	4.6	24	38	0.13	----	4.74	"	"
1.10	35.10	56.16	1.790	5.1	35	56	0.14	----	4.67	CLAY	"
1.19	34.90	55.84	1.910	5.5	35	56	0.15	----	4.64	"	"
1.27	33.00	52.80	1.970	6.0	33	53	0.16	----	4.39	"	"
1.36	29.60	47.36	1.970	6.7	30	47	0.17	----	3.94	"	"
1.45	26.00	41.60	1.970	7.6	26	42	0.19	----	3.45	"	"
1.54	23.30	37.28	1.890	8.1	23	37	0.20	----	3.09	"	"
1.63	21.00	33.60	1.780	8.5	21	34	0.21	----	2.79	"	"
1.72	19.60	31.36	1.700	8.7	20	31	0.22	----	2.60	"	"
1.81	18.70	29.92	1.670	8.9	19	30	0.23	----	2.48	"	"
1.89	18.50	29.60	1.650	8.9	19	30	0.25	----	2.45	"	"
1.98	18.80	30.08	1.660	8.8	19	30	0.26	----	2.49	"	"
2.07	18.70	29.92	1.640	8.8	19	30	0.27	----	2.48	"	"
2.16	19.10	30.56	1.610	8.4	19	31	0.28	----	2.53	"	"
2.25	19.10	30.56	1.570	8.2	19	31	0.29	----	2.53	"	"
2.34	18.40	29.44	1.560	8.5	18	29	0.31	----	2.43	"	"
2.55	17.50	28.00	1.450	8.3	18	28	0.33	----	2.31	"	"
2.64	16.80	26.88	1.350	8.0	17	27	0.35	----	2.22	"	"
2.73	15.90	25.44	1.260	7.9	16	25	0.36	----	2.10	"	"
2.82	14.50	23.20	1.170	8.1	15	23	0.37	----	1.91	"	"
2.91	14.30	22.88	1.100	7.7	14	23	0.38	----	1.88	"	120-130
3.00	13.70	21.92	1.090	8.0	14	22	0.39	----	1.80	"	"
3.08	13.90	22.24	1.080	7.8	14	22	0.40	----	1.83	"	"
3.17	13.40	21.44	1.010	7.5	13	21	0.41	----	1.76	"	"
3.26	12.60	20.16	0.950	7.5	13	20	0.43	----	1.65	"	"
3.35	11.20	17.92	0.860	7.7	11	18	0.44	----	1.83	"	"
3.44	10.50	16.80	0.780	7.4	11	17	0.45	----	1.71	"	"
3.53	9.80	15.68	0.710	7.2	10	16	0.46	----	1.60	"	"
3.62	9.50	15.20	0.670	7.1	10	15	0.47	----	1.54	"	"
3.71	9.40	15.04	0.630	6.7	9	15	0.48	----	1.53	"	"
3.80	8.60	13.76	0.610	7.1	9	14	0.49	----	1.67	"	"
3.89	8.60	13.76	0.570	6.6	9	14	0.50	----	1.67	"	"
3.98	9.00	14.40	0.580	6.4	9	14	0.52	----	1.46	"	"
4.07	11.40	18.24	0.510	4.5	11	18	0.53	----	1.86	"	"
4.16	8.40	13.44	0.460	5.5	8	13	0.54	----	1.63	"	110-120
4.25	7.40	11.84	0.440	5.9	7	12	0.54	----	1.43	"	"
4.34	8.00	12.80	0.420	5.3	8	13	0.55	----	1.54	"	"
4.43	8.20	13.12	0.380	4.6	8	13	0.55	----	1.58	"	"
4.52	7.70	12.32	0.410	5.3	8	12	0.56	----	1.48	"	"
4.61	7.00	11.20	0.410	5.9	7	11	0.56	----	1.34	"	"
4.70	6.60	10.56	0.370	5.6	7	11	0.57	----	1.26	"	"
4.79	6.00	9.60	0.300	5.0	6	10	0.57	----	1.14	"	100-110

4.88	4.70	7.52	0.250	5.3	5	8	0.57	----	0.88	"	"
4.97	4.10	6.56	0.210	5.1	4	7	0.58	----	0.76	"	90-100
5.06	4.30	6.88	0.210	4.9	4	7	0.58	----	0.80	"	"
5.15	5.70	9.12	0.220	3.9	6	9	0.58	----	1.08	"	100-110
5.24	6.20	9.92	0.230	3.7	6	10	0.59	----	1.17	"	"
5.33	6.30	10.08	0.220	3.5	6	10	0.59	----	1.19	"	"
5.42	6.70	10.72	0.240	3.6	7	11	0.59	----	1.27	"	"
5.51	6.40	10.24	0.270	4.2	6	10	0.60	----	1.21	"	"
5.60	7.10	11.36	0.460	6.5	7	11	0.60	----	1.35	"	110-120
5.69	9.20	14.72	0.490	5.3	9	15	0.61	----	1.47	"	"
5.77	11.40	18.24	0.510	4.5	11	18	0.61	----	1.84	"	120-130
5.88	12.20	19.52	0.480	3.9	12	20	0.62	----	1.58	"	"
5.97	9.00	14.40	0.390	4.3	9	14	0.62	----	1.44	"	110-120
6.06	5.30	8.48	0.290	5.5	5	8	0.63	----	0.99	"	100-110
6.15	4.40	7.04	0.230	5.2	4	7	0.63	----	0.80	"	"
6.24	5.00	8.00	0.200	4.0	5	8	0.64	----	0.92	"	"
6.33	6.00	9.60	0.210	3.5	6	10	0.64	----	1.12	"	"
6.42	6.40	10.24	0.240	3.7	6	10	0.64	----	1.20	"	"
6.51	7.10	11.36	0.280	3.9	7	11	0.65	----	1.34	"	"
6.61	7.90	12.64	0.300	3.8	8	13	0.65	----	1.50	"	110-120
6.70	8.20	13.12	0.310	3.8	8	13	0.66	----	1.56	"	"
6.79	8.10	12.96	0.320	4.0	8	13	0.66	----	1.54	"	"
6.88	8.40	13.44	0.330	3.9	8	13	0.67	----	1.60	"	"
6.97	8.20	13.12	0.350	4.3	8	13	0.67	----	1.56	"	"
7.06	8.70	13.92	0.370	4.3	9	14	0.68	----	1.65	"	"
7.15	9.00	14.40	0.390	4.3	9	14	0.68	----	1.43	"	"
7.24	8.70	13.92	0.400	4.6	9	14	0.69	----	1.65	"	"
7.33	9.10	14.56	0.410	4.5	9	15	0.69	----	1.44	"	"
7.42	9.20	14.72	0.410	4.5	9	15	0.70	----	1.46	"	"
7.51	9.40	15.04	0.410	4.4	9	15	0.70	----	1.49	"	"
7.60	9.70	15.52	0.430	4.4	10	16	0.70	----	1.54	"	"
7.69	9.60	15.36	0.440	4.6	10	15	0.71	----	1.52	"	"
7.78	10.50	16.80	0.450	4.3	11	17	0.71	----	1.67	"	"
7.87	10.20	16.32	0.440	4.3	10	16	0.72	----	1.62	"	"
7.96	10.00	16.00	0.430	4.3	10	16	0.72	----	1.59	"	"
8.05	9.80	15.68	0.460	4.7	10	16	0.73	----	1.55	"	"
8.14	10.40	16.64	0.510	4.9	10	17	0.73	----	1.65	"	120-130
8.23	11.70	18.72	0.530	4.5	12	19	0.74	----	1.87	"	"
8.31	12.90	20.64	0.580	4.5	13	21	0.75	----	1.65	"	"
8.40	12.40	19.84	0.630	5.1	12	20	0.75	----	1.59	"	"
8.49	11.90	19.04	0.640	5.4	12	19	0.76	----	1.90	"	"
8.58	12.00	19.20	0.640	5.3	12	19	0.76	----	1.53	"	"
8.67	12.50	20.00	0.600	4.8	13	20	0.77	----	1.60	"	"
8.76	13.40	21.44	0.570	4.3	13	21	0.77	----	1.72	"	"
8.86	13.00	20.80	0.570	4.4	13	21	0.78	----	1.66	"	"
8.94	12.10	19.36	0.550	4.5	12	19	0.78	----	1.54	"	"
9.03	11.40	18.24	0.550	4.8	11	18	0.79	----	1.81	"	"
9.15	11.80	18.88	0.530	4.5	12	19	0.80	----	1.87	"	"
9.24	11.10	17.73	0.530	4.8	11	18	0.80	----	1.76	"	"
9.33	9.80	15.60	0.510	5.2	10	16	0.81	----	1.54	"	"
9.42	9.00	14.28	0.480	5.3	9	14	0.81	----	1.40	"	110-120
9.50	8.00	12.66	0.450	5.6	8	13	0.82	----	1.48	"	"
9.59	8.60	13.57	0.510	5.9	9	14	0.82	----	1.60	"	"
9.68	9.80	15.40	0.560	5.7	10	15	0.83	----	1.54	"	120-130
9.77	12.20	19.11	0.630	5.2	12	19	0.83	----	1.55	"	"

9.87	11.90	18.57	0.640	5.4	12	19	0.84	----	1.88	"	"
9.96	10.60	16.48	0.650	6.1	11	16	0.85	----	1.67	"	"
10.05	9.10	14.10	0.610	6.7	9	14	0.85	----	1.42	"	"
10.14	9.10	14.05	0.570	6.3	9	14	0.86	----	1.41	"	"
10.23	8.10	12.46	0.540	6.7	8	12	0.86	----	1.50	"	110-120
10.32	8.00	12.27	0.550	6.9	8	12	0.87	----	1.47	"	"
10.41	7.40	11.32	0.540	7.3	7	11	0.87	----	1.35	"	"
10.50	7.20	10.98	0.530	7.4	7	11	0.88	----	1.31	"	"
10.59	7.50	11.40	0.490	6.5	8	11	0.88	----	1.37	"	"
10.68	6.90	10.45	0.440	6.4	7	10	0.88	----	1.25	"	"
10.77	8.70	13.14	0.420	4.8	9	13	0.89	----	1.61	"	"
10.85	8.30	12.50	0.430	5.2	8	12	0.89	----	1.53	"	"
10.94	8.70	13.06	0.410	4.7	9	13	0.90	----	1.61	"	"
11.03	8.00	11.97	0.350	4.4	8	12	0.90	----	1.47	"	"
11.12	7.00	10.44	0.340	4.9	7	10	0.91	----	1.27	"	"
11.21	6.20	9.22	0.310	5.0	6	9	0.91	----	1.10	"	100-110
11.30	6.90	10.24	0.280	4.1	7	10	0.92	----	1.24	"	"
11.39	7.70	11.40	0.290	3.8	8	11	0.92	----	1.40	"	"
11.48	8.60	12.69	0.300	3.5	9	13	0.92	----	1.58	"	110-120
11.57	9.00	13.24	0.300	3.3	9	13	0.93	----	1.38	"	"
11.66	9.10	13.34	0.310	3.4	9	13	0.93	----	1.40	"	"
11.75	8.70	12.71	0.310	3.6	9	13	0.94	----	1.60	"	"
11.84	8.60	12.53	0.300	3.5	9	13	0.94	----	1.58	"	"
11.93	8.80	12.78	0.290	3.3	9	13	0.95	----	1.62	"	"
12.02	8.40	12.16	0.300	3.6	8	12	0.95	----	1.54	"	"
12.11	8.40	12.12	0.380	4.5	8	12	0.96	----	1.53	"	"
12.20	8.60	12.36	0.400	4.7	9	12	0.96	----	1.57	"	"
12.28	9.40	13.47	0.420	4.5	9	13	0.97	----	1.44	"	"
12.39	10.80	15.42	0.460	4.3	11	15	0.97	----	1.68	"	"
12.48	10.60	15.07	0.480	4.5	11	15	0.98	----	1.64	"	120-130
12.57	10.70	15.15	0.490	4.6	11	15	0.98	----	1.66	"	"
12.66	12.10	17.07	0.480	4.0	12	17	0.99	----	1.51	"	"
12.75	12.90	18.13	0.440	3.4	9	12	0.99	----	1.62	Silty CLAY to CLAY	"
12.84	11.90	16.67	0.380	3.2	8	11	1.00	----	1.85	"	110-120
12.93	9.70	13.56	0.340	3.5	10	14	1.00	----	1.49	CLAY	"
13.01	8.90	12.42	0.270	3.0	6	8	1.01	----	1.62	Silty CLAY to CLAY	100-110
13.11	8.00	11.15	0.200	2.5	5	7	1.01	----	1.44	"	"
13.20	6.40	8.91	0.160	2.5	4	6	1.01	----	1.12	"	90-100
13.29	5.70	7.93	0.160	2.8	6	8	1.02	----	0.98	CLAY	"
13.38	5.70	7.92	0.180	3.2	6	8	1.02	----	0.98	"	100-110
13.47	6.50	9.01	0.180	2.8	7	9	1.03	----	1.14	"	"
13.56	6.50	9.00	0.190	2.9	7	9	1.03	----	1.14	"	"
13.65	6.30	8.71	0.200	3.2	6	9	1.03	----	1.10	"	"
13.74	6.70	9.25	0.210	3.1	7	9	1.04	----	1.18	"	"
13.83	6.80	9.38	0.180	2.6	5	6	1.04	----	1.20	Silty CLAY to CLAY	"
13.92	5.50	7.57	0.160	2.9	6	8	1.04	----	0.93	CLAY	90-100
14.01	4.70	6.47	0.150	3.2	5	6	1.05	----	0.77	"	"
14.10	3.90	5.36	0.140	3.6	4	5	1.05	----	0.61	"	"
14.19	4.90	6.73	0.140	2.9	5	7	1.05	----	0.81	"	"
14.28	5.50	7.54	0.190	3.5	6	8	1.06	----	0.93	"	100-110
14.37	7.50	10.27	0.200	2.7	5	7	1.06	----	1.33	Silty CLAY to CLAY	"
14.46	11.60	15.85	0.200	1.7	6	8	1.06	----	1.79	Clayey SILT to Silty CLAY	"
14.54	9.60	13.10	0.210	2.2	5	7	1.07	----	1.46	"	"
14.63	9.70	13.22	0.230	2.4	5	7	1.07	----	1.47	"	"
14.72	9.30	12.66	0.260	2.8	6	8	1.08	----	1.41	Silty CLAY to CLAY	"

14.81	10.00	13.58	0.280	2.8	7	9	1.08	----	1.52	"	110-120
14.90	11.50	15.59	0.300	2.6	6	8	1.08	----	1.77	Clayey SILT to Silty CLAY	"
14.99	12.50	16.92	0.330	2.6	6	8	1.09	----	1.55	"	"
15.08	12.10	16.35	0.390	3.2	8	11	1.09	----	1.49	Silty CLAY to CLAY	"
15.17	12.50	16.86	0.390	3.1	8	11	1.10	----	1.55	"	"
15.26	12.00	16.15	0.390	3.3	8	11	1.10	----	1.48	"	"
15.35	11.60	15.58	0.450	3.9	12	16	1.11	----	1.78	CLAY	120-130
15.44	11.30	15.15	0.520	4.6	11	15	1.11	----	1.73	"	"
15.53	11.30	15.11	0.570	5.0	11	15	1.12	----	1.73	"	"
15.73	14.10	18.77	0.530	3.8	9	13	1.13	----	1.76	Silty CLAY to CLAY	"
15.82	12.60	16.73	0.500	4.0	13	17	1.14	----	1.56	CLAY	"
15.90	10.10	13.39	0.450	4.5	10	13	1.14	----	1.53	"	110-120
15.99	8.20	10.85	0.370	4.5	8	11	1.15	----	1.45	"	"
16.08	8.00	10.57	0.330	4.1	8	11	1.15	----	1.41	"	"
16.17	7.70	10.15	0.330	4.3	8	10	1.16	----	1.35	"	"
16.26	7.80	10.26	0.360	4.6	8	10	1.16	----	1.37	"	"
16.35	8.60	11.30	0.330	3.8	9	11	1.17	----	1.53	"	"
16.44	8.30	10.88	0.310	3.7	8	11	1.17	----	1.47	"	"
16.53	8.70	11.38	0.300	3.4	9	11	1.18	----	1.55	"	"
16.62	7.30	9.53	0.320	4.4	7	10	1.18	----	1.26	"	"
16.71	8.60	11.21	0.330	3.8	9	11	1.19	----	1.52	"	"
16.80	8.20	10.67	0.300	3.7	8	11	1.19	----	1.44	"	"
16.88	6.40	8.32	0.260	4.1	6	8	1.19	----	1.08	"	100-110
16.97	4.80	6.23	0.230	4.8	5	6	1.20	----	0.76	"	"
17.06	5.30	6.87	0.200	3.8	5	7	1.20	----	0.86	"	"
17.15	4.70	6.08	0.180	3.8	5	6	1.20	----	0.74	"	90-100
17.24	5.20	6.72	0.190	3.7	5	7	1.21	----	0.84	"	100-110
17.33	6.30	8.13	0.220	3.5	6	8	1.21	----	1.06	"	"
17.42	5.60	7.21	0.250	4.5	6	7	1.22	----	0.92	"	"
17.50	5.10	6.56	0.270	5.3	5	7	1.22	----	0.81	"	"
17.59	5.90	7.58	0.280	4.7	6	8	1.22	----	0.97	"	"
17.68	6.90	8.85	0.300	4.3	7	9	1.23	----	1.17	"	"
17.77	8.20	10.49	0.370	4.5	8	10	1.23	----	1.43	"	110-120
17.86	10.40	13.28	0.430	4.1	10	13	1.24	----	1.56	"	"
17.94	16.30	20.77	0.470	2.9	8	10	1.24	----	2.03	Clayey SILT to Silty CLAY	120-130
18.03	20.00	25.43	0.480	2.4	10	13	1.25	----	2.53	"	"
18.12	14.40	18.27	0.440	3.1	10	12	1.25	----	1.78	Silty CLAY to CLAY	"
18.21	11.50	14.57	0.400	3.5	8	10	1.26	----	1.74	"	110-120
18.30	10.70	13.53	0.370	3.5	7	9	1.26	----	1.60	"	"
18.38	10.10	12.75	0.340	3.4	7	8	1.27	----	1.50	"	"
18.47	10.30	12.98	0.390	3.8	10	13	1.27	----	1.54	CLAY	"
18.56	10.00	12.57	0.690	6.9	10	13	1.28	----	1.49	"	120-130
18.65	10.50	13.17	1.030	9.8	11	13	1.28	----	1.57	"	"
18.74	17.50	21.90	1.080	6.2	18	22	1.29	----	2.19	"	130-140
18.82	34.30	42.83	1.230	3.6	17	21	1.29	----	4.43	Clayey SILT to Silty CLAY	"
18.88	51.60	64.32	1.410	2.7	21	26	1.30	----	6.73	Sandy SILT to Clayey SILT	"
18.97	54.70	68.01	1.550	2.8	22	27	1.31	----	7.14	"	"
19.06	45.30	56.19	1.370	3.0	18	22	1.31	----	5.89	"	"
19.15	28.30	35.01	1.190	4.2	19	23	1.32	----	3.62	Silty CLAY to CLAY	"
19.24	16.00	19.75	1.050	6.6	16	20	1.32	----	1.98	CLAY	"
19.32	12.20	15.03	0.830	6.8	12	15	1.33	----	1.47	"	120-130
19.41	9.80	12.04	0.510	5.2	10	12	1.34	----	1.44	"	"
19.50	8.80	10.79	0.350	4.0	9	11	1.34	----	1.53	"	110-120
19.59	9.30	11.39	0.300	3.2	6	8	1.35	----	1.36	Silty CLAY to CLAY	"
19.68	9.00	11.00	0.320	3.6	9	11	1.35	----	1.31	CLAY	"

19.77	10.70	13.05	0.340	3.2	7	9	1.35	----	1.59	Silty CLAY to CLAY	"
19.86	12.30	14.98	0.380	3.1	8	10	1.36	----	1.48	"	"
19.94	13.30	16.16	0.410	3.1	9	11	1.36	----	1.62	"	120-130
20.03	13.40	16.25	0.440	3.3	9	11	1.37	----	1.63	"	"
20.12	13.20	15.97	0.460	3.5	9	11	1.38	----	1.60	"	"
20.21	13.60	16.42	0.430	3.2	9	11	1.38	----	1.65	"	"
20.30	13.60	16.38	0.440	3.2	9	11	1.39	----	1.65	"	"
20.39	12.60	15.14	0.450	3.6	8	10	1.39	----	1.52	"	"
20.47	11.70	14.03	0.440	3.8	12	14	1.40	----	1.75	CLAY	"
20.56	11.30	13.53	0.430	3.8	11	14	1.40	----	1.68	"	110-120
20.65	9.90	11.83	0.420	4.2	10	12	1.41	----	1.45	"	"
20.74	9.90	11.81	0.390	3.9	10	12	1.41	----	1.45	"	"
20.82	10.10	12.02	0.370	3.7	10	12	1.42	----	1.48	"	"
20.91	10.80	12.83	0.370	3.4	7	9	1.42	----	1.59	Silty CLAY to CLAY	"
21.00	11.50	13.64	0.390	3.4	8	9	1.43	----	1.71	"	"
21.09	11.50	13.61	0.410	3.6	8	9	1.43	----	1.71	"	"
21.17	11.10	13.11	0.430	3.9	11	13	1.43	----	1.64	CLAY	"
21.26	11.40	13.44	0.440	3.9	11	13	1.44	----	1.69	"	"
21.35	11.00	12.95	0.450	4.1	11	13	1.44	----	1.62	"	"
21.44	10.80	12.69	0.430	4.0	11	13	1.45	----	1.59	"	"
21.52	10.50	12.31	0.430	4.1	11	12	1.45	----	1.54	"	"
21.61	9.90	11.59	0.420	4.2	10	12	1.46	----	1.44	"	"
21.70	10.30	12.03	0.410	4.0	10	12	1.46	----	1.50	"	"
21.79	9.30	10.84	0.430	4.6	9	11	1.47	----	1.34	"	"
21.88	10.10	11.75	0.560	5.5	10	12	1.47	----	1.47	"	120-130
21.97	10.50	12.19	0.690	6.6	11	12	1.48	----	1.53	"	"
22.05	11.50	13.32	0.710	6.2	12	13	1.48	----	1.70	"	"
22.28	11.30	13.01	0.640	5.7	11	13	1.50	----	1.66	"	"
22.37	11.30	12.98	0.610	5.4	11	13	1.50	----	1.66	"	"
22.46	11.00	12.62	0.600	5.5	11	13	1.51	----	1.61	"	"
22.54	11.90	13.62	0.620	5.2	12	14	1.51	----	1.76	"	"
22.63	12.00	13.72	0.650	5.4	12	14	1.52	----	1.42	"	"
22.72	12.80	14.60	0.650	5.1	13	15	1.53	----	1.53	"	"
22.81	11.90	13.55	0.640	5.4	12	14	1.53	----	1.76	"	"
22.90	11.30	12.85	0.620	5.5	11	13	1.54	----	1.66	"	"
22.99	11.60	13.17	0.580	5.0	12	13	1.54	----	1.71	"	"
23.08	12.20	13.82	0.550	4.5	12	14	1.55	----	1.44	"	"
23.16	13.60	15.38	0.550	4.0	14	15	1.55	----	1.63	"	"
23.25	14.20	16.03	0.570	4.0	14	16	1.56	----	1.71	"	"
23.34	14.20	16.00	0.580	4.1	14	16	1.56	----	1.71	"	"
23.43	14.60	16.42	0.570	3.9	10	11	1.57	----	1.76	Silty CLAY to CLAY	"
23.52	14.20	15.95	0.550	3.9	9	11	1.58	----	1.71	"	"
23.61	13.20	14.80	0.530	4.0	13	15	1.58	----	1.57	CLAY	"
23.69	13.20	14.77	0.500	3.8	9	10	1.59	----	1.57	Silty CLAY to CLAY	"
23.78	13.60	15.19	0.530	3.9	14	15	1.59	----	1.63	CLAY	"
23.87	14.20	15.83	0.670	4.7	14	16	1.60	----	1.70	"	"
23.94	18.90	21.05	0.790	4.2	13	14	1.60	----	2.33	Silty CLAY to CLAY	"
24.03	24.50	27.22	0.910	3.7	16	18	1.61	----	3.08	"	130-140
24.11	25.30	28.06	0.990	3.9	17	19	1.61	----	3.18	"	"
24.20	25.00	27.67	1.060	4.2	17	18	1.62	----	3.14	"	"
24.29	23.30	25.73	1.020	4.4	16	17	1.63	----	2.91	"	"
24.37	20.80	22.92	0.850	4.1	14	15	1.63	----	2.58	"	"
24.46	17.50	19.25	0.690	3.9	12	13	1.64	----	2.14	"	120-130
24.55	14.40	15.81	0.590	4.1	14	16	1.64	----	1.73	CLAY	"
24.63	12.50	13.70	0.490	3.9	13	14	1.65	----	1.47	"	"

24.72	12.30	13.46	0.420	3.4	8	9	1.65	----	1.44	Silty CLAY to CLAY	"
24.81	12.40	13.55	0.390	3.1	8	9	1.66	----	1.46	"	110-120
24.90	12.50	13.63	0.420	3.4	8	9	1.66	----	1.47	"	120-130
24.99	13.10	14.26	0.450	3.4	9	10	1.67	----	1.55	"	"
25.07	14.10	15.32	0.450	3.2	9	10	1.68	----	1.68	"	"
25.16	14.40	15.62	0.540	3.8	10	10	1.68	----	1.72	"	"
25.25	14.60	15.81	0.620	4.2	15	16	1.69	----	1.75	CLAY	"
25.34	13.80	14.91	0.600	4.3	14	15	1.69	----	1.64	"	"
25.40	10.30	11.12	0.570	5.5	10	11	1.70	----	1.46	"	"
25.50	13.10	14.11	0.500	3.8	9	9	1.70	----	1.54	Silty CLAY to CLAY	"
25.58	12.00	12.90	0.450	3.8	12	13	1.71	----	1.40	CLAY	"
25.67	11.00	11.81	0.430	3.9	11	12	1.71	----	1.58	"	110-120
25.76	9.50	10.18	0.400	4.2	10	10	1.72	----	1.33	"	"
25.84	8.90	9.53	0.400	4.5	9	10	1.72	----	1.47	"	"
25.93	9.30	9.94	0.420	4.5	9	10	1.73	----	1.29	"	"
26.02	10.40	11.10	0.470	4.5	10	11	1.73	----	1.48	"	"
26.11	12.10	12.89	0.510	4.2	12	13	1.74	----	1.41	"	120-130
26.20	13.30	14.14	0.540	4.1	13	14	1.74	----	1.57	"	"
26.28	14.40	15.28	0.580	4.0	14	15	1.75	----	1.71	"	"
26.37	14.20	15.04	0.620	4.4	14	15	1.75	----	1.68	"	"
26.46	14.20	15.02	0.630	4.4	14	15	1.76	----	1.68	"	"
26.55	13.80	14.58	0.650	4.7	14	15	1.76	----	1.63	"	"
26.64	13.60	14.35	0.670	4.9	14	14	1.77	----	1.60	"	"
26.72	13.90	14.65	0.650	4.7	14	15	1.77	----	1.64	"	"
26.81	14.20	14.95	0.640	4.5	14	15	1.78	----	1.68	"	"
26.90	14.80	15.56	0.640	4.3	15	16	1.79	----	1.76	"	"
26.99	15.10	15.86	0.650	4.3	15	16	1.79	----	1.80	"	"
27.08	15.40	16.15	0.660	4.3	15	16	1.80	----	1.84	"	"
27.16	16.60	17.39	0.660	4.0	11	12	1.80	----	2.00	Silty CLAY to CLAY	"
27.25	19.00	19.88	0.730	3.8	13	13	1.81	----	2.32	"	"
27.34	21.60	22.56	0.830	3.8	14	15	1.81	----	2.66	"	130-140
27.43	23.00	23.99	0.890	3.9	15	16	1.82	----	2.85	"	"
27.51	22.80	23.75	0.940	4.1	15	16	1.83	----	2.82	"	"
27.60	22.20	23.09	1.020	4.6	22	23	1.83	----	2.74	CLAY	"
27.69	20.40	21.18	1.130	5.5	20	21	1.84	----	2.50	"	"
27.78	18.10	18.77	1.240	6.9	18	19	1.85	----	2.19	"	"
27.86	18.50	19.16	1.360	7.4	19	19	1.85	----	2.24	"	"
27.95	20.20	20.88	1.610	8.0	20	21	1.86	----	2.47	"	"
28.04	26.40	27.26	1.850	7.0	26	27	1.87	----	3.30	"	"
28.12	28.90	29.79	2.070	7.2	29	30	1.87	----	3.63	"	"
28.21	33.40	34.38	2.270	6.8	33	34	1.88	----	4.23	"	"
28.30	38.40	39.47	2.250	5.9	38	39	1.88	----	4.89	"	"
28.38	35.90	36.85	2.200	6.1	36	37	1.89	----	4.56	"	"
28.47	29.30	30.03	2.440	8.3	29	30	1.90	----	3.68	"	"
28.56	30.70	31.42	2.740	8.9	31	31	1.90	----	3.86	"	"
28.64	35.30	36.07	2.810	8.0	35	36	1.91	----	4.48	"	"
28.68	40.00	40.85	2.910	7.3	40	41	1.91	----	5.10	"	"
28.76	44.80	45.68	3.210	7.2	45	46	1.92	----	5.74	"	"
28.85	70.50	71.79	3.730	5.3	71	72	1.92	----	9.17	Very Stiff Fine Grained *	"
28.94	111.40	113.27	4.140	3.7	45	45	1.93	----	14.62	Sandy SILT to Clayey SILT	"
29.02	140.50	142.64	4.390	3.1	56	57	1.94	----	18.50	"	"
29.11	156.20	158.35	4.880	3.1	62	63	1.94	----	20.59	"	"
29.19	172.90	175.03	5.150	3.0	58	58	1.95	41	----	Silty SAND to Sandy SILT	"
29.27	185.30	187.31	5.660	3.1	62	62	1.95	42	----	"	"
29.38	174.40	175.97	5.780	3.3	87	88	1.96	41	----	SAND to Clayey SAND *	"

29.46	176.10	177.43	5.770	3.3	70	71	1.97	----	23.24	Sandy SILT to Clayey SILT	"
29.53	172.20	173.30	5.540	3.2	69	69	1.97	----	22.72	" "	
29.61	161.60	162.40	5.120	3.2	65	65	1.98	----	21.31	" "	
29.66	157.80	158.46	4.840	3.1	53	53	1.98	41	----	Silty SAND to Sandy SILT	"
29.76	156.20	156.57	4.030	2.6	52	52	1.99	41	----	" "	
29.85	150.30	150.43	3.530	2.3	50	50	2.00	40	----	" "	
29.93	147.20	147.19	3.300	2.2	49	49	2.00	40	----	" "	
30.01	140.60	140.58	3.000	2.1	47	47	2.01	40	----	" "	

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-14
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 12:57:11
Terminated at 50.0 feet Groundwater measured at 3.9 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.55	31.80	50.88	1.350	4.2	21	34	0.06	----	4.24	Silty CLAY to CLAY	"
0.65	28.00	44.80	1.230	4.4	19	30	0.08	----	3.73	"	"
0.74	25.10	40.16	1.040	4.1	17	27	0.09	----	3.34	"	"
0.83	23.00	36.80	0.900	3.9	15	25	0.10	----	3.06	"	"
0.92	22.00	35.20	0.810	3.7	15	23	0.11	----	2.93	"	"
1.01	22.40	35.84	0.760	3.4	11	18	0.13	----	2.98	Clayey SILT to Silty CLAY	120-130
1.11	23.10	36.96	0.760	3.3	12	18	0.14	----	3.07	"	"
1.20	23.70	37.92	0.820	3.5	12	19	0.15	----	3.15	"	130-140
1.29	23.50	37.60	0.880	3.7	16	25	0.16	----	3.12	Silty CLAY to CLAY	"
1.38	22.30	35.68	0.980	4.4	15	24	0.17	----	2.96	"	"
1.47	21.30	34.08	1.100	5.2	21	34	0.19	----	2.83	CLAY	"
1.56	20.80	33.28	1.170	5.6	21	33	0.20	----	2.76	"	"
1.65	20.90	33.44	1.190	5.7	21	33	0.21	----	2.77	"	"
1.74	20.40	32.64	1.190	5.8	20	33	0.22	----	2.71	"	"
1.84	20.20	32.32	1.140	5.6	20	32	0.24	----	2.68	"	"
1.93	19.10	30.56	1.050	5.5	19	31	0.25	----	2.53	"	"
2.02	17.30	27.68	0.970	5.6	17	28	0.26	----	2.29	"	"
2.11	15.40	24.64	0.910	5.9	15	25	0.27	----	2.04	"	120-130
2.29	14.00	22.40	0.810	5.8	14	22	0.29	----	1.85	"	"
2.39	13.80	22.08	0.730	5.3	14	22	0.31	----	1.82	"	"
2.48	13.70	21.92	0.720	5.3	14	22	0.32	----	1.81	"	"
2.57	13.20	21.12	0.710	5.4	13	21	0.33	----	1.74	"	"
2.65	13.60	21.76	0.710	5.2	14	22	0.34	----	1.79	"	"
2.74	13.50	21.60	0.690	5.1	14	22	0.35	----	1.78	"	"
2.84	12.50	20.00	0.640	5.1	13	20	0.36	----	1.64	"	"
2.93	11.50	18.40	0.620	5.4	12	18	0.37	----	1.89	"	"
3.02	10.40	16.64	0.580	5.6	10	17	0.39	----	1.70	"	"
3.13	10.00	16.00	0.530	5.3	10	16	0.40	----	1.63	"	"
3.22	9.90	15.84	0.490	4.9	10	16	0.41	----	1.62	"	110-120
3.32	10.00	16.00	0.460	4.6	10	16	0.42	----	1.63	"	"
3.41	10.00	16.00	0.430	4.3	10	16	0.43	----	1.63	"	"
3.50	9.10	14.56	0.410	4.5	9	15	0.44	----	1.48	"	"
3.60	8.50	13.60	0.380	4.5	9	14	0.45	----	1.65	"	"
3.69	7.40	11.84	0.350	4.7	7	12	0.46	----	1.43	"	"
3.78	6.20	9.92	0.310	5.0	6	10	0.47	----	1.19	"	100-110
3.88	5.60	8.96	0.280	5.0	6	9	0.48	----	1.07	"	"
3.97	6.20	9.92	0.240	3.9	6	10	0.49	----	1.19	"	"
4.06	6.80	10.88	0.220	3.2	7	11	0.49	----	1.31	"	"
4.15	6.90	11.04	0.230	3.3	7	11	0.50	----	1.33	"	"
4.25	6.80	10.88	0.240	3.5	7	11	0.50	----	1.31	"	"
4.34	6.90	11.04	0.240	3.5	7	11	0.50	----	1.33	"	"
4.43	6.80	10.88	0.240	3.5	7	11	0.51	----	1.31	"	"
4.52	6.20	9.92	0.220	3.5	6	10	0.51	----	1.18	"	"
4.62	6.40	10.24	0.230	3.6	6	10	0.52	----	1.22	"	"
4.71	7.10	11.36	0.220	3.1	7	11	0.52	----	1.36	"	"
4.80	7.70	12.32	0.200	2.6	5	8	0.52	----	1.48	Silty CLAY to CLAY	"
4.90	7.80	12.48	0.190	2.4	5	8	0.53	----	1.50	"	"

4.99	8.30	13.28	0.190	2.3	6	9	0.53	----	1.60	"	"
5.08	7.70	12.32	0.190	2.5	5	8	0.53	----	1.48	"	"
5.18	7.60	12.16	0.190	2.5	5	8	0.54	----	1.46	"	"
5.27	7.50	12.00	0.210	2.8	5	8	0.54	----	1.44	"	"
5.54	13.60	21.76	0.500	3.7	9	15	0.56	----	1.77	"	120-130
5.63	16.10	25.76	0.660	4.1	16	26	0.57	----	2.10	CLAY	"
5.72	17.50	28.00	0.780	4.5	18	28	0.57	----	2.29	"	"
5.82	18.50	29.60	0.870	4.7	19	30	0.58	----	2.42	"	"
5.91	19.50	31.20	0.880	4.5	20	31	0.58	----	2.55	"	130-140
6.01	21.00	33.60	0.860	4.1	14	22	0.59	----	2.75	Silty CLAY to CLAY	"
6.10	21.50	34.40	0.840	3.9	14	23	0.60	----	2.82	"	"
6.19	20.20	32.32	0.750	3.7	13	22	0.60	----	2.64	"	120-130
6.29	18.40	29.44	0.560	3.0	9	15	0.61	----	2.40	Clayey SILT to Silty CLAY	"
6.38	15.20	24.32	0.390	2.6	8	12	0.62	----	1.98	"	"
6.47	10.10	16.16	0.270	2.7	7	11	0.62	----	1.62	Silty CLAY to CLAY	110-120
6.57	8.50	13.60	0.220	2.6	6	9	0.62	----	1.62	"	100-110
6.66	8.30	13.28	0.230	2.8	6	9	0.63	----	1.58	"	"
6.75	8.10	12.96	0.250	3.1	5	9	0.63	----	1.54	"	"
6.85	6.80	10.88	0.230	3.4	7	11	0.64	----	1.28	CLAY	"
6.94	5.60	8.96	0.280	5.0	6	9	0.64	----	1.04	"	"
7.03	5.90	9.44	0.290	4.9	6	9	0.64	----	1.10	"	"
7.13	8.00	12.80	0.260	3.3	8	13	0.65	----	1.51	"	"
7.22	9.10	14.56	0.240	2.6	6	10	0.65	----	1.44	Silty CLAY to CLAY	"
7.31	8.50	13.60	0.280	3.3	9	14	0.66	----	1.61	CLAY	110-120
7.40	9.90	15.84	0.400	4.0	10	16	0.66	----	1.58	"	"
7.50	13.60	21.76	0.500	3.7	9	15	0.67	----	1.75	Silty CLAY to CLAY	120-130
7.59	19.00	30.40	0.540	2.8	10	15	0.67	----	2.47	Clayey SILT to Silty CLAY	"
7.68	18.30	29.28	0.500	2.7	9	15	0.68	----	2.38	"	"
7.78	14.40	23.04	0.480	3.3	10	15	0.68	----	1.86	Silty CLAY to CLAY	"
7.87	11.30	18.08	0.490	4.3	11	18	0.69	----	1.81	CLAY	"
7.96	12.10	19.36	0.480	4.0	12	19	0.70	----	1.55	"	"
8.05	15.40	24.64	0.460	3.0	8	12	0.70	----	1.99	Clayey SILT to Silty CLAY	"
8.14	19.70	31.52	0.480	2.4	10	16	0.71	----	2.56	"	"
8.24	23.70	37.92	0.590	2.5	12	19	0.71	----	3.09	"	"
8.33	24.80	39.68	0.590	2.4	10	16	0.72	----	3.24	Sandy SILT to Clayey SILT	"
8.42	22.90	36.64	0.670	2.9	11	18	0.73	----	2.99	Clayey SILT to Silty CLAY	"
8.52	17.90	28.64	0.710	4.0	12	19	0.73	----	2.32	Silty CLAY to CLAY	"
8.61	15.80	25.28	0.650	4.1	16	25	0.74	----	2.04	CLAY	"
8.67	13.70	21.92	0.570	4.2	14	22	0.74	----	1.76	"	"
8.70	24.00	38.40	0.540	2.3	10	15	0.74	----	3.13	Sandy SILT to Clayey SILT	"
8.80	31.20	49.92	0.550	1.8	12	20	0.75	----	4.09	"	"
8.89	37.80	60.48	0.620	1.6	13	20	0.75	35	----	Silty SAND to Sandy SILT	"
8.98	42.00	67.20	0.700	1.7	14	22	0.76	36	----	"	"
9.07	45.80	73.28	0.790	1.7	15	24	0.77	36	----	"	130-140
9.16	52.10	83.36	0.830	1.6	17	28	0.77	37	----	"	120-130
9.25	59.60	95.36	0.830	1.4	20	32	0.78	38	----	"	"
9.35	65.70	105.12	0.760	1.2	22	35	0.78	38	----	"	"
9.44	68.20	109.12	0.610	0.9	17	27	0.79	39	----	SAND to Silty SAND	"
9.53	63.00	100.80	0.850	1.3	21	34	0.80	38	----	Silty SAND to Sandy SILT	"
9.62	52.90	84.52	0.940	1.8	18	28	0.80	37	----	"	130-140
9.72	46.30	73.66	0.980	2.1	19	29	0.81	----	6.10	Sandy SILT to Clayey SILT	"
9.81	30.90	48.95	1.060	3.4	15	24	0.82	----	4.04	Clayey SILT to Silty CLAY	"
9.90	17.80	28.08	0.990	5.6	18	28	0.82	----	2.29	CLAY	"
9.99	14.40	22.63	0.640	4.4	14	23	0.83	----	1.84	"	120-130
10.09	11.70	18.33	0.400	3.4	8	12	0.83	----	1.85	Silty CLAY to CLAY	110-120

10.18	7.50	11.71	0.300	4.0	8	12	0.84	----	1.38	CLAY	"
10.27	7.00	10.91	0.270	3.9	7	11	0.84	----	1.28	"	100-110
10.36	8.80	13.67	0.300	3.4	9	14	0.85	----	1.63	"	110-120
10.45	9.90	15.33	0.300	3.0	7	10	0.85	----	1.54	Silty CLAY to CLAY	"
10.54	11.40	17.60	0.330	2.9	8	12	0.86	----	1.79	"	"
10.64	14.60	22.45	0.390	2.7	7	11	0.86	----	1.86	Clayey SILT to Silty CLAY	120-130
10.73	18.50	28.34	0.480	2.6	9	14	0.87	----	2.38	"	"
10.82	20.80	31.75	0.660	3.2	10	16	0.87	----	2.69	"	"
10.91	23.80	36.17	0.980	4.1	16	24	0.88	----	3.09	Silty CLAY to CLAY	130-140
11.00	31.60	47.82	1.250	4.0	21	32	0.89	----	4.12	"	"
11.09	40.30	60.72	1.200	3.0	16	24	0.89	----	5.28	Sandy SILT to Clayey SILT	"
11.18	43.10	64.66	1.110	2.6	17	26	0.90	----	5.66	"	"
11.27	34.10	50.93	0.960	2.8	14	20	0.91	----	4.46	"	"
11.36	25.30	37.62	0.770	3.0	13	19	0.91	----	3.28	Clayey SILT to Silty CLAY	"
11.46	22.10	32.73	0.590	2.7	11	16	0.92	----	2.85	"	120-130
11.55	19.20	28.33	0.460	2.4	10	14	0.92	----	2.47	"	"
11.64	17.90	26.31	0.460	2.6	9	13	0.93	----	2.29	"	"
11.73	17.40	25.47	0.700	4.0	12	17	0.94	----	2.22	Silty CLAY to CLAY	"
11.83	17.30	25.22	0.600	3.5	12	17	0.94	----	2.21	"	"
11.92	16.90	24.54	0.520	3.1	8	12	0.95	----	2.16	Clayey SILT to Silty CLAY	"
12.01	17.80	25.75	0.460	2.6	9	13	0.95	----	2.28	"	"
12.10	14.60	21.04	0.380	2.6	7	11	0.96	----	1.85	"	"
12.19	13.00	18.67	0.340	2.6	7	9	0.96	----	1.63	"	110-120
12.28	13.50	19.32	0.340	2.5	7	10	0.97	----	1.70	"	"
12.38	13.80	19.68	0.320	2.3	7	10	0.97	----	1.74	"	"
12.47	14.30	20.33	0.320	2.2	7	10	0.98	----	1.81	"	"
12.56	14.50	20.54	0.350	2.4	7	10	0.98	----	1.83	"	"
12.65	14.60	20.60	0.430	2.9	7	10	0.99	----	1.84	"	120-130
12.75	15.90	22.34	0.490	3.1	8	11	0.99	----	2.02	"	"
12.84	16.50	23.09	0.530	3.2	8	12	1.00	----	2.10	"	"
12.93	17.10	23.88	0.600	3.5	11	16	1.01	----	2.18	Silty CLAY to CLAY	"
13.02	16.70	23.27	0.630	3.8	11	16	1.01	----	2.12	"	"
13.11	17.70	24.61	0.640	3.6	12	16	1.02	----	2.25	"	"
13.21	17.80	24.70	0.650	3.7	12	16	1.02	----	2.27	"	"
13.30	17.30	23.95	0.660	3.8	12	16	1.03	----	2.20	"	"
13.39	17.30	23.90	0.660	3.8	12	16	1.04	----	2.20	"	"
13.49	16.60	22.88	0.640	3.9	11	15	1.04	----	2.10	"	"
13.58	16.40	22.56	0.620	3.8	11	15	1.05	----	2.08	"	"
13.67	15.40	21.14	0.590	3.8	10	14	1.05	----	1.94	"	"
13.76	15.50	21.23	0.570	3.7	10	14	1.06	----	1.95	"	"
13.86	15.60	21.32	0.510	3.3	10	14	1.06	----	1.97	"	"
13.95	15.00	20.45	0.440	2.9	8	10	1.07	----	1.89	Clayey SILT to Silty CLAY	"
14.04	14.60	19.86	0.400	2.7	7	10	1.08	----	1.83	"	"
14.13	14.20	19.28	0.390	2.7	7	10	1.08	----	1.78	"	"
14.23	14.70	19.91	0.400	2.7	7	10	1.09	----	1.84	"	"
14.32	13.70	18.51	0.420	3.1	9	12	1.09	----	1.71	Silty CLAY to CLAY	"
14.41	11.00	14.84	0.430	3.9	11	15	1.10	----	1.69	CLAY	110-120
14.50	9.70	13.06	0.410	4.2	10	13	1.10	----	1.47	"	"
14.60	8.80	11.83	0.380	4.3	9	12	1.11	----	1.58	"	"
14.69	8.70	11.67	0.350	4.0	9	12	1.11	----	1.56	"	"
14.78	7.90	10.58	0.330	4.2	8	11	1.12	----	1.40	"	"
14.88	8.30	11.09	0.310	3.7	8	11	1.12	----	1.48	"	"
14.97	8.10	10.80	0.340	4.2	8	11	1.13	----	1.44	"	"
15.06	8.50	11.31	0.340	4.0	9	11	1.13	----	1.52	"	"
15.16	9.40	12.49	0.320	3.4	9	12	1.14	----	1.41	"	"

15.21	7.10	9.42	0.310	4.4	7	9	1.14	----	1.24	"	"
15.27	10.50	13.92	0.290	2.8	7	9	1.14	----	1.60	Silty CLAY to CLAY	"
15.36	10.60	14.02	0.290	2.7	7	9	1.15	----	1.61	"	"
15.46	10.50	13.86	0.280	2.7	7	9	1.15	----	1.59	"	"
15.55	10.90	14.36	0.300	2.8	7	10	1.16	----	1.66	"	"
15.64	11.70	15.39	0.340	2.9	8	10	1.16	----	1.79	"	"
15.73	13.70	17.98	0.370	2.7	7	9	1.17	----	1.70	Clayey SILT to Silty CLAY	"
15.83	13.30	17.42	0.390	2.9	9	12	1.17	----	1.65	Silty CLAY to CLAY	120-130
15.92	12.40	16.21	0.390	3.1	8	11	1.18	----	1.52	"	110-120
16.01	12.30	16.05	0.400	3.3	8	11	1.18	----	1.51	"	"
16.11	11.60	15.10	0.350	3.0	8	10	1.19	----	1.77	"	"
16.20	10.50	13.64	0.330	3.1	7	9	1.19	----	1.59	"	"
16.30	10.00	12.97	0.310	3.1	7	9	1.20	----	1.50	"	"
16.39	10.10	13.07	0.300	3.0	7	9	1.20	----	1.52	"	"
16.48	10.10	13.05	0.300	3.0	7	9	1.21	----	1.52	"	"
16.58	10.60	13.67	0.340	3.2	7	9	1.21	----	1.60	"	"
16.67	11.80	15.18	0.380	3.2	8	10	1.22	----	1.80	"	"
16.77	13.80	17.71	0.420	3.0	9	12	1.22	----	1.70	"	120-130
16.86	13.30	17.03	0.420	3.2	9	11	1.23	----	1.64	"	"
16.95	12.30	15.72	0.390	3.2	8	10	1.23	----	1.50	"	110-120
17.05	9.60	12.24	0.310	3.2	6	8	1.24	----	1.43	"	"
17.14	8.30	10.57	0.270	3.3	8	11	1.24	----	1.45	CLAY	100-110
17.23	7.90	10.04	0.240	3.0	5	7	1.25	----	1.37	Silty CLAY to CLAY	"
17.33	8.30	10.53	0.240	2.9	6	7	1.25	----	1.45	"	"
17.42	9.90	12.54	0.260	2.6	7	8	1.26	----	1.47	"	110-120
17.51	11.10	14.04	0.270	2.4	6	7	1.26	----	1.67	Clayey SILT to Silty CLAY	"
17.61	10.70	13.50	0.300	2.8	7	9	1.27	----	1.61	Silty CLAY to CLAY	"
17.70	9.80	12.35	0.330	3.4	7	8	1.27	----	1.46	"	"
17.79	9.00	11.32	0.340	3.8	9	11	1.28	----	1.32	CLAY	"
17.89	9.00	11.30	0.310	3.4	9	11	1.28	----	1.32	"	"
17.98	9.30	11.65	0.300	3.2	6	8	1.29	----	1.37	Silty CLAY to CLAY	"
18.08	9.40	11.75	0.290	3.1	6	8	1.29	----	1.39	"	"
18.17	9.90	12.35	0.380	3.8	10	12	1.30	----	1.47	CLAY	"
18.26	11.40	14.19	0.620	5.4	11	14	1.30	----	1.72	"	120-130
18.36	11.70	14.53	0.530	4.5	12	15	1.31	----	1.77	"	"
18.45	10.60	13.14	0.450	4.2	11	13	1.31	----	1.58	"	110-120
18.50	12.50	15.48	0.400	3.2	8	10	1.32	----	1.52	Silty CLAY to CLAY	"
18.60	10.50	12.98	0.360	3.4	7	9	1.32	----	1.56	"	"
18.69	11.30	13.94	0.370	3.3	8	9	1.33	----	1.70	"	"
18.78	11.60	14.28	0.450	3.9	12	14	1.33	----	1.74	CLAY	120-130
18.87	13.40	16.46	0.660	4.9	13	16	1.34	----	1.64	"	"
18.96	16.10	19.73	0.780	4.8	16	20	1.34	----	1.99	"	"
19.06	24.50	29.95	0.770	3.1	12	15	1.35	----	3.11	Clayey SILT to Silty CLAY	130-140
19.15	30.90	37.68	0.810	2.6	12	15	1.36	----	3.97	Sandy SILT to Clayey SILT	"
19.24	28.60	34.79	0.650	2.3	11	14	1.36	----	3.66	"	120-130
19.34	22.40	27.18	0.540	2.4	11	14	1.37	----	2.83	Clayey SILT to Silty CLAY	"
19.43	14.30	17.31	0.490	3.4	10	12	1.37	----	1.75	Silty CLAY to CLAY	"
19.52	12.40	14.98	0.420	3.4	8	10	1.38	----	1.50	"	"
19.61	12.20	14.71	0.350	2.9	8	10	1.38	----	1.47	"	110-120
19.71	11.00	13.24	0.330	3.0	7	9	1.39	----	1.64	"	"
19.80	11.00	13.21	0.350	3.2	7	9	1.39	----	1.63	"	"
19.89	11.00	13.18	0.350	3.2	7	9	1.40	----	1.63	"	"
19.99	12.60	15.07	0.360	2.9	8	10	1.40	----	1.52	"	"
20.08	12.90	15.40	0.370	2.9	6	8	1.41	----	1.56	Clayey SILT to Silty CLAY	"
20.17	13.10	15.61	0.390	3.0	9	10	1.41	----	1.58	Silty CLAY to CLAY	"

20.26	13.50	16.05	0.410	3.0	9	11	1.42	----	1.64	"	120-130
20.36	14.10	16.72	0.390	2.8	7	8	1.42	----	1.72	Clayey SILT to Silty CLAY	"
20.45	13.50	15.98	0.360	2.7	7	8	1.43	----	1.64	"	110-120
20.54	12.20	14.41	0.340	2.8	6	7	1.43	----	1.46	"	"
20.63	11.80	13.91	0.320	2.7	6	7	1.44	----	1.76	"	"
20.72	11.60	13.65	0.300	2.6	6	7	1.44	----	1.73	"	"
20.82	10.90	12.80	0.310	2.8	7	9	1.45	----	1.61	Silty CLAY to CLAY	"
20.91	10.70	12.54	0.310	2.9	7	8	1.45	----	1.57	"	"
21.00	10.70	12.52	0.320	3.0	7	8	1.46	----	1.57	"	"
21.09	10.60	12.38	0.380	3.6	11	12	1.46	----	1.56	CLAY	"
21.18	11.20	13.04	0.450	4.0	11	13	1.47	----	1.65	"	120-130
21.28	12.10	14.06	0.410	3.4	8	9	1.47	----	1.44	Silty CLAY to CLAY	110-120
21.37	12.50	14.50	0.360	2.9	8	10	1.48	----	1.50	"	"
21.46	8.50	9.84	0.460	5.4	9	10	1.48	----	1.44	CLAY	"
21.56	8.20	9.47	0.470	5.7	8	9	1.49	----	1.38	"	"
21.65	8.60	9.92	0.470	5.5	9	10	1.49	----	1.46	"	"
21.71	8.40	9.67	0.470	5.6	8	10	1.50	----	1.42	"	"
21.77	16.40	18.85	0.450	2.7	8	9	1.50	----	2.01	Clayey SILT to Silty CLAY	120-130
21.87	26.40	30.30	0.380	1.4	11	12	1.51	----	3.34	Sandy SILT to Clayey SILT	"
21.96	30.90	35.41	0.350	1.1	10	12	1.51	32	----	Silty SAND to Sandy SILT	110-120
22.05	30.40	34.79	0.280	0.9	10	12	1.52	32	----	"	100-110
22.14	25.50	29.15	0.240	0.9	9	10	1.52	31	----	"	"
22.23	18.70	21.34	0.270	1.4	7	9	1.52	----	2.32	Sandy SILT to Clayey SILT	110-120
22.33	14.00	15.96	0.230	1.6	7	8	1.53	----	1.69	Clayey SILT to Silty CLAY	100-110
22.42	11.30	12.86	0.210	1.9	6	6	1.53	----	1.66	"	"
22.51	9.00	10.23	0.200	2.2	5	5	1.54	----	1.28	"	"
22.61	7.40	8.40	0.240	3.2	7	8	1.54	----	1.21	CLAY	"
22.70	7.30	8.28	0.280	3.8	7	8	1.54	----	1.19	"	"
22.79	9.10	10.30	0.290	3.2	6	7	1.55	----	1.29	Silty CLAY to CLAY	110-120
22.88	9.80	11.08	0.310	3.2	7	7	1.55	----	1.41	"	"
22.98	9.40	10.61	0.300	3.2	6	7	1.56	----	1.34	"	"
23.07	8.80	9.92	0.250	2.8	6	7	1.56	----	1.48	"	100-110
23.16	9.50	10.70	0.260	2.7	6	7	1.57	----	1.35	"	"
23.26	8.30	9.33	0.250	3.0	6	6	1.57	----	1.38	"	"
23.35	8.30	9.32	0.250	3.0	6	6	1.57	----	1.38	"	"
23.44	8.50	9.54	0.250	2.9	6	6	1.58	----	1.42	"	"
23.53	8.90	9.97	0.260	2.9	6	7	1.58	----	1.50	"	"
23.62	8.80	9.85	0.250	2.8	6	7	1.59	----	1.48	"	"
23.71	8.80	9.83	0.230	2.6	6	7	1.59	----	1.48	"	"
23.81	9.00	10.05	0.230	2.6	6	7	1.59	----	1.26	"	"
23.90	9.20	10.26	0.240	2.6	6	7	1.60	----	1.30	"	"
23.99	8.20	9.13	0.230	2.8	5	6	1.60	----	1.35	"	"
24.08	8.40	9.34	0.240	2.9	6	6	1.61	----	1.39	"	"
24.17	8.60	9.55	0.260	3.0	6	6	1.61	----	1.43	"	"
24.26	9.80	10.87	0.290	3.0	7	7	1.61	----	1.39	"	110-120
24.36	11.70	12.95	0.350	3.0	8	9	1.62	----	1.71	"	"
24.45	13.30	14.70	0.400	3.0	9	10	1.63	----	1.58	"	120-130
24.54	11.70	12.91	0.390	3.3	8	9	1.63	----	1.71	"	110-120
24.63	10.70	11.79	0.370	3.5	7	8	1.63	----	1.54	"	"
24.73	11.30	12.43	0.430	3.8	11	12	1.64	----	1.64	CLAY	"
24.82	10.80	11.85	0.480	4.4	11	12	1.65	----	1.55	"	120-130
24.91	11.90	13.04	0.490	4.1	12	13	1.65	----	1.74	"	"
25.15	11.10	12.11	0.360	3.2	7	8	1.66	----	1.60	Silty CLAY to CLAY	110-120
25.25	11.70	12.74	0.350	3.0	8	8	1.67	----	1.70	"	"
25.34	9.80	10.66	0.350	3.6	10	11	1.67	----	1.38	CLAY	"

25.43	11.20	12.16	0.330	2.9	7	8	1.68	----	1.61	Silty CLAY to CLAY	"
25.52	9.50	10.30	0.330	3.5	10	10	1.68	----	1.33	CLAY	"
25.61	9.80	10.61	0.310	3.2	7	7	1.69	----	1.38	Silty CLAY to CLAY	"
25.71	9.00	9.72	0.270	3.0	6	6	1.69	----	1.25	"	"
25.80	8.00	8.63	0.250	3.1	5	6	1.70	----	1.29	"	100-110
25.89	8.00	8.62	0.260	3.3	8	9	1.70	----	1.29	CLAY	"
25.99	7.70	8.29	0.250	3.2	8	8	1.70	----	1.23	"	"
26.08	7.80	8.38	0.250	3.2	8	8	1.71	----	1.25	"	"
26.17	8.10	8.69	0.230	2.8	5	6	1.71	----	1.31	Silty CLAY to CLAY	"
26.26	7.00	7.50	0.220	3.1	7	8	1.72	----	1.09	CLAY	"
26.35	6.20	6.64	0.200	3.2	6	7	1.72	----	0.93	"	"
26.45	5.90	6.31	0.190	3.2	6	6	1.72	----	0.87	"	"
26.54	6.30	6.73	0.190	3.0	6	7	1.73	----	0.95	"	"
26.63	6.00	6.40	0.200	3.3	6	6	1.73	----	0.88	"	"
26.73	7.70	8.20	0.230	3.0	5	5	1.74	----	1.22	Silty CLAY to CLAY	"
26.82	9.40	10.00	0.250	2.7	6	7	1.74	----	1.30	"	"
26.91	9.00	9.56	0.290	3.2	6	6	1.75	----	1.23	"	110-120
27.00	8.90	9.43	0.310	3.5	9	9	1.75	----	1.46	CLAY	"
27.09	8.40	8.89	0.380	4.5	8	9	1.76	----	1.36	"	"
27.19	14.10	14.91	0.450	3.2	9	10	1.76	----	1.67	Silty CLAY to CLAY	120-130
27.28	18.40	19.43	0.520	2.8	9	10	1.77	----	2.24	Clayey SILT to Silty CLAY	"
27.37	18.60	19.62	0.600	3.2	9	10	1.77	----	2.26	"	"
27.46	18.90	19.91	0.710	3.8	13	13	1.78	----	2.30	Silty CLAY to CLAY	"
27.55	19.20	20.20	0.760	4.0	13	13	1.78	----	2.34	"	"
27.65	20.30	21.33	0.780	3.8	14	14	1.79	----	2.49	"	"
27.74	20.70	21.72	0.800	3.9	14	14	1.80	----	2.54	"	"
27.83	20.80	21.79	0.810	3.9	14	15	1.80	----	2.55	"	"
27.92	19.50	20.40	0.880	4.5	20	20	1.81	----	2.38	CLAY	130-140
28.02	16.90	17.66	0.910	5.4	17	18	1.81	----	2.03	"	120-130
28.11	15.20	15.86	0.770	5.1	15	16	1.82	----	1.80	"	"
28.20	13.50	14.07	0.670	5.0	14	14	1.83	----	1.58	"	"
28.25	14.80	15.41	0.630	4.3	15	15	1.83	----	1.75	"	"
28.34	13.50	14.04	0.570	4.2	14	14	1.83	----	1.58	"	"
28.43	12.30	12.77	0.560	4.6	12	13	1.84	----	1.42	"	"
28.50	13.00	13.49	0.540	4.2	13	13	1.84	----	1.51	"	"
28.60	14.60	15.13	0.520	3.6	10	10	1.85	----	1.72	Silty CLAY to CLAY	"
28.69	12.40	12.83	0.540	4.4	12	13	1.86	----	1.43	CLAY	"
28.78	11.90	12.30	0.570	4.8	12	12	1.86	----	1.70	"	"
28.87	12.70	13.11	0.540	4.3	13	13	1.87	----	1.46	"	"
28.96	13.00	13.40	0.490	3.8	9	9	1.87	----	1.50	Silty CLAY to CLAY	"
29.05	12.30	12.66	0.480	3.9	12	13	1.88	----	1.41	CLAY	"
29.15	11.90	12.23	0.490	4.1	12	12	1.88	----	1.69	"	"
29.24	14.50	14.88	0.520	3.6	10	10	1.89	----	1.70	Silty CLAY to CLAY	"
29.33	18.60	19.06	0.620	3.3	9	10	1.90	----	2.25	Clayey SILT to Silty CLAY	"
29.42	23.10	23.65	0.670	2.9	12	12	1.90	----	2.85	"	"
29.51	24.10	24.64	0.690	2.9	12	12	1.91	----	2.98	"	"
29.60	23.50	23.99	0.740	3.1	12	12	1.91	----	2.90	"	"
29.70	22.50	22.93	0.810	3.6	11	11	1.92	----	2.76	"	130-140
29.79	25.10	25.54	0.920	3.7	13	13	1.93	----	3.11	"	"
29.88	25.60	26.01	1.000	3.9	17	17	1.93	----	3.18	Silty CLAY to CLAY	"
29.97	25.90	26.28	1.170	4.5	17	18	1.94	----	3.22	"	"
30.06	28.80	29.17	1.370	4.8	29	29	1.95	----	3.60	CLAY	"
30.15	35.40	35.80	1.630	4.6	24	24	1.95	----	4.48	Silty CLAY to CLAY	"
30.24	41.80	42.21	1.700	4.1	21	21	1.96	----	5.33	Clayey SILT to Silty CLAY	"
30.32	41.10	41.44	1.540	3.7	21	21	1.97	----	5.24	"	"

30.41	32.80	33.02	1.420	4.3	22	22	1.97	----	4.13	Silty CLAY to CLAY	"
30.50	27.80	27.94	1.220	4.4	19	19	1.98	----	3.46	"	"
30.59	23.10	23.18	0.920	4.0	15	15	1.98	----	2.84	"	"
30.68	16.70	16.74	0.710	4.3	17	17	1.99	----	1.98	CLAY	120-130
30.77	12.90	12.91	0.520	4.0	13	13	2.00	----	1.48	"	"
30.86	10.20	10.20	0.380	3.7	10	10	2.00	----	1.39	"	110-120
30.95	9.20	9.20	0.320	3.5	9	9	2.01	----	1.23	"	"
31.04	9.30	9.30	0.290	3.1	6	6	2.01	----	1.24	Silty CLAY to CLAY	"
31.13	8.90	8.90	0.310	3.5	9	9	2.01	----	1.41	CLAY	"
31.22	9.70	9.70	0.500	5.2	10	10	2.02	----	1.31	"	"
31.31	11.20	11.19	0.890	7.9	11	11	2.03	----	1.56	"	120-130
31.40	14.40	14.39	0.920	6.4	14	14	2.03	----	1.67	"	"
31.48	17.90	17.89	0.950	5.3	18	18	2.04	----	2.14	"	130-140
31.57	26.20	26.18	0.920	3.5	13	13	2.04	----	3.24	Clayey SILT to Silty CLAY	"
31.66	24.20	24.18	0.830	3.4	12	12	2.05	----	2.97	"	"
31.75	21.40	21.38	0.830	3.9	14	14	2.06	----	2.60	Silty CLAY to CLAY	"
31.84	19.70	19.68	0.800	4.1	13	13	2.06	----	2.37	"	120-130
31.91	19.00	18.97	0.800	4.2	13	13	2.07	----	2.28	"	"
32.00	16.80	16.78	0.820	4.9	17	17	2.07	----	1.98	CLAY	"
32.08	15.30	15.28	0.760	5.0	15	15	2.08	----	1.78	"	"
32.17	12.00	11.98	0.690	5.8	12	12	2.08	----	1.34	"	"
32.26	11.00	10.98	0.590	5.4	11	11	2.09	----	1.51	"	"
32.35	10.80	10.78	0.460	4.3	11	11	2.09	----	1.48	"	110-120
32.45	9.60	9.58	0.400	4.2	10	10	2.10	----	1.28	"	"
32.54	9.30	9.28	0.390	4.2	9	9	2.10	----	1.23	"	"
32.63	9.50	9.48	0.350	3.7	10	9	2.11	----	1.26	"	"
32.72	8.80	8.78	0.380	4.3	9	9	2.11	----	1.37	"	"
32.81	9.60	9.58	0.430	4.5	10	10	2.12	----	1.27	"	"
32.90	9.70	9.68	0.460	4.7	10	10	2.12	----	1.29	"	"
32.99	10.50	10.47	0.510	4.9	11	10	2.13	----	1.42	"	120-130
33.08	11.10	11.07	0.570	5.1	11	11	2.13	----	1.52	"	"
33.17	11.50	11.47	0.640	5.6	12	11	2.14	----	1.59	"	"
33.26	12.90	12.86	0.740	5.7	13	13	2.14	----	1.45	"	"
33.35	14.40	14.36	0.890	6.2	14	14	2.15	----	1.65	"	"
33.44	16.90	16.85	0.990	5.9	17	17	2.16	----	1.99	"	130-140
33.53	21.90	21.83	1.020	4.7	22	22	2.16	----	2.65	"	"
33.62	25.00	24.92	1.010	4.0	17	17	2.17	----	3.06	Silty CLAY to CLAY	"
33.71	24.10	24.01	0.970	4.0	16	16	2.18	----	2.94	"	"
33.80	19.60	19.53	0.920	4.7	20	20	2.18	----	2.34	CLAY	"
33.89	18.70	18.63	0.880	4.7	19	19	2.19	----	2.22	"	120-130
33.98	18.50	18.43	0.800	4.3	19	18	2.19	----	2.20	"	"
34.07	16.10	16.04	0.670	4.2	16	16	2.20	----	1.87	"	"
34.16	12.30	12.25	0.530	4.3	12	12	2.21	----	1.37	"	"
34.25	10.30	10.26	0.400	3.9	10	10	2.21	----	1.37	"	110-120
34.34	10.50	10.45	0.310	3.0	7	7	2.21	----	1.41	Silty CLAY to CLAY	"
34.43	10.00	9.96	0.290	2.9	7	7	2.22	----	1.32	"	"
34.53	10.40	10.35	0.390	3.8	10	10	2.22	----	1.39	CLAY	"
34.62	10.20	10.15	0.580	5.7	10	10	2.23	----	1.35	"	120-130
34.70	10.10	10.05	0.680	6.7	10	10	2.24	----	1.34	"	"
34.77	9.40	9.35	0.790	8.4	9	9	2.24	----	1.22	"	"
34.87	15.70	15.62	1.330	8.5	16	16	2.25	----	1.81	"	130-140
34.96	30.10	29.95	1.780	5.9	30	30	2.25	----	3.73	"	"
35.05	47.00	46.76	1.940	4.1	24	23	2.26	----	5.99	Clayey SILT to Silty CLAY	"
35.14	49.70	49.44	1.860	3.7	25	25	2.27	----	6.35	"	"
35.23	49.40	49.13	1.870	3.8	25	25	2.27	----	6.30	"	"

35.31	48.70	48.43	1.980	4.1	24	24	2.28	----	6.21	"	"
35.40	46.40	46.13	1.710	3.7	23	23	2.29	----	5.90	"	"
35.49	37.90	37.68	1.230	3.2	19	19	2.29	----	4.77	"	"
35.58	25.70	25.55	1.100	4.3	17	17	2.30	----	3.14	Silty CLAY to CLAY	"
35.67	16.70	16.60	0.900	5.4	17	17	2.30	----	1.94	CLAY	120-130
35.76	13.70	13.62	0.730	5.3	14	14	2.31	----	1.54	"	"
35.86	14.80	14.71	0.710	4.8	15	15	2.32	----	1.69	"	"
35.94	15.40	15.30	0.750	4.9	15	15	2.32	----	1.77	"	"
36.03	16.70	16.59	0.810	4.9	17	17	2.33	----	1.94	"	"
36.12	18.50	18.38	0.860	4.6	19	18	2.33	----	2.18	"	"
36.21	19.20	19.07	0.880	4.6	19	19	2.34	----	2.27	"	"
36.30	19.30	19.17	0.880	4.6	19	19	2.34	----	2.28	"	130-140
36.39	17.80	17.68	0.870	4.9	18	18	2.35	----	2.08	"	120-130
36.48	16.90	16.78	0.810	4.8	17	17	2.36	----	1.96	"	"
36.57	16.40	16.28	0.750	4.6	16	16	2.36	----	1.89	"	"
36.66	14.60	14.49	0.720	4.9	15	14	2.37	----	1.65	"	"
36.75	13.50	13.40	0.680	5.0	14	13	2.37	----	1.51	"	"
36.84	14.00	13.89	0.630	4.5	14	14	2.38	----	1.57	"	"
36.93	12.30	12.21	0.590	4.8	12	12	2.38	----	1.34	"	"
37.02	12.20	12.10	0.570	4.7	12	12	2.39	----	1.33	"	"
37.11	13.30	13.19	0.550	4.1	13	13	2.40	----	1.48	"	"
37.20	14.80	14.68	0.530	3.6	10	10	2.40	----	1.67	Silty CLAY to CLAY	"
37.29	14.70	14.58	0.550	3.7	10	10	2.41	----	1.66	"	"
37.38	14.40	14.28	0.570	4.0	14	14	2.41	----	1.62	CLAY	"
37.47	15.30	15.17	0.580	3.8	10	10	2.42	----	1.74	Silty CLAY to CLAY	"
37.56	16.20	16.06	0.570	3.5	11	11	2.42	----	1.86	"	"
37.65	15.70	15.57	0.600	3.8	10	10	2.43	----	1.79	"	"
37.74	13.40	13.28	0.600	4.5	13	13	2.43	----	1.48	CLAY	"
37.83	13.40	13.28	0.610	4.6	13	13	2.44	----	1.48	"	"
37.92	12.90	12.78	0.600	4.7	13	13	2.45	----	1.42	"	"
38.01	15.00	14.86	0.590	3.9	10	10	2.45	----	1.69	Silty CLAY to CLAY	"
38.04	15.90	15.76	0.600	3.8	11	11	2.45	----	1.81	"	"
38.09	16.30	16.15	0.600	3.7	11	11	2.46	----	1.87	"	"
38.18	16.50	16.35	0.640	3.9	11	11	2.46	----	1.89	"	"
38.27	16.10	15.95	0.680	4.2	16	16	2.47	----	1.84	CLAY	"
38.36	16.40	16.24	0.690	4.2	16	16	2.47	----	1.88	"	"
38.45	16.30	16.14	0.660	4.0	11	11	2.48	----	1.86	Silty CLAY to CLAY	"
38.54	15.50	15.35	0.620	4.0	10	10	2.48	----	1.76	"	"
38.63	14.60	14.46	0.570	3.9	10	10	2.49	----	1.64	"	"
38.72	13.50	13.37	0.520	3.9	9	9	2.50	----	1.49	"	"
38.81	12.50	12.37	0.490	3.9	13	12	2.50	----	1.35	CLAY	"
38.91	12.60	12.44	0.540	4.3	13	12	2.51	----	1.37	"	"
39.00	14.90	14.68	0.600	4.0	15	15	2.51	----	1.67	"	"
39.09	19.20	18.89	0.670	3.5	13	13	2.52	----	2.25	Silty CLAY to CLAY	"
39.18	21.70	21.31	0.790	3.6	14	14	2.52	----	2.58	"	"
39.27	22.30	21.85	0.880	3.9	15	15	2.53	----	2.66	"	130-140
39.36	26.00	25.41	0.980	3.8	13	13	2.54	----	3.15	Clayey SILT to Silty CLAY	"
39.45	27.10	26.43	1.100	4.1	18	18	2.54	----	3.30	Silty CLAY to CLAY	"
39.52	26.10	25.41	1.260	4.8	26	25	2.55	----	3.16	CLAY	"
39.61	27.10	26.32	1.520	5.6	27	26	2.56	----	3.29	"	"
39.70	46.80	45.36	1.720	3.7	23	23	2.56	----	5.92	Clayey SILT to Silty CLAY	"
39.79	75.50	73.01	2.080	2.8	30	29	2.57	----	9.75	Sandy SILT to Clayey SILT	"
39.86	82.30	79.45	2.420	2.9	33	32	2.57	----	10.65	"	"
39.95	79.50	76.58	2.920	3.7	40	38	2.58	----	10.28	Clayey SILT to Silty CLAY	"
40.04	75.90	72.95	3.500	4.6	76	73	2.59	----	9.80	Very Stiff Fine Grained *	"

40.13	70.30	67.42	4.070	5.8	70	67	2.59	----	9.05	"	"
40.20	67.30	64.43	4.210	6.3	67	64	2.60	----	8.65	"	"
40.27	70.00	66.90	4.060	5.8	70	67	2.60	----	9.01	"	"
40.34	80.50	76.80	3.680	4.6	81	77	2.61	----	10.41	"	"
40.43	98.70	93.94	2.980	3.0	39	38	2.62	----	12.83	Sandy SILT to Clayey SILT	"
40.50	106.30	101.00	2.500	2.4	35	34	2.62	38	----	Silty SAND to Sandy SILT	"
40.59	113.50	107.60	2.100	1.9	38	36	2.63	38	----	"	"
40.66	116.40	110.16	2.380	2.0	39	37	2.63	39	----	"	"
40.74	112.70	106.43	2.900	2.6	38	35	2.64	38	----	"	"
40.83	97.90	92.25	3.170	3.2	39	37	2.64	----	12.72	Sandy SILT to Clayey SILT	"
40.90	80.10	75.34	3.220	4.0	40	38	2.65	----	10.35	Clayey SILT to Silty CLAY	"
40.99	58.80	55.18	3.190	5.4	59	55	2.66	----	7.51	Very Stiff Fine Grained *	"
41.07	45.00	42.14	3.170	7.0	45	42	2.66	----	5.67	CLAY	"
41.16	33.80	31.58	3.150	9.3	34	32	2.67	----	4.17	"	"
41.25	27.10	25.26	2.550	9.4	27	25	2.67	----	3.28	"	"
41.46	20.30	18.82	1.290	6.4	20	19	2.69	----	2.37	"	"
41.55	16.60	15.36	0.950	5.7	17	15	2.70	----	1.88	"	120-130
41.63	14.80	13.67	0.740	5.0	15	14	2.70	----	1.64	"	"
41.71	13.10	12.08	0.650	5.0	13	12	2.71	----	1.41	"	"
41.80	12.40	11.41	0.610	4.9	12	11	2.71	----	1.31	"	"
41.88	12.40	11.39	0.600	4.8	12	11	2.72	----	1.31	"	"
41.97	12.70	11.64	0.600	4.7	13	12	2.72	----	1.35	"	"
42.05	12.90	11.80	0.610	4.7	13	12	2.73	----	1.38	"	"
42.14	13.30	12.14	0.630	4.7	13	12	2.73	----	1.43	"	"
42.23	13.40	12.21	0.650	4.9	13	12	2.74	----	1.44	"	"
42.31	14.70	13.37	0.710	4.8	15	13	2.74	----	1.62	"	"
42.40	15.20	13.80	0.780	5.1	15	14	2.75	----	1.68	"	"
42.48	16.60	15.04	0.850	5.1	17	15	2.75	----	1.87	"	"
42.57	16.60	15.01	0.900	5.4	17	15	2.76	----	1.87	"	"
42.65	16.90	15.25	0.940	5.6	17	15	2.77	----	1.91	"	"
42.74	18.30	16.48	0.970	5.3	18	16	2.77	----	2.09	"	130-140
42.83	18.70	16.80	0.980	5.2	19	17	2.78	----	2.15	"	"
42.92	19.60	17.57	0.950	4.8	20	18	2.78	----	2.27	"	"
43.00	20.30	18.15	0.920	4.5	20	18	2.79	----	2.36	"	"
43.09	19.70	17.57	0.900	4.6	20	18	2.80	----	2.28	"	"
43.18	19.80	17.62	0.890	4.5	20	18	2.80	----	2.29	"	"
43.27	21.10	18.73	0.890	4.2	14	12	2.81	----	2.46	Silty CLAY to CLAY	"
43.36	23.90	21.17	0.910	3.8	16	14	2.82	----	2.83	"	"
43.44	26.80	23.68	0.960	3.6	13	12	2.82	----	3.22	Clayey SILT to Silty CLAY	"
43.53	27.50	24.24	1.020	3.7	14	12	2.83	----	3.31	"	"
43.62	27.50	24.18	1.060	3.9	18	16	2.84	----	3.31	Silty CLAY to CLAY	"
43.71	27.50	24.12	1.070	3.9	18	16	2.84	----	3.31	"	"
43.80	26.70	23.36	1.110	4.2	18	16	2.85	----	3.20	"	"
43.89	25.00	21.82	1.200	4.8	25	22	2.85	----	2.98	CLAY	"
43.98	24.10	20.98	1.290	5.4	24	21	2.86	----	2.86	"	"
44.07	25.10	21.80	1.380	5.5	25	22	2.87	----	2.99	"	"
44.16	27.30	23.66	1.900	7.0	27	24	2.87	----	3.28	"	"
44.25	29.30	25.33	2.200	7.5	29	25	2.88	----	3.55	"	"
44.34	33.40	28.80	2.310	6.9	33	29	2.89	----	4.09	"	"
44.42	37.40	32.17	2.470	6.6	37	32	2.89	----	4.63	"	"
44.46	44.20	37.98	2.580	5.8	44	38	2.90	----	5.53	"	"
44.55	44.00	37.71	2.860	6.5	44	38	2.90	----	5.50	"	"
44.64	46.00	39.33	3.070	6.7	46	39	2.91	----	5.77	"	"
44.73	49.10	41.87	3.170	6.5	49	42	2.92	----	6.18	"	"
44.81	48.70	41.43	3.110	6.4	49	41	2.92	----	6.13	"	"

44.90	44.20	37.51	2.940	6.7	44	38	2.93	----	5.53	"	"
44.99	38.60	32.68	2.760	7.2	39	33	2.93	----	4.78	"	"
45.08	34.60	29.22	2.580	7.5	35	29	2.94	----	4.25	"	"
45.16	33.80	28.47	2.440	7.2	34	28	2.95	----	4.14	"	"
45.25	33.50	28.15	2.350	7.0	34	28	2.95	----	4.10	"	"
45.34	31.90	26.74	2.380	7.5	32	27	2.96	----	3.88	"	"
45.42	30.50	25.50	2.540	8.3	31	26	2.97	----	3.70	"	"
45.51	30.00	25.02	2.560	8.5	30	25	2.97	----	3.63	"	"
45.60	34.00	28.29	2.530	7.4	34	28	2.98	----	4.16	"	"
45.68	36.70	30.46	3.020	8.2	37	30	2.99	----	4.52	"	"
45.77	37.60	31.13	3.730	9.9	38	31	2.99	----	4.64	"	"
45.85	53.00	43.77	3.810	7.2	53	44	3.00	----	6.69	"	"
45.94	82.30	67.87	3.640	4.4	82	68	3.00	----	10.60	Very Stiff Fine Grained *	"
46.02	86.40	71.19	3.630	4.2	43	36	3.01	----	11.14	Clayey SILT to Silty CLAY	"
46.10	99.40	81.83	3.480	3.5	40	33	3.02	----	12.88	Sandy SILT to Clayey SILT	"
46.18	128.80	105.94	3.310	2.6	43	35	3.02	38	----	Silty SAND to Sandy SILT	"
46.25	152.00	124.94	3.120	2.1	51	42	3.03	39	----	"	"
46.31	158.40	130.12	2.890	1.8	40	33	3.03	40	----	SAND to Silty SAND	"
46.40	159.60	130.99	2.960	1.9	40	33	3.04	40	----	"	"
46.48	158.90	130.31	3.860	2.4	53	43	3.04	40	----	Silty SAND to Sandy SILT	"
46.56	181.90	149.05	4.270	2.3	61	50	3.05	40	----	"	"
46.62	217.50	178.10	4.930	2.3	73	59	3.05	41	----	"	"
46.69	283.50	232.00	6.800	2.4	95	77	3.06	43	----	"	"
46.74	364.20	297.86	10.000	2.7	182	149	3.06	44	----	SAND to Clayey SAND *	>140
46.80	452.20	369.60	9.960	2.2	226	185	3.07	46	----	"	130-140
46.86	518.80	423.79	9.600	1.9	104	85	3.07	46	----	SAND	"
46.92	523.20	427.13	10.400	2.0	105	85	3.08	46	----	"	"
46.98	496.30	404.93	10.920	2.2	248	202	3.08	46	----	SAND to Clayey SAND *	"
47.03	483.40	394.17	11.900	2.5	242	197	3.08	46	----	"	"
47.09	502.20	409.26	12.270	2.4	251	205	3.09	46	----	"	"
47.16	560.50	456.44	13.590	2.4	280	228	3.09	47	----	"	"
47.21	580.30	472.33	13.680	2.4	290	236	3.10	47	----	"	"
47.27	520.00	422.95	13.600	2.6	260	211	3.10	46	----	"	>140
47.32	527.60	428.92	9.320	1.8	106	86	3.10	46	----	SAND	130-140
47.38	476.80	387.37	10.240	2.1	238	194	3.11	46	----	SAND to Clayey SAND *	"
47.45	433.70	352.09	13.540	3.1	217	176	3.11	45	----	"	>140
47.52	409.10	331.89	13.420	3.3	205	166	3.12	45	----	"	"
47.55	399.70	324.15	12.500	3.1	200	162	3.12	45	----	"	"
47.58	415.40	336.75	11.540	2.8	208	168	3.12	45	----	"	"
47.63	198.90	161.17	10.250	5.2	199	161	3.13	----	26.13	Very Stiff Fine Grained *	"
47.69	418.30	338.73	7.860	1.9	84	68	3.13	45	----	SAND	130-140
47.76	362.40	293.25	4.600	1.3	72	59	3.14	44	----	"	"
47.79	378.30	306.02	4.180	1.1	76	61	3.14	44	----	"	120-130
47.88	414.20	334.89	2.090	0.5	69	56	3.14	45	----	Gravelly SAND to SAND	100-110
47.91	390.50	315.65	2.150	0.6	65	53	3.15	45	----	"	110-120
47.98	441.50	356.65	3.710	0.8	74	59	3.15	45	----	"	120-130
48.02	369.30	298.22	4.110	1.1	74	60	3.15	44	----	SAND	"
48.07	366.80	296.07	3.850	1.0	73	59	3.16	44	----	"	"
48.14	327.60	264.23	3.970	1.2	66	53	3.16	44	----	"	130-140
48.21	313.30	252.51	3.850	1.2	63	51	3.17	43	----	"	"
48.29	292.30	235.41	4.040	1.4	58	47	3.17	43	----	"	"
48.36	305.30	245.69	3.610	1.2	61	49	3.18	43	----	"	"
48.43	271.60	218.41	3.170	1.2	54	44	3.18	43	----	"	"
48.50	293.40	235.77	3.570	1.2	59	47	3.19	43	----	"	"
48.58	250.00	200.74	6.800	2.7	83	67	3.19	42	----	Silty SAND to Sandy SILT	"

48.65	277.40	222.58	4.820	1.7	55	45	3.20	43	----	SAND	"
48.71	314.70	252.34	3.630	1.2	63	50	3.20	43	----	"	"
48.77	335.30	268.69	5.430	1.6	67	54	3.21	44	----	"	"
48.83	329.80	264.11	6.360	1.9	66	53	3.21	44	----	"	"
48.86	356.30	285.24	7.200	2.0	71	57	3.21	44	----	"	"
48.90	371.00	296.89	7.260	2.0	74	59	3.22	44	----	"	"
48.97	546.90	437.32	8.410	1.5	109	87	3.22	47	----	"	"
49.04	542.20	433.23	10.610	2.0	108	87	3.23	46	----	"	"
49.11	645.50	515.41	11.460	1.8	129	103	3.23	47	----	"	"
49.16	713.40	569.35	10.840	1.5	143	114	3.23	>48	----	"	"
49.21	662.80	528.66	10.260	1.5	133	106	3.24	48	----	"	"
49.30	568.40	452.95	10.340	1.8	114	91	3.24	47	----	"	"
49.37	554.60	441.64	10.190	1.8	111	88	3.25	47	----	"	"
49.46	552.60	439.63	9.520	1.7	111	88	3.26	47	----	"	"
49.54	506.50	402.63	9.320	1.8	101	81	3.26	46	----	"	"
49.63	444.50	353.00	9.590	2.2	222	176	3.27	45	----	SAND to Clayey SAND *	"
49.71	391.50	310.66	9.280	2.4	196	155	3.27	45	----	"	"
49.78	332.50	263.62	9.080	2.7	166	132	3.28	44	----	"	>140
49.85	316.10	250.42	8.160	2.6	158	125	3.28	43	----	"	130-140
49.93	305.50	241.84	7.030	2.3	61	48	3.29	43	----	SAND	"
50.00	296.10	234.23	6.160	2.1	59	47	3.30	43	----	"	"
50.07	280.40	221.64	5.600	2.0	56	44	3.30	43	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-15
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 11:16:26
Terminated at 52.0 feet Groundwater measured at 4.1 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	20.70	33.12	0.570	2.8	10	17	0.07	----	2.76	Clayey SILT to Silty CLAY	120-130
0.66	18.50	29.60	0.540	2.9	9	15	0.08	----	2.46	"	"
0.75	17.90	28.64	0.570	3.2	9	14	0.09	----	2.38	"	"
0.84	18.50	29.60	0.650	3.5	12	20	0.10	----	2.46	Silty CLAY to CLAY	"
0.92	19.10	30.56	0.790	4.1	13	20	0.11	----	2.54	"	"
1.01	20.60	32.96	0.950	4.6	21	33	0.12	----	2.74	CLAY	130-140
1.10	21.00	33.60	1.100	5.2	21	34	0.13	----	2.79	"	"
1.18	21.10	33.76	1.200	5.7	21	34	0.15	----	2.80	"	"
1.25	21.30	34.08	1.250	5.9	21	34	0.15	----	2.83	"	"
1.34	21.80	34.88	1.300	6.0	22	35	0.17	----	2.90	"	"
1.43	22.30	35.68	1.310	5.9	22	36	0.18	----	2.96	"	"
1.52	22.20	35.52	1.330	6.0	22	36	0.19	----	2.95	"	"
1.60	21.90	35.04	1.380	6.3	22	35	0.20	----	2.91	"	"
1.69	20.80	33.28	1.360	6.5	21	33	0.21	----	2.76	"	"
1.78	21.10	33.76	1.310	6.2	21	34	0.23	----	2.80	"	"
1.86	21.80	34.88	1.300	6.0	22	35	0.24	----	2.89	"	"
1.95	21.40	34.24	1.300	6.1	21	34	0.25	----	2.84	"	"
2.03	20.70	33.12	1.280	6.2	21	33	0.26	----	2.74	"	"
2.11	20.20	32.32	1.220	6.0	20	32	0.27	----	2.68	"	"
2.20	18.70	29.92	1.150	6.1	19	30	0.28	----	2.47	"	"
2.29	17.10	27.36	1.020	6.0	17	27	0.29	----	2.26	"	"
2.38	15.60	24.96	0.900	5.8	16	25	0.31	----	2.06	"	120-130
2.47	14.40	23.04	0.810	5.6	14	23	0.32	----	1.90	"	"
2.56	12.70	20.32	0.730	5.7	13	20	0.33	----	1.67	"	"
2.64	12.30	19.68	0.640	5.2	12	20	0.34	----	1.62	"	"
2.74	11.30	18.08	0.600	5.3	11	18	0.35	----	1.85	"	"
2.82	11.00	17.60	0.620	5.6	11	18	0.36	----	1.80	"	"
2.91	10.70	17.12	0.650	6.1	11	17	0.37	----	1.75	"	"
3.00	11.30	18.08	0.660	5.8	11	18	0.38	----	1.85	"	"
3.09	10.70	17.12	0.650	6.1	11	17	0.40	----	1.75	"	"
3.18	9.80	15.68	0.610	6.2	10	16	0.41	----	1.60	"	"
3.27	8.40	13.44	0.540	6.4	8	13	0.42	----	1.64	"	110-120
3.36	7.30	11.68	0.460	6.3	7	12	0.43	----	1.42	"	"
3.45	7.50	12.00	0.390	5.2	8	12	0.44	----	1.46	"	"
3.54	6.00	9.60	0.340	5.7	6	10	0.45	----	1.16	"	100-110
3.63	5.20	8.32	0.280	5.4	5	8	0.46	----	0.99	"	"
3.72	4.90	7.84	0.250	5.1	5	8	0.47	----	0.93	"	"
3.80	4.70	7.52	0.250	5.3	5	8	0.47	----	0.89	"	"
3.89	5.10	8.16	0.290	5.7	5	8	0.48	----	0.97	"	"
3.98	7.00	11.20	0.380	5.4	7	11	0.49	----	1.35	"	110-120
4.07	10.30	16.48	0.440	4.3	10	16	0.50	----	1.67	"	"
4.16	13.30	21.28	0.510	3.8	9	14	0.51	----	1.74	Silty CLAY to CLAY	120-130
4.25	14.00	22.40	0.560	4.0	14	22	0.52	----	1.83	CLAY	"
4.34	11.90	19.04	0.520	4.4	12	19	0.52	----	1.94	"	"
4.43	10.00	16.00	0.410	4.1	10	16	0.53	----	1.62	"	110-120
4.51	10.40	16.64	0.310	3.0	7	11	0.53	----	1.69	Silty CLAY to CLAY	"
4.60	10.40	16.64	0.260	2.5	5	8	0.53	----	1.69	Clayey SILT to Silty CLAY	"

4.69	9.50	15.20	0.270	2.8	6	10	0.54	----	1.54	Silty CLAY to CLAY	"
4.78	8.00	12.80	0.270	3.4	8	13	0.54	----	1.54	CLAY	100-110
4.87	6.90	11.04	0.260	3.8	7	11	0.55	----	1.32	"	"
4.96	8.80	14.08	0.250	2.8	6	9	0.55	----	1.70	Silty CLAY to CLAY	"
5.05	15.80	25.28	0.210	1.3	6	10	0.55	----	2.07	Sandy SILT to Clayey SILT	"
5.14	32.20	51.52	0.230	0.7	11	17	0.56	34	----	Silty SAND to Sandy SILT	"
5.23	34.40	55.04	0.270	0.8	11	18	0.56	35	----	"	"
5.28	26.40	42.24	0.280	1.1	9	14	0.57	33	----	"	110-120
5.32	32.60	52.16	0.290	0.9	11	17	0.57	34	----	"	"
5.41	32.90	52.64	0.300	0.9	11	18	0.57	34	----	"	"
5.50	34.00	54.40	0.350	1.0	11	18	0.58	34	----	"	"
5.59	36.70	58.72	0.380	1.0	12	20	0.58	35	----	"	"
5.66	40.20	64.32	0.430	1.1	13	21	0.58	35	----	"	"
5.74	46.10	73.76	0.560	1.2	15	25	0.59	36	----	"	120-130
5.82	53.20	85.12	0.650	1.2	18	28	0.59	37	----	"	"
5.91	62.20	99.52	0.720	1.2	21	33	0.60	38	----	"	"
5.99	67.40	107.84	0.740	1.1	17	27	0.61	38	----	SAND to Silty SAND	"
6.07	74.40	119.04	0.790	1.1	19	30	0.61	39	----	"	"
6.15	77.50	124.00	0.760	1.0	19	31	0.62	39	----	"	"
6.24	76.00	121.60	0.690	0.9	19	30	0.62	39	----	"	"
6.31	80.60	128.96	0.680	0.8	20	32	0.62	39	----	"	110-120
6.39	83.30	133.28	0.660	0.8	21	33	0.63	40	----	"	"
6.48	86.40	138.24	0.690	0.8	22	35	0.63	40	----	"	"
6.55	89.70	143.52	0.760	0.8	22	36	0.64	40	----	"	"
6.62	91.10	145.76	0.820	0.9	23	36	0.64	40	----	"	120-130
6.68	100.20	160.32	0.820	0.8	25	40	0.65	41	----	"	110-120
6.76	109.20	174.72	0.820	0.8	22	35	0.65	41	----	SAND	"
6.84	107.70	172.32	0.870	0.8	27	43	0.65	41	----	SAND to Silty SAND	"
6.92	124.90	199.84	0.920	0.7	25	40	0.66	42	----	SAND	"
7.00	135.80	217.28	0.940	0.7	27	43	0.66	42	----	"	"
7.09	145.40	232.64	0.960	0.7	29	47	0.67	43	----	"	"
7.17	142.10	227.36	1.010	0.7	28	45	0.67	43	----	"	"
7.26	142.40	227.84	1.180	0.8	28	46	0.68	43	----	"	120-130
7.34	139.00	222.40	1.440	1.0	28	44	0.68	43	----	"	"
7.43	137.90	220.64	1.610	1.2	34	55	0.69	43	----	SAND to Silty SAND	"
7.51	137.70	220.32	1.600	1.2	34	55	0.69	43	----	"	"
7.59	138.20	221.12	1.650	1.2	35	55	0.70	43	----	"	"
7.67	146.30	234.08	1.500	1.0	29	47	0.70	43	----	SAND	"
7.75	141.60	226.56	1.380	1.0	28	45	0.71	43	----	"	"
7.82	171.10	273.76	1.330	0.8	34	55	0.71	44	----	"	110-120
7.91	191.70	306.72	1.290	0.7	38	61	0.72	44	----	"	"
7.98	194.50	311.20	1.490	0.8	39	62	0.72	45	----	"	"
8.05	219.20	350.72	1.630	0.7	44	70	0.72	45	----	"	"
8.13	229.10	366.56	1.830	0.8	46	73	0.73	45	----	"	120-130
8.21	234.40	375.04	0.940	0.4	47	75	0.73	46	----	"	100-110
8.29	231.40	370.24	1.140	0.5	46	74	0.74	46	----	"	"
8.38	240.10	384.16	1.170	0.5	48	77	0.74	46	----	"	"
8.46	232.50	372.00	1.200	0.5	47	74	0.74	46	----	"	110-120
8.50	215.10	344.16	1.250	0.6	43	69	0.74	45	----	"	"
8.58	211.20	337.92	1.280	0.6	42	68	0.75	45	----	"	"
8.67	205.90	329.44	1.250	0.6	41	66	0.75	45	----	"	"
8.75	200.40	320.64	1.270	0.6	40	64	0.76	45	----	"	"
8.80	208.80	334.08	1.360	0.7	42	67	0.76	45	----	"	"
8.88	215.00	344.00	1.450	0.7	43	69	0.77	45	----	"	"
8.96	221.70	354.72	1.710	0.8	44	71	0.77	45	----	"	"

9.05	225.40	360.64	1.880	0.8	45	72	0.77	45	----	"	120-130
9.13	211.30	338.08	1.760	0.8	42	68	0.78	45	----	"	"
9.21	208.80	334.08	1.740	0.8	42	67	0.78	45	----	"	"
9.29	191.90	307.04	1.710	0.9	38	61	0.79	44	----	"	"
9.38	196.40	314.24	1.440	0.7	39	63	0.79	45	----	"	110-120
9.46	203.10	324.96	1.260	0.6	41	65	0.80	45	----	"	"
9.54	200.40	320.00	1.420	0.7	40	64	0.80	45	----	"	"
9.62	205.10	326.63	1.500	0.7	41	65	0.81	45	----	"	"
9.70	212.00	336.72	1.470	0.7	42	67	0.81	45	----	"	"
9.79	214.70	339.92	1.720	0.8	43	68	0.82	45	----	"	120-130
9.87	209.50	330.60	1.920	0.9	42	66	0.82	45	----	"	"
9.95	215.70	339.29	1.890	0.9	43	68	0.83	45	----	"	"
10.03	202.20	317.18	1.550	0.8	40	63	0.83	45	----	"	110-120
10.11	179.10	280.17	1.240	0.7	36	56	0.84	44	----	"	"
10.20	152.50	237.90	1.120	0.7	31	48	0.84	43	----	"	"
10.28	113.60	176.71	0.900	0.8	23	35	0.84	41	----	"	"
10.36	88.90	137.83	1.000	1.1	22	34	0.85	40	----	SAND to Silty SAND	120-130
10.45	56.70	87.55	1.110	2.0	19	29	0.86	37	----	Silty SAND to Sandy SILT	130-140
10.54	33.40	51.35	1.070	3.2	17	26	0.86	----	4.37	Clayey SILT to Silty CLAY	"
10.63	24.00	36.74	0.840	3.5	12	18	0.87	----	3.11	"	"
10.72	19.10	29.13	0.670	3.5	13	19	0.87	----	2.46	Silty CLAY to CLAY	120-130
10.81	14.00	21.27	0.460	3.3	9	14	0.88	----	1.78	"	"
10.91	14.50	21.95	0.420	2.9	7	11	0.89	----	1.85	Clayey SILT to Silty CLAY	"
11.00	15.00	22.62	0.460	3.1	8	11	0.89	----	1.91	"	"
11.08	15.00	22.54	0.530	3.5	10	15	0.90	----	1.91	Silty CLAY to CLAY	"
11.14	18.10	27.13	0.550	3.0	9	14	0.90	----	2.32	Clayey SILT to Silty CLAY	"
11.23	15.60	23.30	0.490	3.1	8	12	0.91	----	1.99	"	"
11.31	12.90	19.20	0.430	3.3	9	13	0.91	----	1.63	Silty CLAY to CLAY	"
11.37	12.70	18.85	0.420	3.3	8	13	0.92	----	1.60	"	"
11.46	12.90	19.08	0.510	4.0	13	19	0.92	----	1.63	CLAY	"
11.54	15.90	23.43	0.770	4.8	16	23	0.93	----	2.03	"	"
11.63	20.50	30.08	1.160	5.7	21	30	0.93	----	2.64	"	130-140
11.72	30.90	45.15	1.550	5.0	31	45	0.94	----	4.03	"	"
11.80	40.10	58.34	1.770	4.4	27	39	0.95	----	5.25	Silty CLAY to CLAY	"
11.89	42.80	62.00	1.790	4.2	21	31	0.95	----	5.61	Clayey SILT to Silty CLAY	"
11.98	32.50	46.87	1.550	4.8	33	47	0.96	----	4.24	CLAY	"
12.07	25.00	35.89	1.250	5.0	25	36	0.96	----	3.24	"	"
12.16	19.90	28.44	0.970	4.9	20	28	0.97	----	2.55	"	"
12.24	18.80	26.77	0.730	3.9	13	18	0.98	----	2.41	Silty CLAY to CLAY	120-130
12.33	18.40	26.09	0.600	3.3	9	13	0.98	----	2.35	Clayey SILT to Silty CLAY	"
12.42	16.80	23.73	0.570	3.4	11	16	0.99	----	2.14	Silty CLAY to CLAY	"
12.51	13.50	18.99	0.570	4.2	14	19	0.99	----	1.70	CLAY	"
12.60	12.90	18.08	0.550	4.3	13	18	1.00	----	1.62	"	"
12.69	14.00	19.57	0.560	4.0	14	20	1.00	----	1.76	"	"
12.78	15.20	21.20	0.620	4.1	15	21	1.01	----	1.92	"	"
12.87	14.70	20.46	0.630	4.3	15	20	1.02	----	1.86	"	"
12.96	15.30	21.25	0.570	3.7	10	14	1.02	----	1.93	Silty CLAY to CLAY	"
13.05	14.70	20.38	0.590	4.0	15	20	1.03	----	1.85	CLAY	"
13.14	15.80	21.86	0.720	4.6	16	22	1.03	----	2.00	"	"
13.22	18.10	24.98	1.120	6.2	18	25	1.04	----	2.31	"	130-140
13.31	27.70	38.13	1.610	5.8	28	38	1.04	----	3.59	"	"
13.40	49.10	67.44	1.910	3.9	25	34	1.05	----	6.44	Clayey SILT to Silty CLAY	"
13.49	47.60	65.22	1.820	3.8	24	33	1.06	----	6.24	"	"
13.57	30.30	41.41	1.390	4.6	20	28	1.06	----	3.93	Silty CLAY to CLAY	"
13.66	20.20	27.54	0.850	4.2	13	18	1.07	----	2.58	"	"

13.75	15.90	21.63	0.670	4.2	16	22	1.08	----	2.01	CLAY	120-130
13.84	13.70	18.60	0.580	4.2	14	19	1.08	----	1.71	"	"
13.90	14.30	19.39	0.550	3.8	10	13	1.09	----	1.79	Silty CLAY to CLAY	"
13.99	13.30	17.99	0.560	4.2	13	18	1.09	----	1.66	CLAY	"
14.08	13.40	18.09	0.570	4.3	13	18	1.10	----	1.67	"	"
14.17	14.30	19.26	0.580	4.1	14	19	1.10	----	1.79	"	"
14.25	15.50	20.84	0.660	4.3	16	21	1.11	----	1.95	"	"
14.34	17.10	22.94	0.640	3.7	11	15	1.11	----	2.16	Silty CLAY to CLAY	"
14.43	17.40	23.29	0.600	3.4	12	16	1.12	----	2.20	"	"
14.52	15.00	20.03	0.580	3.9	10	13	1.12	----	1.88	"	"
14.61	14.50	19.32	0.560	3.9	10	13	1.13	----	1.81	"	"
14.69	15.20	20.21	0.500	3.3	10	13	1.13	----	1.91	"	"
14.78	16.90	22.43	0.510	3.0	8	11	1.14	----	2.13	Clayey SILT to Silty CLAY	"
14.87	17.30	22.91	0.590	3.4	12	15	1.15	----	2.19	Silty CLAY to CLAY	"
14.96	19.40	25.63	0.610	3.1	10	13	1.15	----	2.46	Clayey SILT to Silty CLAY	"
15.05	17.70	23.33	0.630	3.6	12	16	1.16	----	2.24	Silty CLAY to CLAY	"
15.14	15.20	19.99	0.620	4.1	15	20	1.16	----	1.90	CLAY	"
15.22	15.50	20.35	0.620	4.0	10	14	1.17	----	1.94	Silty CLAY to CLAY	"
15.26	17.40	22.82	0.630	3.6	12	15	1.17	----	2.20	"	"
15.35	19.40	25.39	0.680	3.5	13	17	1.18	----	2.46	"	"
15.44	20.00	26.11	0.700	3.5	13	17	1.18	----	2.54	"	"
15.53	17.30	22.54	0.690	4.0	12	15	1.19	----	2.18	"	"
15.61	17.30	22.49	0.680	3.9	12	15	1.19	----	2.18	"	"
15.70	17.70	22.96	0.610	3.4	12	15	1.20	----	2.23	"	"
15.79	18.70	24.20	0.630	3.4	9	12	1.20	----	2.36	Clayey SILT to Silty CLAY	"
15.88	22.90	29.56	0.790	3.4	11	15	1.21	----	2.92	"	130-140
15.97	23.20	29.87	0.820	3.5	12	15	1.22	----	2.96	"	"
16.06	25.60	32.87	0.860	3.4	13	16	1.22	----	3.28	"	"
16.15	20.50	26.26	0.830	4.0	14	18	1.23	----	2.60	Silty CLAY to CLAY	120-130
16.24	21.50	27.48	0.790	3.7	14	18	1.23	----	2.73	"	"
16.33	20.60	26.27	0.700	3.4	10	13	1.24	----	2.61	Clayey SILT to Silty CLAY	"
16.42	18.90	24.05	0.720	3.8	13	16	1.25	----	2.39	Silty CLAY to CLAY	"
16.51	17.40	22.09	0.710	4.1	12	15	1.25	----	2.18	"	"
16.60	15.30	19.38	0.680	4.4	15	19	1.26	----	1.90	CLAY	"
16.69	13.20	16.69	0.600	4.5	13	17	1.26	----	1.62	"	"
16.78	14.10	17.79	0.580	4.1	14	18	1.27	----	1.74	"	"
16.87	14.50	18.25	0.590	4.1	15	18	1.27	----	1.80	"	"
16.95	15.80	19.85	0.590	3.7	11	13	1.28	----	1.97	Silty CLAY to CLAY	"
17.04	17.30	21.68	0.590	3.4	12	14	1.28	----	2.17	"	"
17.13	15.40	19.26	0.580	3.8	10	13	1.29	----	1.91	"	"
17.22	14.10	17.60	0.550	3.9	9	12	1.30	----	1.74	"	"
17.31	13.40	16.69	0.510	3.8	9	11	1.30	----	1.64	"	"
17.40	12.40	15.41	0.470	3.8	12	15	1.31	----	1.51	CLAY	"
17.49	12.10	15.00	0.480	4.0	12	15	1.31	----	1.47	"	"
17.57	12.30	15.22	0.490	4.0	12	15	1.32	----	1.50	"	"
17.66	11.80	14.57	0.490	4.2	12	15	1.32	----	1.79	"	"
17.75	12.00	14.79	0.600	5.0	12	15	1.33	----	1.45	"	"
17.84	13.40	16.47	0.670	5.0	13	16	1.33	----	1.64	"	"
17.93	15.00	18.40	0.680	4.5	15	18	1.34	----	1.85	"	"
18.02	15.50	18.97	0.720	4.6	16	19	1.35	----	1.92	"	"
18.11	15.20	18.57	0.780	5.1	15	19	1.35	----	1.88	"	"
18.18	15.10	18.41	0.780	5.2	15	18	1.36	----	1.86	"	"
18.27	14.30	17.40	0.900	6.3	14	17	1.36	----	1.76	"	"
18.36	12.90	15.66	0.900	7.0	13	16	1.37	----	1.57	"	"
18.45	11.10	13.44	0.760	6.8	11	13	1.37	----	1.66	"	"

18.53	10.80	13.05	0.690	6.4	11	13	1.38	----	1.61	"	"
18.58	13.40	16.18	0.670	5.0	13	16	1.38	----	1.63	"	"
18.66	16.20	19.52	0.630	3.9	11	13	1.39	----	2.01	Silty CLAY to CLAY	"
18.75	15.60	18.75	0.620	4.0	10	13	1.39	----	1.93	"	"
18.84	15.60	18.71	0.640	4.1	16	19	1.40	----	1.93	CLAY	"
18.93	16.10	19.27	0.620	3.9	11	13	1.40	----	1.99	Silty CLAY to CLAY	"
19.02	15.90	18.98	0.600	3.8	11	13	1.41	----	1.96	"	"
19.11	14.70	17.51	0.610	4.1	15	18	1.41	----	1.80	CLAY	"
19.20	12.60	14.98	0.620	4.9	13	15	1.42	----	1.52	"	"
19.29	11.90	14.11	0.590	5.0	12	14	1.43	----	1.79	"	"
19.38	11.30	13.37	0.550	4.9	11	13	1.43	----	1.68	"	"
19.47	11.30	13.34	0.520	4.6	11	13	1.44	----	1.68	"	"
19.55	11.10	13.07	0.480	4.3	11	13	1.44	----	1.65	"	"
19.64	10.80	12.70	0.440	4.1	11	13	1.45	----	1.60	"	110-120
19.73	10.90	12.79	0.400	3.7	11	13	1.45	----	1.61	"	"
19.82	10.60	12.41	0.360	3.4	7	8	1.46	----	1.56	Silty CLAY to CLAY	"
19.91	9.80	11.46	0.350	3.6	10	11	1.46	----	1.43	CLAY	"
20.00	9.30	10.85	0.350	3.8	9	11	1.47	----	1.35	"	"
20.09	9.10	10.60	0.350	3.8	9	11	1.47	----	1.31	"	"
20.18	9.30	10.81	0.350	3.8	9	11	1.47	----	1.34	"	"
20.27	9.30	10.79	0.370	4.0	9	11	1.48	----	1.34	"	"
20.36	9.30	10.77	0.380	4.1	9	11	1.48	----	1.34	"	"
20.45	9.50	10.98	0.450	4.7	10	11	1.49	----	1.37	"	"
20.53	10.20	11.76	0.570	5.6	10	12	1.49	----	1.49	"	120-130
20.62	11.40	13.11	0.720	6.3	11	13	1.50	----	1.69	"	"
20.71	13.20	15.15	0.890	6.7	13	15	1.51	----	1.59	"	"
20.80	14.60	16.73	1.090	7.5	15	17	1.51	----	1.78	"	"
20.89	15.90	18.19	1.320	8.3	16	18	1.52	----	1.95	"	130-140
20.98	18.90	21.57	1.310	6.9	19	22	1.52	----	2.35	"	"
21.07	24.80	28.25	0.970	3.9	17	19	1.53	----	3.13	Silty CLAY to CLAY	"
21.15	40.90	46.50	0.750	1.8	16	19	1.54	----	5.28	Sandy SILT to Clayey SILT	"
21.23	50.70	57.55	0.650	1.3	17	19	1.54	35	----	Silty SAND to Sandy SILT	120-130
21.33	43.00	48.72	0.720	1.7	14	16	1.55	34	----	"	"
21.41	33.80	38.22	1.030	3.0	17	19	1.55	----	4.33	Clayey SILT to Silty CLAY	130-140
21.50	29.90	33.74	1.230	4.1	20	22	1.56	----	3.81	Silty CLAY to CLAY	"
21.59	30.20	34.01	1.220	4.0	20	23	1.57	----	3.85	"	"
21.66	34.40	38.67	1.150	3.3	17	19	1.57	----	4.41	Clayey SILT to Silty CLAY	"
21.75	34.50	38.70	1.240	3.6	17	19	1.58	----	4.42	"	"
21.84	31.00	34.71	1.180	3.8	16	17	1.58	----	3.95	"	"
21.93	25.50	28.49	1.010	4.0	17	19	1.59	----	3.22	Silty CLAY to CLAY	"
22.02	19.80	22.07	0.950	4.8	20	22	1.60	----	2.46	CLAY	"
22.10	16.60	18.47	0.960	5.8	17	18	1.60	----	2.03	"	120-130
22.19	12.40	13.78	0.880	7.1	12	14	1.61	----	1.47	"	"
22.28	11.70	12.97	0.670	5.7	12	13	1.61	----	1.72	"	"
22.37	10.00	11.07	0.480	4.8	10	11	1.62	----	1.44	"	110-120
22.46	9.40	10.39	0.430	4.6	9	10	1.62	----	1.34	"	"
22.55	9.10	10.05	0.420	4.6	9	10	1.63	----	1.28	"	"
22.64	9.10	10.03	0.450	4.9	9	10	1.63	----	1.28	"	"
22.72	9.50	10.46	0.440	4.6	10	10	1.64	----	1.35	"	"
22.81	9.10	10.00	0.430	4.7	9	10	1.64	----	1.28	"	"
22.90	8.90	9.77	0.410	4.6	9	10	1.65	----	1.50	"	"
22.99	8.60	9.42	0.370	4.3	9	9	1.65	----	1.44	"	"
23.08	7.80	8.53	0.350	4.5	8	9	1.66	----	1.28	"	"
23.17	8.40	9.17	0.330	3.9	8	9	1.66	----	1.39	"	"
23.26	8.10	8.83	0.320	4.0	8	9	1.67	----	1.33	"	"

23.32	8.10	8.82	0.320	4.0	8	9	1.67	----	1.33	"	"
23.41	8.20	8.92	0.340	4.1	8	9	1.67	----	1.35	"	"
23.50	8.80	9.56	0.360	4.1	9	10	1.68	----	1.47	"	"
23.59	8.40	9.11	0.390	4.6	8	9	1.68	----	1.39	"	"
23.68	8.80	9.53	0.420	4.8	9	10	1.69	----	1.47	"	"
23.77	9.20	9.94	0.460	5.0	9	10	1.69	----	1.29	"	"
23.85	10.10	10.90	0.510	5.0	10	11	1.70	----	1.44	"	120-130
23.94	12.40	13.35	0.560	4.5	12	13	1.70	----	1.46	"	"
24.03	14.50	15.59	0.590	4.1	15	16	1.71	----	1.74	"	"
24.12	13.70	14.70	0.600	4.4	14	15	1.71	----	1.63	"	"
24.21	12.00	12.85	0.560	4.7	12	13	1.72	----	1.40	"	"
24.30	10.70	11.44	0.490	4.6	11	11	1.73	----	1.53	"	"
24.39	9.00	9.60	0.380	4.2	9	10	1.73	----	1.25	"	110-120
24.47	8.40	8.95	0.340	4.0	8	9	1.73	----	1.38	"	"
24.56	8.90	9.47	0.310	3.5	9	9	1.74	----	1.48	"	"
24.65	8.90	9.45	0.370	4.2	9	9	1.74	----	1.48	"	"
24.74	8.80	9.33	0.450	5.1	9	9	1.75	----	1.46	"	"
24.83	8.20	8.69	0.450	5.5	8	9	1.75	----	1.34	"	"
24.91	6.80	7.20	0.440	6.5	7	7	1.76	----	1.05	"	"
24.98	9.70	10.26	0.450	4.6	10	10	1.76	----	1.36	"	"
25.07	10.00	10.56	0.500	5.0	10	11	1.77	----	1.41	"	120-130
25.15	11.50	12.13	0.510	4.4	12	12	1.77	----	1.66	"	"
25.24	11.80	12.43	0.540	4.6	12	12	1.78	----	1.71	"	"
25.33	13.10	13.78	0.570	4.4	13	14	1.78	----	1.54	"	"
25.42	12.90	13.55	0.600	4.7	13	14	1.79	----	1.51	"	"
25.51	14.40	15.11	0.590	4.1	14	15	1.79	----	1.71	"	"
25.60	13.80	14.46	0.580	4.2	14	14	1.80	----	1.63	"	"
25.69	13.40	14.03	0.550	4.1	13	14	1.81	----	1.58	"	"
25.78	13.60	14.22	0.510	3.7	9	9	1.81	----	1.60	Silty CLAY to CLAY	"
25.87	12.60	13.15	0.480	3.8	13	13	1.82	----	1.47	CLAY	"
25.96	12.20	12.72	0.470	3.9	12	13	1.82	----	1.41	"	"
26.05	12.10	12.60	0.490	4.0	12	13	1.83	----	1.40	"	"
26.13	12.30	12.79	0.510	4.1	12	13	1.83	----	1.43	"	"
26.22	13.30	13.81	0.550	4.1	13	14	1.84	----	1.56	"	"
26.31	13.70	14.21	0.620	4.5	14	14	1.84	----	1.61	"	"
26.40	14.40	14.92	0.690	4.8	14	15	1.85	----	1.70	"	"
26.49	13.80	14.28	0.740	5.4	14	14	1.86	----	1.62	"	"
26.58	13.60	14.05	0.730	5.4	14	14	1.86	----	1.60	"	"
26.67	13.80	14.24	0.710	5.1	14	14	1.87	----	1.62	"	"
26.76	15.00	15.46	0.700	4.7	15	15	1.87	----	1.78	"	"
26.85	15.50	15.95	0.730	4.7	16	16	1.88	----	1.85	"	"
26.94	17.80	18.30	0.790	4.4	18	18	1.88	----	2.15	"	"
27.03	19.60	20.12	0.870	4.4	20	20	1.89	----	2.39	"	130-140
27.11	19.00	19.47	0.920	4.8	19	19	1.90	----	2.31	"	"
27.20	18.30	18.73	0.920	5.0	18	19	1.90	----	2.22	"	"
27.29	18.70	19.11	0.900	4.8	19	19	1.91	----	2.27	"	120-130
27.38	18.10	18.47	0.860	4.8	18	18	1.91	----	2.19	"	"
27.47	17.60	17.94	0.830	4.7	18	18	1.92	----	2.12	"	"
27.56	18.70	19.04	0.860	4.6	19	19	1.93	----	2.27	"	"
27.65	18.90	19.21	0.910	4.8	19	19	1.93	----	2.29	"	130-140
27.73	18.40	18.67	0.920	5.0	18	19	1.94	----	2.23	"	"
27.82	18.20	18.44	0.970	5.3	18	18	1.94	----	2.20	"	"
27.91	18.70	18.92	1.010	5.4	19	19	1.95	----	2.26	"	"
28.00	17.80	17.98	1.020	5.7	18	18	1.96	----	2.14	"	"
28.09	17.10	17.25	1.040	6.1	17	17	1.96	----	2.05	"	"

28.18	17.70	17.83	1.050	5.9	18	18	1.97	----	2.13	"	"
28.26	18.30	18.40	1.060	5.8	18	18	1.98	----	2.21	"	"
28.44	20.10	20.15	1.120	5.6	20	20	1.99	----	2.45	"	"
28.53	19.70	19.72	1.110	5.6	20	20	2.00	----	2.39	"	"
28.61	18.20	18.20	1.010	5.5	18	18	2.00	----	2.19	"	"
28.70	16.70	16.70	0.870	5.2	17	17	2.01	----	1.99	"	120-130
28.79	14.50	14.50	0.770	5.3	15	14	2.01	----	1.70	"	"
28.88	13.10	13.10	0.700	5.3	13	13	2.02	----	1.51	"	"
28.97	14.30	14.29	0.620	4.3	14	14	2.02	----	1.67	"	"
29.06	15.90	15.89	0.580	3.6	11	11	2.03	----	1.88	Silty CLAY to CLAY	"
29.15	16.20	16.19	0.600	3.7	11	11	2.04	----	1.92	"	"
29.24	16.70	16.69	0.620	3.7	11	11	2.04	----	1.99	"	"
29.33	16.60	16.58	0.640	3.9	11	11	2.05	----	1.97	"	"
29.42	16.20	16.18	0.670	4.1	16	16	2.05	----	1.92	CLAY	"
29.51	15.70	15.68	0.710	4.5	16	16	2.06	----	1.85	"	"
29.59	17.10	17.08	0.760	4.4	17	17	2.06	----	2.04	"	"
29.68	19.40	19.37	0.810	4.2	13	13	2.07	----	2.34	Silty CLAY to CLAY	"
29.77	19.70	19.67	0.810	4.1	13	13	2.07	----	2.38	"	"
29.86	20.60	20.57	0.840	4.1	14	14	2.08	----	2.50	"	130-140
29.95	21.80	21.76	0.880	4.0	15	15	2.09	----	2.66	"	"
30.04	21.70	21.66	0.880	4.1	14	14	2.09	----	2.65	"	"
30.13	21.80	21.76	0.930	4.3	15	15	2.10	----	2.66	"	"
30.22	22.00	21.95	0.980	4.5	22	22	2.11	----	2.68	CLAY	"
30.31	18.80	18.76	1.000	5.3	19	19	2.11	----	2.26	"	"
30.39	15.00	14.96	0.930	6.2	15	15	2.12	----	1.75	"	120-130
30.48	12.60	12.57	0.780	6.2	13	13	2.12	----	1.43	"	"
30.57	10.50	10.47	0.600	5.7	11	10	2.13	----	1.43	"	"
30.66	10.60	10.57	0.490	4.6	11	11	2.14	----	1.45	"	"
30.75	11.40	11.37	0.370	3.2	8	8	2.14	----	1.58	Silty CLAY to CLAY	110-120
30.84	11.00	10.97	0.330	3.0	7	7	2.14	----	1.52	"	"
30.93	10.20	10.17	0.320	3.1	7	7	2.15	----	1.38	"	"
31.01	10.10	10.07	0.300	3.0	7	7	2.15	----	1.36	"	"
31.10	11.00	10.97	0.350	3.2	7	7	2.16	----	1.51	"	"
31.19	13.30	13.26	0.450	3.4	9	9	2.16	----	1.52	"	120-130
31.28	13.10	13.06	0.640	4.9	13	13	2.17	----	1.49	CLAY	"
31.37	11.80	11.76	0.860	7.3	12	12	2.18	----	1.64	"	"
31.46	10.70	10.66	0.840	7.9	11	11	2.18	----	1.46	"	"
31.54	10.20	10.16	0.810	7.9	10	10	2.19	----	1.37	"	"
31.61	12.40	12.35	0.810	6.5	12	12	2.19	----	1.39	"	"
31.70	10.10	10.06	0.770	7.6	10	10	2.20	----	1.36	"	"
31.79	8.90	8.86	0.730	8.2	9	9	2.20	----	1.39	"	"
31.88	9.20	9.16	0.710	7.7	9	9	2.21	----	1.20	"	"
31.97	9.00	8.96	0.650	7.2	9	9	2.21	----	1.17	"	"
32.06	9.60	9.56	0.580	6.0	10	10	2.22	----	1.27	"	"
32.15	10.50	10.45	0.550	5.2	11	10	2.22	----	1.42	"	"
32.23	11.20	11.15	0.560	5.0	11	11	2.23	----	1.53	"	"
32.32	12.90	12.84	0.620	4.8	13	13	2.24	----	1.45	"	"
32.41	15.00	14.93	0.680	4.5	15	15	2.24	----	1.73	"	"
32.50	16.20	16.12	0.750	4.6	16	16	2.25	----	1.89	"	"
32.59	15.30	15.22	0.790	5.2	15	15	2.25	----	1.77	"	"
32.68	14.60	14.52	0.790	5.4	15	15	2.26	----	1.68	"	"
32.77	15.80	15.72	0.760	4.8	16	16	2.26	----	1.84	"	"
32.86	17.60	17.51	0.720	4.1	12	12	2.27	----	2.08	Silty CLAY to CLAY	"
32.94	17.80	17.70	0.730	4.1	12	12	2.27	----	2.10	"	"
33.03	19.20	19.09	0.770	4.0	13	13	2.28	----	2.29	"	"

33.10	20.00	19.89	0.800	4.0	13	13	2.28	----	2.39	"	"
33.19	19.80	19.69	0.830	4.2	13	13	2.29	----	2.37	"	"
33.28	19.50	19.38	0.850	4.4	20	19	2.30	----	2.33	CLAY	"
33.37	19.50	19.38	0.860	4.4	20	19	2.30	----	2.32	"	"
33.46	19.90	19.78	0.870	4.4	20	20	2.31	----	2.38	"	130-140
33.55	18.80	18.68	0.830	4.4	19	19	2.31	----	2.23	"	120-130
33.63	18.80	18.68	0.860	4.6	19	19	2.32	----	2.23	"	"
33.72	18.50	18.38	0.960	5.2	19	18	2.32	----	2.19	"	130-140
33.81	19.30	19.17	1.180	6.1	19	19	2.33	----	2.29	"	"
33.90	24.10	23.94	1.480	6.1	24	24	2.34	----	2.93	"	"
33.99	28.40	28.20	1.730	6.1	28	28	2.34	----	3.51	"	"
34.07	29.30	29.09	1.790	6.1	29	29	2.35	----	3.63	"	"
34.16	26.50	26.31	1.720	6.5	27	26	2.36	----	3.25	"	"
34.25	22.70	22.54	1.610	7.1	23	23	2.36	----	2.74	"	"
34.34	20.30	20.15	1.520	7.5	20	20	2.37	----	2.42	"	"
34.43	20.30	20.15	1.620	8.0	20	20	2.38	----	2.42	"	"
34.51	23.70	23.52	1.930	8.1	24	24	2.38	----	2.87	"	"
34.60	28.90	28.68	2.190	7.6	29	29	2.39	----	3.57	"	"
34.69	27.60	27.38	2.160	7.8	28	27	2.39	----	3.39	"	"
34.88	27.80	27.57	1.820	6.5	28	28	2.41	----	3.42	"	"
34.96	24.40	24.20	1.660	6.8	24	24	2.41	----	2.96	"	"
35.05	21.80	21.62	1.510	6.9	22	22	2.42	----	2.62	"	"
35.14	23.80	23.60	1.390	5.8	24	24	2.43	----	2.88	"	"
35.22	22.70	22.50	1.240	5.5	23	23	2.43	----	2.73	"	"
35.31	18.10	17.94	1.060	5.9	18	18	2.44	----	2.12	"	"
35.40	15.70	15.56	0.910	5.8	16	16	2.45	----	1.80	"	120-130
35.49	14.80	14.67	0.770	5.2	15	15	2.45	----	1.68	"	"
35.58	15.50	15.36	0.700	4.5	16	15	2.46	----	1.77	"	"
35.67	16.50	16.35	0.700	4.2	17	16	2.46	----	1.90	"	"
35.75	16.10	15.95	0.710	4.4	16	16	2.47	----	1.85	"	"
35.84	15.20	15.06	0.710	4.7	15	15	2.47	----	1.73	"	"
35.93	15.90	15.75	0.720	4.5	16	16	2.48	----	1.82	"	"
36.01	16.50	16.34	0.730	4.4	17	16	2.48	----	1.90	"	"
36.10	16.50	16.34	0.760	4.6	17	16	2.49	----	1.90	"	"
36.19	16.10	15.94	0.790	4.9	16	16	2.49	----	1.85	"	"
36.26	15.50	15.35	0.810	5.2	16	15	2.50	----	1.77	"	"
36.35	14.40	14.23	0.780	5.4	14	14	2.50	----	1.62	"	"
36.43	13.20	13.02	0.720	5.5	13	13	2.51	----	1.46	"	"
36.52	12.60	12.41	0.660	5.2	13	12	2.52	----	1.38	"	"
36.61	12.40	12.19	0.590	4.8	12	12	2.52	----	1.35	"	"
36.70	12.20	11.97	0.540	4.4	12	12	2.53	----	1.32	"	"
36.78	13.00	12.73	0.530	4.1	13	13	2.53	----	1.43	"	"
36.87	14.50	14.18	0.540	3.7	10	9	2.54	----	1.63	Silty CLAY to CLAY	"
36.96	15.60	15.22	0.560	3.6	10	10	2.54	----	1.77	"	"
37.04	15.80	15.39	0.580	3.7	11	10	2.55	----	1.80	"	"
37.13	15.20	14.78	0.590	3.9	10	10	2.55	----	1.72	"	"
37.21	14.50	14.07	0.600	4.1	15	14	2.56	----	1.62	CLAY	"
37.30	13.30	12.88	0.570	4.3	13	13	2.56	----	1.46	"	"
37.39	12.70	12.28	0.540	4.3	13	12	2.57	----	1.38	"	"
37.48	11.50	11.10	0.540	4.7	12	11	2.58	----	1.53	"	"
37.56	11.80	11.37	0.540	4.6	12	11	2.58	----	1.58	"	"
37.65	13.00	12.50	0.590	4.5	13	12	2.59	----	1.42	"	"
37.74	14.80	14.20	0.700	4.7	15	14	2.59	----	1.66	"	"
37.83	15.90	15.23	0.810	5.1	16	15	2.60	----	1.81	"	"
37.91	17.00	16.25	0.920	5.4	17	16	2.60	----	1.95	"	"

38.11	21.80	20.74	1.170	5.4	22	21	2.62	----	2.59	"	130-140
38.20	22.70	21.55	1.220	5.4	23	22	2.62	----	2.71	"	"
38.28	23.00	21.79	1.190	5.2	23	22	2.63	----	2.75	"	"
38.37	22.40	21.17	1.170	5.2	22	21	2.64	----	2.67	"	"
38.46	20.30	19.14	1.160	5.7	20	19	2.64	----	2.39	"	"
38.54	20.00	18.82	1.110	5.6	20	19	2.65	----	2.35	"	"
38.63	20.30	19.06	1.090	5.4	20	19	2.65	----	2.39	"	"
38.72	20.00	18.74	1.070	5.4	20	19	2.66	----	2.35	"	"
38.80	18.90	17.67	1.060	5.6	19	18	2.67	----	2.20	"	"
38.88	17.60	16.42	1.060	6.0	18	16	2.67	----	2.02	"	"
38.97	17.90	16.66	1.090	6.1	18	17	2.68	----	2.06	"	"
39.05	18.10	16.81	1.130	6.2	18	17	2.69	----	2.09	"	"
39.14	20.00	18.54	1.220	6.1	20	19	2.69	----	2.34	"	"
39.23	21.60	19.97	1.360	6.3	22	20	2.70	----	2.55	"	"
39.31	22.90	21.13	1.540	6.7	23	21	2.70	----	2.73	"	"
39.40	23.10	21.26	1.850	8.0	23	21	2.71	----	2.75	"	"
39.49	27.90	25.62	2.340	8.4	28	26	2.72	----	3.39	"	"
39.57	50.10	45.91	2.570	5.1	50	46	2.72	----	6.35	"	"
39.66	75.10	68.67	2.800	3.7	38	34	2.73	----	9.68	Clayey SILT to Silty CLAY	"
39.74	82.60	75.36	3.160	3.8	41	38	2.74	----	10.68	"	"
39.82	71.00	64.64	2.700	3.8	36	32	2.74	----	9.14	"	"
39.89	54.70	49.71	2.450	4.5	36	33	2.75	----	6.96	Silty CLAY to CLAY	"
39.96	39.70	36.01	2.310	5.8	40	36	2.75	----	4.96	CLAY	"
40.02	28.80	26.08	2.210	7.7	29	26	2.76	----	3.51	"	"
40.11	37.90	34.24	2.070	5.5	38	34	2.76	----	4.72	"	"
40.19	73.20	65.99	2.190	3.0	29	26	2.77	----	9.43	Sandy SILT to Clayey SILT	"
40.27	85.40	76.83	2.620	3.1	34	31	2.77	----	11.05	"	"
40.35	73.70	66.15	2.970	4.0	37	33	2.78	----	9.49	Clayey SILT to Silty CLAY	"
40.44	63.30	56.69	2.960	4.7	42	38	2.79	----	8.10	Silty CLAY to CLAY	"
40.52	62.00	55.41	2.820	4.5	41	37	2.79	----	7.93	"	"
40.61	61.70	55.01	2.740	4.4	31	28	2.80	----	7.89	Clayey SILT to Silty CLAY	"
40.69	59.80	53.20	2.610	4.4	30	27	2.80	----	7.63	"	"
40.77	51.60	45.80	2.170	4.2	26	23	2.81	----	6.54	"	"
40.86	38.20	33.83	1.760	4.6	25	23	2.82	----	4.75	Silty CLAY to CLAY	"
40.94	26.00	22.97	1.600	6.2	26	23	2.82	----	3.13	CLAY	"
41.03	19.10	16.84	1.780	9.3	19	17	2.83	----	2.20	"	"
41.11	15.70	13.81	1.450	9.2	16	14	2.84	----	1.75	"	"
41.20	13.70	12.02	1.220	8.9	14	12	2.84	----	1.48	"	"
41.27	11.50	10.07	1.070	9.3	12	10	2.85	----	1.49	"	120-130
41.31	15.30	13.39	0.980	6.4	15	13	2.85	----	1.70	"	"
41.40	12.70	11.09	0.810	6.4	13	11	2.85	----	1.35	"	"
41.48	11.80	10.28	0.660	5.6	12	10	2.86	----	1.53	"	"
41.57	11.20	9.74	0.560	5.0	11	10	2.86	----	1.43	"	"
41.65	11.30	9.81	0.540	4.8	11	10	2.87	----	1.45	"	"
41.74	11.10	9.62	0.550	5.0	11	10	2.87	----	1.41	"	"
41.82	11.70	10.12	0.550	4.7	12	10	2.88	----	1.51	"	"
41.90	11.80	10.18	0.570	4.8	12	10	2.89	----	1.53	"	"
41.99	12.80	11.02	0.590	4.6	13	11	2.89	----	1.36	"	"
42.07	13.60	11.69	0.630	4.6	14	12	2.90	----	1.46	"	"
42.16	14.90	12.78	0.690	4.6	15	13	2.90	----	1.63	"	"
42.25	16.20	13.86	0.770	4.8	16	14	2.91	----	1.81	"	"
42.33	18.80	16.05	0.880	4.7	19	16	2.91	----	2.15	"	"
42.42	20.60	17.55	0.970	4.7	21	18	2.92	----	2.39	"	130-140
42.50	22.20	18.87	1.050	4.7	22	19	2.92	----	2.61	"	"
42.59	24.00	20.35	1.120	4.7	24	20	2.93	----	2.84	"	"

42.68	24.60	20.80	1.130	4.6	25	21	2.94	----	2.92	"	"
42.76	25.70	21.68	1.140	4.4	17	14	2.94	----	3.07	Silty CLAY to CLAY	"
42.85	26.70	22.47	1.170	4.4	18	15	2.95	----	3.20	"	"
42.94	26.70	22.41	1.180	4.4	18	15	2.96	----	3.20	"	"
43.03	27.70	23.20	1.170	4.2	18	15	2.96	----	3.33	"	"
43.11	27.10	22.64	1.150	4.2	18	15	2.97	----	3.25	"	"
43.20	26.50	22.08	1.130	4.3	18	15	2.97	----	3.17	"	"
43.29	26.60	22.11	1.120	4.2	18	15	2.98	----	3.18	"	"
43.37	24.70	20.48	1.110	4.5	16	14	2.99	----	2.93	"	"
43.46	23.10	19.10	1.060	4.6	23	19	2.99	----	2.72	CLAY	"
43.55	20.50	16.91	0.990	4.8	21	17	3.00	----	2.37	"	"
43.63	18.80	15.50	0.890	4.7	19	15	3.01	----	2.14	"	120-130
43.72	17.80	14.66	0.780	4.4	18	15	3.01	----	2.01	"	"
43.81	17.00	13.99	0.700	4.1	11	9	3.02	----	1.90	Silty CLAY to CLAY	"
43.90	17.10	14.06	0.660	3.9	11	9	3.02	----	1.91	"	"
43.98	18.30	15.04	0.670	3.7	12	10	3.03	----	2.07	"	"
44.07	20.20	16.59	0.720	3.6	13	11	3.03	----	2.32	"	"
44.16	22.20	18.21	0.840	3.8	15	12	3.04	----	2.59	"	130-140
44.25	25.40	20.82	1.130	4.4	17	14	3.05	----	3.02	"	"
44.33	28.60	23.42	1.610	5.6	29	23	3.05	----	3.44	CLAY	"
44.42	34.30	28.07	2.080	6.1	34	28	3.06	----	4.20	"	"
44.51	38.30	31.31	2.340	6.1	38	31	3.06	----	4.73	"	"
44.75	39.90	32.54	2.190	5.5	40	33	3.08	----	4.95	"	"
44.84	37.30	30.39	2.050	5.5	37	30	3.09	----	4.60	"	"
44.92	35.00	28.49	1.930	5.5	35	28	3.10	----	4.29	"	"
45.01	33.60	27.33	1.770	5.3	34	27	3.10	----	4.10	"	"
45.10	33.00	26.82	1.640	5.0	33	27	3.11	----	4.02	"	"
45.19	32.80	26.63	1.590	4.8	33	27	3.11	----	3.99	"	"
45.27	34.30	27.82	1.640	4.8	23	19	3.12	----	4.19	Silty CLAY to CLAY	"
45.36	35.80	29.01	1.740	4.9	36	29	3.13	----	4.39	CLAY	"
45.45	36.30	29.39	1.920	5.3	36	29	3.13	----	4.46	"	"
45.53	36.00	29.12	2.070	5.8	36	29	3.14	----	4.42	"	"
45.62	34.30	27.72	2.140	6.2	34	28	3.15	----	4.19	"	"
45.70	34.20	27.62	2.200	6.4	34	28	3.15	----	4.18	"	"
45.79	33.60	27.11	2.220	6.6	34	27	3.16	----	4.10	"	"
45.88	33.70	27.17	2.220	6.6	34	27	3.16	----	4.11	"	"
45.96	33.50	26.98	2.190	6.5	34	27	3.17	----	4.08	"	"
46.05	32.80	26.39	2.150	6.6	33	26	3.18	----	3.99	"	"
46.13	30.80	24.76	2.120	6.9	31	25	3.18	----	3.72	"	"
46.22	30.10	24.18	2.180	7.2	30	24	3.19	----	3.63	"	"
46.30	30.00	24.08	2.470	8.2	30	24	3.20	----	3.61	"	"
46.39	32.20	25.82	2.780	8.6	32	26	3.20	----	3.90	"	"
46.47	41.00	32.85	2.620	6.4	41	33	3.21	----	5.08	"	"
46.55	76.90	61.55	2.530	3.3	31	25	3.21	----	9.86	Sandy SILT to Clayey SILT	"
46.63	142.50	113.97	2.360	1.7	36	28	3.22	39	----	SAND to Silty SAND	"
46.71	188.60	150.73	2.050	1.1	38	30	3.22	40	----	SAND	120-130
46.79	230.40	184.03	1.590	0.7	46	37	3.23	42	----	"	110-120
46.88	238.90	190.70	1.480	0.6	48	38	3.23	42	----	"	"
46.96	232.90	185.77	1.870	0.8	47	37	3.24	42	----	"	120-130
47.04	235.80	187.95	2.260	1.0	47	38	3.24	42	----	"	"
47.12	227.90	181.52	2.160	0.9	46	36	3.25	41	----	"	"
47.20	216.20	172.07	2.190	1.0	43	34	3.25	41	----	"	"
47.28	213.10	169.47	2.780	1.3	43	34	3.26	41	----	"	130-140
47.36	207.50	164.87	3.190	1.5	42	33	3.26	41	----	"	"
47.44	199.70	158.54	3.370	1.7	40	32	3.27	41	----	"	"

47.52	184.00	145.95	3.310	1.8	46	36	3.28	40	----	SAND to Silty SAND	"
47.60	167.40	132.67	2.570	1.5	42	33	3.28	40	----	"	"
47.69	174.20	137.94	2.150	1.2	35	28	3.29	40	----	SAND	"
47.76	178.40	141.16	1.960	1.1	36	28	3.29	40	----	"	120-130
47.84	200.90	158.85	1.980	1.0	40	32	3.30	41	----	"	"
47.92	226.70	179.12	2.210	1.0	45	36	3.30	41	----	"	"
48.00	239.80	189.34	2.510	1.0	48	38	3.31	42	----	"	"
48.08	252.90	199.53	2.700	1.1	51	40	3.31	42	----	"	"
48.16	250.60	197.55	3.110	1.2	50	40	3.32	42	----	"	130-140
48.24	251.30	197.94	3.860	1.5	50	40	3.32	42	----	"	"
48.32	266.70	209.90	3.820	1.4	53	42	3.33	42	----	"	"
48.39	265.50	208.79	4.220	1.6	53	42	3.34	42	----	"	"
48.47	257.90	202.64	4.320	1.7	52	41	3.34	42	----	"	"
48.55	247.60	194.38	4.060	1.6	50	39	3.35	42	----	"	"
48.63	252.70	198.22	4.060	1.6	51	40	3.35	42	----	"	"
48.71	224.70	176.11	4.350	1.9	56	44	3.36	41	----	SAND to Silty SAND	"
48.77	218.00	170.75	4.500	2.1	55	43	3.36	41	----	"	"
48.83	207.80	162.65	4.120	2.0	52	41	3.37	41	----	"	"
48.91	210.80	164.86	3.280	1.6	42	33	3.37	41	----	SAND	"
48.98	202.90	158.56	3.630	1.8	51	40	3.38	41	----	SAND to Silty SAND	"
49.06	236.30	184.51	4.620	2.0	47	37	3.38	42	----	SAND	"
49.13	288.00	224.71	5.440	1.9	58	45	3.39	43	----	"	"
49.19	316.80	247.02	5.100	1.6	63	49	3.39	43	----	"	"
49.25	302.20	235.49	5.270	1.7	60	47	3.40	43	----	"	"
49.32	241.20	187.80	6.500	2.7	80	63	3.40	42	----	Silty SAND to Sandy SILT	"
49.40	217.60	169.28	7.230	3.3	109	85	3.41	41	----	SAND to Clayey SAND *	>140
49.48	215.10	167.19	9.050	4.2	215	167	3.42	----	28.26	Very Stiff Fine Grained *	"
49.55	227.40	176.61	8.730	3.8	114	88	3.42	41	----	SAND to Clayey SAND *	"
49.62	211.30	163.96	9.550	4.5	211	164	3.43	----	27.76	Very Stiff Fine Grained *	"
49.66	212.30	164.66	7.400	3.5	106	82	3.43	41	----	SAND to Clayey SAND *	"
49.73	339.30	262.96	12.640	3.7	170	131	3.43	44	----	"	"
49.78	404.40	313.23	15.450	3.8	202	157	3.44	45	----	"	"
49.81	450.10	348.49	15.460	3.4	225	174	3.44	45	----	"	"
49.84	481.50	372.67	15.800	3.3	241	186	3.44	46	----	"	"
49.88	426.40	329.88	16.180	3.8	213	165	3.45	45	----	"	"
49.96	562.60	434.90	13.620	2.4	281	217	3.45	46	----	"	130-140
50.05	449.90	347.41	13.110	2.9	225	174	3.46	45	----	"	>140
50.09	421.80	325.57	11.640	2.8	211	163	3.46	45	----	"	"
50.17	477.30	368.07	11.030	2.3	239	184	3.47	46	----	"	130-140
50.24	502.20	386.99	8.940	1.8	100	77	3.47	46	----	SAND	"
50.30	523.90	403.43	7.950	1.5	105	81	3.48	46	----	"	"
50.37	498.50	383.59	6.970	1.4	100	77	3.48	46	----	"	"
50.44	496.00	381.39	8.330	1.7	99	76	3.49	46	----	"	"
50.52	475.90	365.61	9.370	2.0	95	73	3.49	45	----	"	"
50.58	484.60	372.05	8.690	1.8	97	74	3.50	46	----	"	"
50.62	404.70	310.55	5.910	1.5	81	62	3.50	45	----	"	"
50.67	485.10	372.06	6.470	1.3	97	74	3.50	46	----	"	"
50.70	479.30	367.48	6.770	1.4	96	73	3.51	46	----	"	"
50.77	362.70	277.88	7.030	1.9	73	56	3.51	44	----	"	"
50.82	455.70	348.93	6.630	1.5	91	70	3.52	45	----	"	"
50.86	433.60	331.86	6.410	1.5	87	66	3.52	45	----	"	"
50.90	245.00	187.45	4.730	1.9	49	37	3.52	42	----	"	"
50.96	409.90	313.43	3.330	0.8	68	52	3.52	45	----	Gravelly SAND to SAND	120-130
51.02	433.70	331.44	4.450	1.0	87	66	3.53	45	----	SAND	"
51.06	435.30	332.52	4.990	1.1	87	67	3.53	45	----	"	130-140

51.13	437.80	334.16	5.180	1.2	88	67	3.54	45	----	"	"
51.16	433.70	330.91	5.910	1.4	87	66	3.54	45	----	"	"
51.21	450.10	343.24	6.900	1.5	90	69	3.54	45	----	"	"
51.27	440.90	336.03	6.170	1.4	88	67	3.55	45	----	"	"
51.31	467.50	356.15	5.640	1.2	94	71	3.55	45	----	"	"
51.37	475.80	362.25	4.530	1.0	95	72	3.55	45	----	"	120-130
51.43	497.70	378.66	5.940	1.2	100	76	3.56	46	----	"	130-140
51.48	479.70	364.78	7.290	1.5	96	73	3.56	45	----	"	"
51.52	479.70	364.64	9.450	2.0	96	73	3.56	45	----	"	"
51.57	511.90	388.88	10.640	2.1	256	194	3.57	46	----	SAND to Clayey SAND *	"
51.60	537.30	408.04	10.780	2.0	269	204	3.57	46	----	"	"
51.63	562.10	426.72	10.850	1.9	112	85	3.57	46	----	SAND	"
51.67	604.30	458.57	10.500	1.7	121	92	3.58	47	----	"	"
51.73	626.80	475.36	11.250	1.8	125	95	3.58	47	----	"	"
51.80	544.20	412.39	10.490	1.9	109	82	3.58	46	----	"	"
51.86	528.40	400.12	12.360	2.3	264	200	3.59	46	----	SAND to Clayey SAND *	"
51.93	523.60	396.20	6.620	1.3	105	79	3.59	46	----	SAND	"
51.96	530.70	401.42	7.590	1.4	106	80	3.60	46	----	"	"
52.03	570.90	431.52	9.910	1.7	114	86	3.60	46	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-16
LOCATION: Santa Rosa CA DATE : 06-02-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 10:41:11
Terminated at 50.0 feet Groundwater measured at 4.4 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.50	35.40	56.64	1.740	4.9	35	57	0.06	----	4.72	CLAY	130-140
0.60	27.90	44.64	1.520	5.4	28	45	0.07	----	3.72	"	"
0.71	23.50	37.60	1.150	4.9	24	38	0.09	----	3.13	"	"
0.81	20.90	33.44	0.930	4.4	21	33	0.10	----	2.78	"	"
0.91	18.70	29.92	0.840	4.5	19	30	0.11	----	2.49	"	120-130
1.00	18.00	28.80	0.790	4.4	18	29	0.12	----	2.39	"	"
1.10	17.70	28.32	0.760	4.3	18	28	0.14	----	2.35	"	"
1.19	15.00	24.00	0.770	5.1	15	24	0.15	----	1.99	"	"
1.29	14.90	23.84	0.790	5.3	15	24	0.16	----	1.98	"	"
1.38	14.90	23.84	0.780	5.2	15	24	0.17	----	1.98	"	"
1.48	15.10	24.16	0.800	5.3	15	24	0.18	----	2.00	"	"
1.57	16.00	25.60	0.830	5.2	16	26	0.19	----	2.12	"	"
1.67	17.60	28.16	0.900	5.1	18	28	0.21	----	2.33	"	"
1.76	19.00	30.40	1.000	5.3	19	30	0.22	----	2.52	"	130-140
1.86	20.20	32.32	1.110	5.5	20	32	0.23	----	2.68	"	"
1.95	22.10	35.36	1.200	5.4	22	35	0.24	----	2.93	"	"
2.20	19.40	31.04	1.220	6.3	19	31	0.28	----	2.57	"	"
2.29	17.90	28.64	1.170	6.5	18	29	0.29	----	2.37	"	"
2.39	16.80	26.88	1.050	6.3	17	27	0.30	----	2.22	"	"
2.48	15.80	25.28	1.010	6.4	16	25	0.32	----	2.09	"	120-130
2.58	15.50	24.80	0.950	6.1	16	25	0.33	----	2.04	"	"
2.67	14.00	22.40	0.900	6.4	14	22	0.34	----	1.84	"	"
2.77	14.30	22.88	0.890	6.2	14	23	0.35	----	1.88	"	"
2.86	14.00	22.40	0.870	6.2	14	22	0.36	----	1.84	"	"
2.96	15.00	24.00	0.830	5.5	15	24	0.38	----	1.97	"	"
3.06	14.10	22.56	0.810	5.7	14	23	0.39	----	1.85	"	"
3.15	13.60	21.76	0.760	5.6	14	22	0.40	----	1.79	"	"
3.25	12.40	19.84	0.730	5.9	12	20	0.41	----	1.63	"	"
3.34	11.70	18.72	0.650	5.6	12	19	0.42	----	1.91	"	"
3.44	10.40	16.64	0.590	5.7	10	17	0.44	----	1.70	"	"
3.54	11.70	18.72	0.550	4.7	12	19	0.45	----	1.91	"	"
3.63	11.20	17.92	0.530	4.7	11	18	0.46	----	1.83	"	"
3.73	10.40	16.64	0.500	4.8	10	17	0.47	----	1.69	"	"
3.83	9.90	15.84	0.480	4.8	10	16	0.48	----	1.61	"	110-120
3.92	9.50	15.20	0.450	4.7	10	15	0.49	----	1.54	"	"
4.02	8.80	14.08	0.420	4.8	9	14	0.50	----	1.71	"	"
4.12	8.20	13.12	0.390	4.8	8	13	0.52	----	1.59	"	"
4.21	8.60	13.76	0.370	4.3	9	14	0.53	----	1.67	"	"
4.31	8.20	13.12	0.360	4.4	8	13	0.54	----	1.59	"	"
4.40	7.70	12.32	0.370	4.8	8	12	0.54	----	1.49	"	"
4.50	7.60	12.16	0.360	4.7	8	12	0.55	----	1.46	"	"
4.59	6.30	10.08	0.340	5.4	6	10	0.55	----	1.20	"	100-110
4.69	5.90	9.44	0.360	6.1	6	9	0.56	----	1.12	"	"
4.79	6.50	10.40	0.350	5.4	7	10	0.56	----	1.24	"	110-120
4.88	7.70	12.32	0.380	4.9	8	12	0.57	----	1.48	"	"
4.98	10.80	17.28	0.450	4.2	11	17	0.57	----	1.75	"	"
5.08	12.80	20.48	0.490	3.8	13	20	0.58	----	1.66	"	120-130

5.18	13.10	20.96	0.600	4.6	13	21	0.58	----	1.70	"	"
5.27	14.70	23.52	0.680	4.6	15	24	0.59	----	1.92	"	"
5.33	18.30	29.28	0.680	3.7	12	20	0.59	----	2.40	Silty CLAY to CLAY	"
5.43	17.20	27.52	0.610	3.5	11	18	0.60	----	2.25	"	"
5.52	14.50	23.20	0.510	3.5	10	15	0.61	----	1.89	"	"
5.62	12.20	19.52	0.440	3.6	8	13	0.61	----	1.58	"	"
5.72	12.20	19.52	0.510	4.2	12	20	0.62	----	1.58	CLAY	"
5.81	16.10	25.76	0.650	4.0	11	17	0.62	----	2.10	Silty CLAY to CLAY	"
5.91	22.90	36.64	0.700	3.1	11	18	0.63	----	3.00	Clayey SILT to Silty CLAY	"
6.01	24.60	39.36	0.720	2.9	12	20	0.64	----	3.23	"	"
6.11	25.20	40.32	0.730	2.9	13	20	0.64	----	3.31	"	130-140
6.20	20.30	32.48	0.540	2.7	10	16	0.65	----	2.66	"	120-130
6.30	13.80	22.08	0.370	2.7	7	11	0.65	----	1.79	"	110-120
6.40	10.20	16.32	0.290	2.8	7	11	0.66	----	1.63	Silty CLAY to CLAY	"
6.49	8.80	14.08	0.300	3.4	9	14	0.66	----	1.68	CLAY	"
6.59	9.50	15.20	0.390	4.1	10	15	0.67	----	1.52	"	"
6.69	10.40	16.64	0.390	3.8	10	17	0.67	----	1.66	"	"
6.78	10.70	17.12	0.390	3.6	11	17	0.68	----	1.71	"	"
6.88	9.40	15.04	0.360	3.8	9	15	0.68	----	1.50	"	"
6.98	8.10	12.96	0.290	3.6	8	13	0.69	----	1.53	"	"
7.07	7.60	12.16	0.320	4.2	8	12	0.69	----	1.43	"	"
7.17	8.60	13.76	0.350	4.1	9	14	0.70	----	1.63	"	"
7.27	8.20	13.12	0.390	4.8	8	13	0.70	----	1.55	"	"
7.36	9.00	14.40	0.410	4.6	9	14	0.71	----	1.42	"	"
7.46	9.00	14.40	0.490	5.4	9	14	0.72	----	1.42	"	"
7.55	10.80	17.28	0.530	4.9	11	17	0.72	----	1.72	"	120-130
7.65	11.00	17.60	0.600	5.5	11	18	0.73	----	1.76	"	"
7.75	12.00	19.20	0.710	5.9	12	19	0.73	----	1.54	"	"
7.84	13.10	20.96	0.750	5.7	13	21	0.74	----	1.68	"	"
7.94	13.80	22.08	0.810	5.9	14	22	0.75	----	1.78	"	"
8.03	15.50	24.80	0.880	5.7	16	25	0.75	----	2.00	"	"
8.13	15.90	25.44	0.900	5.7	16	25	0.76	----	2.05	"	"
8.23	17.50	28.00	1.040	5.9	18	28	0.76	----	2.27	"	130-140
8.32	18.20	29.12	1.220	6.7	18	29	0.77	----	2.36	"	"
8.42	17.90	28.64	1.220	6.8	18	29	0.78	----	2.32	"	"
8.51	17.60	28.16	1.200	6.8	18	28	0.78	----	2.28	"	"
8.61	18.00	28.80	1.130	6.3	18	29	0.79	----	2.33	"	"
8.71	17.90	28.64	1.100	6.1	18	29	0.80	----	2.32	"	"
8.81	16.80	26.78	1.050	6.3	17	27	0.81	----	2.17	"	"
8.90	16.50	26.19	1.000	6.1	17	26	0.81	----	2.13	"	"
9.00	15.90	25.14	0.950	6.0	16	25	0.82	----	2.05	"	120-130
9.09	15.30	24.10	0.900	5.9	15	24	0.82	----	1.97	"	"
9.19	14.80	23.22	0.830	5.6	15	23	0.83	----	1.90	"	"
9.28	12.20	19.07	0.830	6.8	12	19	0.84	----	1.55	"	"
9.38	12.60	19.62	0.800	6.3	13	20	0.84	----	1.60	"	"
9.48	13.90	21.56	0.730	5.3	14	22	0.85	----	1.78	"	"
9.57	12.40	19.16	0.670	5.4	12	19	0.85	----	1.57	"	"
9.67	11.20	17.24	0.630	5.6	11	17	0.86	----	1.77	"	"
9.76	11.90	18.24	0.570	4.8	12	18	0.87	----	1.88	"	"
9.86	12.40	18.94	0.580	4.7	12	19	0.87	----	1.57	"	"
9.95	11.70	17.80	0.590	5.0	12	18	0.88	----	1.85	"	"
10.05	11.60	17.57	0.570	4.9	12	18	0.89	----	1.83	"	"
10.15	11.50	17.35	0.540	4.7	12	17	0.89	----	1.81	"	"
10.24	11.00	16.53	0.500	4.5	11	17	0.90	----	1.73	"	"
10.34	10.80	16.18	0.450	4.2	11	16	0.90	----	1.69	"	110-120

10.43	9.90	14.78	0.390	3.9	10	15	0.91	----	1.54	"	"
10.53	11.50	17.11	0.340	3.0	8	11	0.91	----	1.81	Silty CLAY to CLAY	"
10.62	10.00	14.83	0.330	3.3	7	10	0.92	----	1.56	"	"
10.72	9.40	13.89	0.350	3.7	9	14	0.92	----	1.46	CLAY	"
10.81	8.80	12.96	0.340	3.9	9	13	0.93	----	1.63	"	"
10.91	8.10	11.89	0.330	4.1	8	12	0.93	----	1.49	"	"
11.00	7.40	10.83	0.320	4.3	7	11	0.94	----	1.34	"	"
11.10	6.30	9.19	0.270	4.3	6	9	0.94	----	1.12	"	100-110
11.20	5.40	7.86	0.250	4.6	5	8	0.95	----	0.94	"	"
11.29	4.90	7.11	0.250	5.1	5	7	0.95	----	0.84	"	"
11.39	5.60	8.10	0.270	4.8	6	8	0.95	----	0.98	"	"
11.49	5.20	7.50	0.280	5.4	5	8	0.96	----	0.90	"	"
11.58	5.00	7.19	0.360	7.2	5	7	0.96	----	0.86	"	"
11.68	5.00	7.17	0.340	6.8	5	7	0.97	----	0.86	"	"
11.77	5.50	7.87	0.320	5.8	6	8	0.97	----	0.96	"	"
11.81	7.10	10.14	0.310	4.4	7	10	0.97	----	1.28	"	110-120
11.90	6.70	9.54	0.310	4.6	7	10	0.98	----	1.20	"	100-110
12.00	7.90	11.22	0.280	3.5	8	11	0.98	----	1.43	"	"
12.10	7.30	10.34	0.250	3.4	7	10	0.98	----	1.31	"	"
12.19	7.20	10.17	0.240	3.3	7	10	0.99	----	1.29	"	"
12.29	6.70	9.43	0.230	3.4	7	9	0.99	----	1.19	"	"
12.38	5.50	7.72	0.220	4.0	6	8	1.00	----	0.95	"	"
12.48	6.10	8.54	0.250	4.1	6	9	1.00	----	1.07	"	"
12.58	6.10	8.53	0.250	4.1	6	9	1.00	----	1.07	"	"
12.67	7.10	9.91	0.230	3.2	7	10	1.01	----	1.27	"	"
12.77	6.90	9.61	0.230	3.3	7	10	1.01	----	1.23	"	"
12.87	4.90	6.82	0.210	4.3	5	7	1.02	----	0.82	"	"
12.96	4.20	5.84	0.170	4.0	4	6	1.02	----	0.68	"	90-100
13.06	5.50	7.63	0.140	2.5	6	8	1.02	----	0.94	"	"
13.15	5.80	8.04	0.160	2.8	6	8	1.03	----	1.00	"	"
13.25	6.30	8.72	0.280	4.4	6	9	1.03	----	1.10	"	100-110
13.35	8.80	12.16	0.530	6.0	9	12	1.04	----	1.60	"	110-120
13.44	17.40	23.99	0.760	4.4	17	24	1.04	----	2.21	"	120-130
13.54	25.40	34.93	1.000	3.9	17	23	1.05	----	3.28	Silty CLAY to CLAY	130-140
13.63	28.90	39.63	1.120	3.9	19	26	1.05	----	3.74	"	"
13.73	30.40	41.58	1.290	4.2	20	28	1.06	----	3.94	"	"
13.82	32.10	43.79	1.500	4.7	21	29	1.07	----	4.17	"	"
13.92	34.60	47.08	1.540	4.5	23	31	1.08	----	4.50	"	"
14.01	34.00	46.14	1.420	4.2	23	31	1.08	----	4.42	"	"
14.10	33.70	45.62	1.300	3.9	17	23	1.09	----	4.38	Clayey SILT to Silty CLAY	"
14.20	41.40	55.89	1.130	2.7	17	22	1.10	----	5.41	Sandy SILT to Clayey SILT	"
14.29	47.30	63.69	0.880	1.9	16	21	1.10	35	----	Silty SAND to Sandy SILT	"
14.39	48.50	65.16	0.710	1.5	16	22	1.11	36	----	"	120-130
14.48	47.80	64.07	0.650	1.4	16	21	1.11	35	----	"	"
14.57	43.20	57.75	0.740	1.7	14	19	1.12	35	----	"	130-140
14.67	36.30	48.40	0.860	2.4	15	19	1.13	----	4.72	Sandy SILT to Clayey SILT	"
14.76	27.70	36.83	0.820	3.0	14	18	1.14	----	3.57	Clayey SILT to Silty CLAY	"
14.86	20.50	27.19	0.800	3.9	14	18	1.14	----	2.61	Silty CLAY to CLAY	120-130
14.95	14.50	19.19	0.730	5.0	15	19	1.15	----	1.81	CLAY	"
15.03	10.90	14.40	0.620	5.7	11	14	1.15	----	1.66	"	"
15.07	16.60	21.90	0.690	4.2	17	22	1.15	----	2.09	"	"
15.17	22.30	29.35	0.910	4.1	15	20	1.16	----	2.85	Silty CLAY to CLAY	130-140
15.26	57.80	75.86	0.920	1.6	19	25	1.17	36	----	Silty SAND to Sandy SILT	"
15.33	92.00	120.53	1.040	1.1	23	30	1.17	39	----	SAND to Silty SAND	120-130
15.43	91.40	119.47	1.050	1.1	23	30	1.18	39	----	"	"

15.52	79.00	103.02	1.060	1.3	26	34	1.18	38	----	Silty SAND to Sandy SILT	"
15.61	60.70	78.94	1.430	2.4	24	32	1.19	----	7.97	Sandy SILT to Clayey SILT	130-140
15.71	42.80	55.51	1.330	3.1	17	22	1.20	----	5.58	"	"
15.80	34.70	44.88	1.060	3.1	17	22	1.21	----	4.50	Clayey SILT to Silty CLAY	"
15.90	29.00	37.40	0.920	3.2	15	19	1.21	----	3.74	"	"
15.99	22.10	28.44	0.670	3.0	11	14	1.22	----	2.82	"	120-130
16.09	14.70	18.88	0.320	2.2	7	9	1.22	----	1.83	"	110-120
16.18	11.20	14.36	0.240	2.1	6	7	1.23	----	1.70	"	100-110
16.27	8.80	11.26	0.260	3.0	6	8	1.23	----	1.56	Silty CLAY to CLAY	"
16.37	8.50	10.86	0.280	3.3	9	11	1.24	----	1.50	CLAY	110-120
16.46	9.80	12.49	0.260	2.7	7	8	1.24	----	1.47	Silty CLAY to CLAY	"
16.56	8.80	11.20	0.270	3.1	6	7	1.24	----	1.56	"	100-110
16.65	8.70	11.05	0.290	3.3	9	11	1.25	----	1.54	CLAY	110-120
16.74	9.50	12.04	0.270	2.8	6	8	1.25	----	1.41	Silty CLAY to CLAY	"
16.84	10.60	13.41	0.310	2.9	7	9	1.26	----	1.60	"	"
16.93	10.20	12.88	0.380	3.7	10	13	1.26	----	1.53	CLAY	"
17.03	11.70	14.74	0.490	4.2	12	15	1.27	----	1.78	"	120-130
17.12	14.10	17.73	0.570	4.0	14	18	1.28	----	1.74	"	"
17.21	15.90	19.95	0.650	4.1	16	20	1.28	----	1.98	"	"
17.31	13.60	17.02	0.820	6.0	14	17	1.29	----	1.67	"	"
17.40	11.80	14.74	0.750	6.4	12	15	1.29	----	1.79	"	"
17.49	12.40	15.45	0.680	5.5	12	15	1.30	----	1.51	"	"
17.59	13.10	16.29	0.660	5.0	13	16	1.31	----	1.60	"	"
17.68	13.30	16.50	0.620	4.7	13	16	1.31	----	1.63	"	"
17.78	12.20	15.10	0.700	5.7	12	15	1.32	----	1.48	"	"
17.87	14.40	17.78	0.780	5.4	14	18	1.32	----	1.78	"	"
17.97	17.50	21.56	0.780	4.5	18	22	1.33	----	2.19	"	"
18.06	22.20	27.29	0.580	2.6	11	14	1.34	----	2.81	Clayey SILT to Silty CLAY	"
18.16	25.40	31.15	0.570	2.2	10	12	1.34	----	3.24	Sandy SILT to Clayey SILT	"
18.25	27.20	33.28	0.660	2.4	11	13	1.35	----	3.48	"	"
18.37	29.70	36.21	0.780	2.6	12	14	1.36	----	3.81	"	130-140
18.47	31.50	38.31	0.710	2.3	13	15	1.36	----	4.05	"	120-130
18.56	33.90	41.14	0.620	1.8	14	16	1.37	----	4.37	"	"
18.65	35.90	43.46	0.590	1.6	14	17	1.37	----	4.64	"	"
18.75	35.20	42.52	0.590	1.7	14	17	1.38	----	4.54	"	"
18.84	29.90	36.03	0.710	2.4	12	14	1.39	----	3.83	"	"
18.94	23.30	28.01	0.740	3.2	12	14	1.39	----	2.95	Clayey SILT to Silty CLAY	"
19.03	20.80	24.94	0.930	4.5	21	25	1.40	----	2.62	CLAY	130-140
19.13	23.60	28.22	0.840	3.6	12	14	1.41	----	2.99	Clayey SILT to Silty CLAY	"
19.22	34.20	40.79	0.700	2.0	14	16	1.41	----	4.40	Sandy SILT to Clayey SILT	120-130
19.31	42.60	50.69	0.570	1.3	14	17	1.42	34	----	Silty SAND to Sandy SILT	"
19.41	43.10	51.19	0.390	0.9	14	17	1.42	34	----	"	110-120
19.50	39.40	46.70	0.420	1.1	13	16	1.43	34	----	"	"
19.59	35.80	42.33	0.600	1.7	14	17	1.43	----	4.61	Sandy SILT to Clayey SILT	120-130
19.69	34.40	40.56	0.740	2.2	14	16	1.44	----	4.43	"	130-140
19.78	35.70	41.98	0.770	2.2	14	17	1.45	----	4.60	"	"
19.88	39.00	45.75	0.660	1.7	13	15	1.45	33	----	Silty SAND to Sandy SILT	120-130
19.97	41.50	48.56	0.580	1.4	14	16	1.46	34	----	"	"
20.06	40.70	47.52	0.480	1.2	14	16	1.46	34	----	"	"
20.16	34.80	40.53	0.630	1.8	14	16	1.47	----	4.48	Sandy SILT to Clayey SILT	"
20.25	30.50	35.42	1.100	3.6	15	18	1.48	----	3.90	Clayey SILT to Silty CLAY	130-140
20.34	38.20	44.24	1.250	3.3	19	22	1.48	----	4.93	"	"
20.43	57.20	66.06	1.370	2.4	23	26	1.49	----	7.46	Sandy SILT to Clayey SILT	"
20.53	27.70	31.90	1.950	7.0	28	32	1.50	----	3.53	CLAY	"
20.62	57.60	66.18	2.410	4.2	29	33	1.50	----	7.51	Clayey SILT to Silty CLAY	"

20.71	130.10	149.18	2.310	1.8	43	50	1.51	40	----	Silty SAND to Sandy SILT	"
20.81	185.50	212.17	2.470	1.3	37	42	1.52	42	----	SAND	"
20.90	208.40	237.89	2.500	1.2	42	48	1.52	43	----	"	"
20.99	225.30	256.74	2.330	1.0	45	51	1.53	43	----	"	120-130
21.08	229.20	260.73	2.550	1.1	46	52	1.53	44	----	"	"
21.17	193.00	219.09	2.590	1.3	39	44	1.54	43	----	"	130-140
21.26	177.30	200.85	2.490	1.4	35	40	1.55	42	----	"	"
21.35	141.10	159.50	2.380	1.7	35	40	1.55	41	----	SAND to Silty SAND	"
21.44	81.70	92.16	2.040	2.5	33	37	1.56	----	10.72	Sandy SILT to Clayey SILT	"
21.69	16.70	18.75	0.980	5.9	17	19	1.58	----	2.05	CLAY	120-130
21.78	11.20	12.55	0.850	7.6	11	13	1.58	----	1.64	"	"
21.87	10.40	11.63	0.460	4.4	10	12	1.59	----	1.51	"	110-120
21.96	9.90	11.06	0.370	3.7	10	11	1.59	----	1.43	"	"
22.05	11.30	12.60	0.350	3.1	8	8	1.60	----	1.66	Silty CLAY to CLAY	"
22.14	11.10	12.36	0.350	3.2	7	8	1.60	----	1.62	"	"
22.24	10.90	12.12	0.370	3.4	7	8	1.61	----	1.59	"	"
22.33	11.00	12.21	0.400	3.6	11	12	1.61	----	1.61	CLAY	"
22.42	12.00	13.30	0.420	3.5	8	9	1.62	----	1.42	Silty CLAY to CLAY	"
22.51	11.90	13.16	0.440	3.7	8	9	1.62	----	1.75	"	120-130
22.60	10.70	11.82	0.440	4.1	11	12	1.63	----	1.55	CLAY	110-120
22.70	11.20	12.35	0.470	4.2	11	12	1.63	----	1.64	"	120-130
22.79	12.60	13.86	0.490	3.9	13	14	1.64	----	1.49	"	"
22.88	15.30	16.80	0.480	3.1	8	8	1.64	----	1.85	Clayey SILT to Silty CLAY	"
22.98	16.30	17.87	0.470	2.9	8	9	1.65	----	1.99	"	"
23.07	15.30	16.74	0.500	3.3	10	11	1.66	----	1.85	Silty CLAY to CLAY	"
23.16	14.90	16.27	0.530	3.6	10	11	1.66	----	1.80	"	"
23.25	17.10	18.64	0.550	3.2	9	9	1.67	----	2.09	Clayey SILT to Silty CLAY	"
23.35	19.70	21.43	0.590	3.0	10	11	1.67	----	2.44	"	"
23.44	22.20	24.10	0.670	3.0	11	12	1.68	----	2.77	"	"
23.53	24.20	26.21	0.740	3.1	12	13	1.69	----	3.03	"	130-140
23.63	24.50	26.48	0.800	3.3	12	13	1.69	----	3.07	"	"
23.72	20.40	22.00	0.760	3.7	14	15	1.70	----	2.53	Silty CLAY to CLAY	120-130
23.82	15.50	16.69	0.610	3.9	10	11	1.70	----	1.87	"	"
23.91	13.80	14.83	0.450	3.3	9	10	1.71	----	1.64	"	"
24.00	12.00	12.87	0.380	3.2	8	9	1.71	----	1.40	"	110-120
24.10	11.50	12.31	0.330	2.9	8	8	1.72	----	1.67	"	"
24.19	11.10	11.87	0.340	3.1	7	8	1.72	----	1.60	"	"
24.29	10.60	11.31	0.330	3.1	7	8	1.73	----	1.52	"	"
24.38	10.40	11.08	0.320	3.1	7	7	1.73	----	1.48	"	"
24.48	9.20	9.79	0.340	3.7	9	10	1.74	----	1.28	CLAY	"
24.57	9.60	10.19	0.480	5.0	10	10	1.75	----	1.35	"	"
24.67	8.90	9.43	0.500	5.6	9	9	1.75	----	1.48	"	"
24.76	9.80	10.37	0.510	5.2	10	10	1.76	----	1.38	"	120-130
24.87	10.60	11.20	0.510	4.8	11	11	1.76	----	1.51	"	"
24.97	10.90	11.50	0.500	4.6	11	12	1.77	----	1.56	"	"
25.06	11.10	11.70	0.480	4.3	11	12	1.77	----	1.59	"	"
25.15	11.00	11.58	0.480	4.4	11	12	1.78	----	1.58	"	"
25.25	12.30	12.93	0.510	4.1	12	13	1.79	----	1.43	"	"
25.34	12.20	12.81	0.520	4.3	12	13	1.79	----	1.42	"	"
25.43	12.60	13.21	0.530	4.2	13	13	1.80	----	1.47	"	"
25.53	13.00	13.61	0.570	4.4	13	14	1.80	----	1.52	"	"
25.62	12.50	13.07	0.600	4.8	13	13	1.81	----	1.46	"	"
25.72	12.20	12.74	0.610	5.0	12	13	1.82	----	1.42	"	"
25.81	13.90	14.50	0.610	4.4	14	14	1.82	----	1.64	"	"
25.90	15.20	15.83	0.620	4.1	15	16	1.83	----	1.81	"	"

26.00	14.90	15.50	0.640	4.3	15	15	1.83	----	1.77	"	"
26.09	15.50	16.10	0.660	4.3	16	16	1.84	----	1.85	"	"
26.19	16.50	17.11	0.710	4.3	17	17	1.85	----	1.99	"	"
26.28	16.70	17.30	0.780	4.7	17	17	1.85	----	2.01	"	"
26.38	17.70	18.31	0.800	4.5	18	18	1.86	----	2.14	"	"
26.47	18.50	19.11	0.820	4.4	19	19	1.86	----	2.25	"	"
26.57	20.90	21.56	0.820	3.9	14	14	1.87	----	2.57	Silty CLAY to CLAY	"
26.66	22.10	22.76	0.830	3.8	15	15	1.88	----	2.73	"	130-140
26.75	21.20	21.80	0.880	4.2	14	15	1.88	----	2.61	"	"
26.85	20.90	21.46	0.880	4.2	14	14	1.89	----	2.57	"	"
26.94	19.10	19.58	0.850	4.5	19	20	1.90	----	2.33	CLAY	120-130
27.03	18.00	18.43	0.800	4.4	18	18	1.90	----	2.18	"	"
27.13	15.40	15.74	0.760	4.9	15	16	1.91	----	1.83	"	"
27.22	13.80	14.09	0.670	4.9	14	14	1.91	----	1.62	"	"
27.32	11.50	11.72	0.580	5.0	12	12	1.92	----	1.64	"	"
27.41	9.60	9.77	0.520	5.4	10	10	1.92	----	1.32	"	"
27.51	8.00	8.14	0.470	5.9	8	8	1.93	----	1.26	"	110-120
27.60	7.10	7.21	0.390	5.5	7	7	1.93	----	1.08	"	"
27.70	7.00	7.10	0.380	5.4	7	7	1.94	----	1.06	"	"
27.79	6.80	6.89	0.370	5.4	7	7	1.94	----	1.02	"	"
27.89	7.20	7.29	0.420	5.8	7	7	1.95	----	1.10	"	"
27.98	8.80	8.90	0.460	5.2	9	9	1.95	----	1.42	"	"
28.08	12.30	12.42	0.510	4.1	12	12	1.96	----	1.41	"	120-130
28.18	11.30	11.39	0.540	4.8	11	11	1.97	----	1.60	"	"
28.27	10.80	10.87	0.560	5.2	11	11	1.97	----	1.51	"	"
28.36	11.60	11.66	0.630	5.4	12	12	1.98	----	1.64	"	"
28.46	15.30	15.36	0.650	4.2	15	15	1.98	----	1.81	"	"
28.53	15.90	15.94	0.620	3.9	11	11	1.99	----	1.89	Silty CLAY to CLAY	"
28.62	13.90	13.92	0.620	4.5	14	14	1.99	----	1.62	CLAY	"
28.72	14.20	14.20	0.680	4.8	14	14	2.00	----	1.66	"	"
28.81	16.10	16.10	0.630	3.9	11	11	2.01	----	1.91	Silty CLAY to CLAY	"
28.91	16.60	16.60	0.620	3.7	11	11	2.01	----	1.98	"	"
29.00	17.20	17.19	0.650	3.8	11	11	2.02	----	2.06	"	"
29.10	18.50	18.49	0.670	3.6	12	12	2.02	----	2.23	"	"
29.19	20.00	19.99	0.640	3.2	10	10	2.03	----	2.43	Clayey SILT to Silty CLAY	"
29.28	20.40	20.39	0.660	3.2	10	10	2.04	----	2.48	"	"
29.38	20.50	20.48	0.670	3.3	10	10	2.04	----	2.49	"	"
29.47	18.40	18.38	0.660	3.6	12	12	2.05	----	2.21	Silty CLAY to CLAY	"
29.57	15.90	15.88	0.670	4.2	16	16	2.05	----	1.88	CLAY	"
29.66	14.20	14.18	0.670	4.7	14	14	2.06	----	1.65	"	"
29.76	15.00	14.98	0.680	4.5	15	15	2.07	----	1.76	"	"
29.85	16.70	16.68	0.680	4.1	11	11	2.07	----	1.98	Silty CLAY to CLAY	"
29.94	15.50	15.48	0.710	4.6	16	15	2.08	----	1.82	CLAY	"
30.04	14.10	14.08	0.690	4.9	14	14	2.08	----	1.63	"	"
30.13	12.00	11.98	0.630	5.3	12	12	2.09	----	1.35	"	"
30.22	12.00	11.98	0.570	4.8	12	12	2.09	----	1.35	"	"
30.32	11.80	11.78	0.510	4.3	12	12	2.10	----	1.66	"	"
30.41	11.30	11.28	0.500	4.4	11	11	2.11	----	1.57	"	"
30.50	10.70	10.68	0.510	4.8	11	11	2.11	----	1.47	"	"
30.59	12.40	12.37	0.550	4.4	12	12	2.12	----	1.40	"	"
30.69	13.20	13.17	0.630	4.8	13	13	2.12	----	1.51	"	"
30.78	13.80	13.76	0.750	5.4	14	14	2.13	----	1.59	"	"
30.87	14.40	14.36	0.860	6.0	14	14	2.14	----	1.67	"	"
30.97	14.30	14.26	0.940	6.6	14	14	2.14	----	1.65	"	"
31.06	12.20	12.16	1.150	9.4	12	12	2.15	----	1.37	"	"

31.15	11.70	11.66	1.040	8.9	12	12	2.15	----	1.63	"	"
31.25	11.90	11.86	0.950	8.0	12	12	2.16	----	1.66	"	"
31.31	14.60	14.55	0.910	6.2	15	15	2.16	----	1.69	"	"
31.40	14.20	14.15	0.900	6.3	14	14	2.17	----	1.64	"	"
31.50	14.60	14.55	0.870	6.0	15	15	2.17	----	1.69	"	"
31.59	12.90	12.85	0.830	6.4	13	13	2.18	----	1.46	"	"
31.68	13.30	13.25	0.790	5.9	13	13	2.19	----	1.51	"	"
31.77	14.00	13.95	0.730	5.2	14	14	2.19	----	1.61	"	"
31.86	15.80	15.74	0.700	4.4	16	16	2.20	----	1.85	"	"
31.96	13.00	12.95	0.660	5.1	13	13	2.20	----	1.47	"	"
32.05	11.20	11.15	0.560	5.0	11	11	2.21	----	1.54	"	"
32.14	9.40	9.36	0.450	4.8	9	9	2.21	----	1.24	"	110-120
32.24	9.50	9.46	0.410	4.3	10	9	2.22	----	1.25	"	"
32.33	10.00	9.96	0.440	4.4	10	10	2.22	----	1.34	"	"
32.42	10.60	10.55	0.500	4.7	11	11	2.23	----	1.43	"	120-130
32.51	12.90	12.84	0.580	4.5	13	13	2.24	----	1.45	"	"
32.61	13.80	13.73	0.630	4.6	14	14	2.24	----	1.57	"	"
32.70	14.60	14.53	0.690	4.7	15	15	2.25	----	1.68	"	"
32.79	15.80	15.72	0.720	4.6	16	16	2.25	----	1.84	"	"
32.89	15.40	15.32	0.720	4.7	15	15	2.26	----	1.78	"	"
32.98	15.50	15.42	0.740	4.8	16	15	2.26	----	1.80	"	"
33.07	16.60	16.51	0.760	4.6	17	17	2.27	----	1.94	"	"
33.16	17.20	17.11	0.740	4.3	17	17	2.28	----	2.02	"	"
33.25	16.90	16.80	0.760	4.5	17	17	2.28	----	1.98	"	"
33.35	16.70	16.60	0.760	4.6	17	17	2.29	----	1.95	"	"
33.44	16.00	15.91	0.750	4.7	16	16	2.29	----	1.86	"	"
33.53	15.60	15.51	0.720	4.6	16	16	2.30	----	1.81	"	"
33.62	14.30	14.21	0.700	4.9	14	14	2.31	----	1.63	"	"
33.72	12.90	12.82	0.750	5.8	13	13	2.31	----	1.44	"	"
33.81	13.60	13.51	0.960	7.1	14	14	2.32	----	1.54	"	"
33.90	20.80	20.67	1.130	5.4	21	21	2.32	----	2.50	"	130-140
33.99	27.90	27.72	1.160	4.2	19	18	2.33	----	3.44	Silty CLAY to CLAY	"
34.09	28.50	28.31	1.080	3.8	14	14	2.34	----	3.52	Clayey SILT to Silty CLAY	"
34.18	22.20	22.05	1.040	4.7	22	22	2.34	----	2.68	CLAY	"
34.27	16.70	16.58	1.360	8.1	17	17	2.35	----	1.95	"	"
34.37	16.10	15.99	1.480	9.2	16	16	2.36	----	1.86	"	"
34.46	21.00	20.85	1.540	7.3	21	21	2.36	----	2.52	"	"
34.56	38.20	37.92	1.470	3.8	19	19	2.37	----	4.81	Clayey SILT to Silty CLAY	"
34.65	42.10	41.78	1.310	3.1	21	21	2.38	----	5.33	"	"
34.75	31.30	31.06	1.090	3.5	16	16	2.38	----	3.89	"	"
34.84	19.50	19.35	0.900	4.6	20	19	2.39	----	2.31	CLAY	"
34.93	13.20	13.10	0.740	5.6	13	13	2.40	----	1.47	"	120-130
35.02	11.50	11.41	0.570	5.0	12	11	2.40	----	1.56	"	"
35.12	10.40	10.32	0.470	4.5	10	10	2.41	----	1.37	"	110-120
35.21	10.50	10.41	0.430	4.1	11	10	2.41	----	1.39	"	"
35.30	9.20	9.12	0.420	4.6	9	9	2.42	----	1.17	"	"
35.39	7.10	7.04	0.420	5.9	7	7	2.42	----	0.98	"	"
35.49	7.50	7.44	0.460	6.1	8	7	2.43	----	1.06	"	"
35.58	9.40	9.32	0.460	4.9	9	9	2.43	----	1.20	"	"
35.67	9.70	9.62	0.470	4.8	10	10	2.44	----	1.25	"	"
35.76	10.40	10.31	0.500	4.8	10	10	2.44	----	1.37	"	120-130
35.85	11.20	11.10	0.530	4.7	11	11	2.45	----	1.50	"	"
35.94	12.00	11.89	0.550	4.6	12	12	2.45	----	1.30	"	"
36.04	12.20	12.09	0.560	4.6	12	12	2.46	----	1.33	"	"
36.13	12.20	12.09	0.570	4.7	12	12	2.47	----	1.33	"	"

36.22	13.50	13.37	0.570	4.2	14	13	2.47	----	1.50	"	"
36.31	14.30	14.16	0.570	4.0	14	14	2.48	----	1.61	"	"
36.40	14.80	14.66	0.580	3.9	10	10	2.48	----	1.67	Silty CLAY to CLAY	"
36.50	15.20	15.05	0.590	3.9	10	10	2.49	----	1.73	"	"
36.59	14.90	14.75	0.580	3.9	10	10	2.49	----	1.69	"	"
36.68	13.90	13.76	0.560	4.0	14	14	2.50	----	1.55	CLAY	"
36.77	13.20	13.04	0.550	4.2	13	13	2.51	----	1.46	"	"
36.86	12.50	12.33	0.510	4.1	13	12	2.51	----	1.36	"	"
36.95	10.60	10.43	0.480	4.5	11	10	2.52	----	1.39	"	"
37.05	10.40	10.22	0.450	4.3	10	10	2.52	----	1.35	"	110-120
37.14	10.60	10.40	0.430	4.1	11	10	2.53	----	1.39	"	"
37.23	10.80	10.58	0.410	3.8	11	11	2.53	----	1.42	"	"
37.32	10.40	10.17	0.400	3.8	10	10	2.54	----	1.35	"	"
37.42	10.80	10.54	0.400	3.7	11	11	2.54	----	1.42	"	"
37.51	10.70	10.43	0.420	3.9	11	10	2.55	----	1.40	"	"
37.60	11.50	11.19	0.500	4.3	12	11	2.55	----	1.53	"	120-130
37.70	11.80	11.45	0.510	4.3	12	11	2.56	----	1.58	"	"
37.79	11.90	11.53	0.520	4.4	12	12	2.56	----	1.60	"	"
37.86	12.80	12.38	0.510	4.0	13	12	2.57	----	1.40	"	"
37.96	12.10	11.68	0.480	4.0	12	12	2.57	----	1.30	"	"
38.05	11.20	10.79	0.460	4.1	11	11	2.58	----	1.48	"	"
38.14	11.50	11.06	0.450	3.9	12	11	2.59	----	1.53	"	"
38.24	11.50	11.04	0.460	4.0	12	11	2.59	----	1.52	"	"
38.33	12.20	11.68	0.470	3.9	12	12	2.60	----	1.31	"	"
38.42	12.50	11.95	0.500	4.0	13	12	2.60	----	1.35	"	"
38.51	12.70	12.11	0.530	4.2	13	12	2.61	----	1.38	"	"
38.61	13.60	12.95	0.580	4.3	14	13	2.62	----	1.50	"	"
38.70	15.20	14.44	0.620	4.1	15	14	2.62	----	1.71	"	"
38.80	15.20	14.41	0.680	4.5	15	14	2.63	----	1.71	"	"
38.89	16.30	15.42	0.740	4.5	16	15	2.63	----	1.85	"	"
38.98	18.20	17.19	0.780	4.3	18	17	2.64	----	2.11	"	"
39.07	18.20	17.15	0.800	4.4	18	17	2.64	----	2.11	"	"
39.17	18.30	17.21	0.790	4.3	18	17	2.65	----	2.12	"	"
39.26	17.30	16.24	0.790	4.6	17	16	2.66	----	1.98	"	"
39.35	18.20	17.05	0.770	4.2	12	11	2.66	----	2.10	Silty CLAY to CLAY	"
39.45	18.60	17.38	0.720	3.9	12	12	2.67	----	2.16	"	"
39.54	18.70	17.44	0.720	3.9	12	12	2.67	----	2.17	"	"
39.63	18.10	16.85	0.780	4.3	18	17	2.68	----	2.09	CLAY	"
39.72	18.30	16.99	0.960	5.2	18	17	2.69	----	2.11	"	130-140
39.82	19.50	18.06	1.250	6.4	20	18	2.69	----	2.27	"	"
39.91	23.00	21.26	1.630	7.1	23	21	2.70	----	2.74	"	"
40.00	33.00	30.43	1.850	5.6	33	30	2.71	----	4.07	"	"
40.09	40.30	37.07	2.040	5.1	40	37	2.71	----	5.04	"	"
40.18	43.80	40.20	2.200	5.0	44	40	2.72	----	5.51	"	"
40.27	40.70	37.26	2.240	5.5	41	37	2.73	----	5.10	"	"
40.36	35.70	32.61	2.350	6.6	36	33	2.73	----	4.43	"	"
40.45	36.60	33.35	2.350	6.4	37	33	2.74	----	4.55	"	"
40.50	38.20	34.76	2.210	5.8	38	35	2.74	----	4.76	"	"
40.61	46.50	42.19	1.880	4.0	23	21	2.75	----	5.87	Clayey SILT to Silty CLAY	"
40.70	50.90	46.07	1.680	3.3	25	23	2.76	----	6.45	"	"
40.79	36.60	33.05	1.320	3.6	18	17	2.76	----	4.54	"	"
40.89	26.10	23.51	0.950	3.6	13	12	2.77	----	3.14	"	"
40.97	18.40	16.54	0.770	4.2	12	11	2.78	----	2.12	Silty CLAY to CLAY	120-130
41.08	16.50	14.80	0.610	3.7	11	10	2.78	----	1.86	"	"
41.15	14.40	12.89	0.530	3.7	10	9	2.79	----	1.58	"	"

41.24	13.10	11.70	0.520	4.0	13	12	2.79	----	1.41	CLAY	"
41.33	12.90	11.50	0.550	4.3	13	12	2.80	----	1.38	"	"
41.42	13.60	12.10	0.580	4.3	14	12	2.80	----	1.47	"	"
41.51	14.00	12.43	0.610	4.4	14	12	2.81	----	1.52	"	"
41.60	14.40	12.76	0.640	4.4	14	13	2.82	----	1.58	"	"
41.69	14.90	13.17	0.670	4.5	15	13	2.82	----	1.64	"	"
41.78	16.80	14.82	0.730	4.3	17	15	2.83	----	1.90	"	"
41.87	18.50	16.29	0.780	4.2	12	11	2.83	----	2.12	Silty CLAY to CLAY	"
41.96	19.80	17.40	0.830	4.2	13	12	2.84	----	2.29	"	"
42.05	21.50	18.84	0.900	4.2	14	13	2.84	----	2.52	"	130-140
42.14	22.20	19.41	0.940	4.2	15	13	2.85	----	2.61	"	"
42.23	23.10	20.15	0.940	4.1	15	13	2.86	----	2.73	"	"
42.32	23.60	20.53	0.940	4.0	16	14	2.86	----	2.80	"	"
42.41	23.90	20.74	0.960	4.0	16	14	2.87	----	2.84	"	"
42.50	25.20	21.82	1.020	4.0	17	15	2.88	----	3.01	"	"
42.59	25.70	22.19	1.130	4.4	17	15	2.88	----	3.08	"	"
42.68	27.80	23.95	1.210	4.4	19	16	2.89	----	3.35	"	"
42.76	28.10	24.15	1.250	4.4	19	16	2.90	----	3.39	"	"
42.86	29.40	25.20	1.260	4.3	20	17	2.90	----	3.57	"	"
42.95	28.70	24.54	1.220	4.3	19	16	2.91	----	3.47	"	"
43.03	27.60	23.54	1.190	4.3	18	16	2.92	----	3.32	"	"
43.13	26.80	22.80	1.120	4.2	18	15	2.92	----	3.22	"	"
43.22	27.00	22.91	1.050	3.9	18	15	2.93	----	3.24	"	"
43.31	25.40	21.50	1.030	4.1	17	14	2.94	----	3.03	"	"
43.40	24.80	20.93	1.000	4.0	17	14	2.94	----	2.95	"	"
43.49	23.70	19.95	0.950	4.0	16	13	2.95	----	2.80	"	"
43.58	22.70	19.06	0.890	3.9	15	13	2.96	----	2.67	"	"
43.67	21.50	18.01	0.840	3.9	14	12	2.96	----	2.51	"	"
43.76	21.10	17.63	0.800	3.8	14	12	2.97	----	2.45	"	120-130
43.85	21.60	18.01	0.790	3.7	14	12	2.97	----	2.52	"	"
43.94	22.90	19.05	0.820	3.6	11	10	2.98	----	2.69	Clayey SILT to Silty CLAY	130-140
44.03	24.10	19.99	0.960	4.0	16	13	2.99	----	2.85	Silty CLAY to CLAY	"
44.12	26.50	21.93	1.340	5.1	27	22	2.99	----	3.17	CLAY	"
44.21	27.50	22.69	1.720	6.3	28	23	3.00	----	3.30	"	"
44.30	29.60	24.40	1.780	6.0	30	24	3.01	----	3.58	"	"
44.52	31.70	26.07	1.550	4.9	32	26	3.02	----	3.86	"	"
44.60	29.00	23.83	1.470	5.1	29	24	3.03	----	3.50	"	"
44.69	27.10	22.25	1.480	5.5	27	22	3.03	----	3.24	"	"
44.78	26.30	21.58	1.580	6.0	26	22	3.04	----	3.14	"	"
44.86	26.30	21.56	1.750	6.7	26	22	3.05	----	3.13	"	"
44.95	25.90	21.21	1.950	7.5	26	21	3.05	----	3.08	"	"
45.04	27.40	22.42	2.130	7.8	27	22	3.06	----	3.28	"	"
45.12	28.80	23.54	2.250	7.8	29	24	3.07	----	3.47	"	"
45.21	28.80	23.52	2.360	8.2	29	24	3.07	----	3.47	"	"
45.28	28.50	23.26	2.450	8.6	29	23	3.08	----	3.42	"	"
45.37	29.10	23.73	2.530	8.7	29	24	3.08	----	3.50	"	"
45.45	31.50	25.66	2.560	8.1	32	26	3.09	----	3.82	"	"
45.54	36.30	29.55	2.530	7.0	36	30	3.10	----	4.46	"	"
45.62	38.40	31.23	2.500	6.5	38	31	3.10	----	4.74	"	"
45.71	37.50	30.47	2.520	6.7	38	30	3.11	----	4.62	"	"
45.80	34.20	27.77	2.580	7.5	34	28	3.11	----	4.18	"	"
45.88	33.50	27.17	2.610	7.8	34	27	3.12	----	4.09	"	"
45.97	32.00	25.93	2.590	8.1	32	26	3.13	----	3.88	"	"
46.05	31.30	25.34	2.570	8.2	31	25	3.13	----	3.79	"	"
46.14	30.00	24.27	2.600	8.7	30	24	3.14	----	3.62	"	"

46.22	29.60	23.92	2.640	8.9	30	24	3.15	----	3.56	"	"
46.31	31.00	25.03	2.720	8.8	31	25	3.15	----	3.75	"	"
46.39	31.60	25.50	2.910	9.2	32	25	3.16	----	3.83	"	"
46.48	33.20	26.76	3.280	9.9	33	27	3.16	----	4.04	"	"
46.56	36.30	29.24	3.830	10.6	36	29	3.17	----	4.45	"	"
46.64	40.80	32.84	3.810	9.3	41	33	3.18	----	5.05	"	"
46.72	54.20	43.58	3.570	6.6	54	44	3.18	----	6.84	"	"
46.81	67.20	53.99	3.450	5.1	67	54	3.19	----	8.57	Very Stiff Fine Grained *	"
46.87	103.50	83.10	3.100	3.0	41	33	3.19	----	13.41	Sandy SILT to Clayey SILT	"
46.95	181.20	145.36	3.150	1.7	45	36	3.20	40	----	SAND to Silty SAND	"
47.03	222.50	178.34	3.080	1.4	45	36	3.20	41	----	SAND	"
47.11	255.30	204.47	2.990	1.2	51	41	3.21	42	----	"	"
47.19	252.80	202.32	2.890	1.1	51	40	3.21	42	----	"	120-130
47.27	203.80	162.96	2.560	1.3	41	33	3.22	41	----	"	130-140
47.35	184.30	147.24	2.250	1.2	37	29	3.23	40	----	"	"
47.44	143.10	114.23	2.140	1.5	36	29	3.23	39	----	SAND to Silty SAND	"
47.64	120.50	95.99	1.720	1.4	30	24	3.25	38	----	"	"
47.72	115.10	91.61	1.620	1.4	29	23	3.25	37	----	"	"
47.80	115.80	92.08	1.890	1.6	29	23	3.26	38	----	"	"
47.89	127.70	101.46	2.070	1.6	32	25	3.27	38	----	"	"
47.97	157.40	124.95	2.100	1.3	39	31	3.27	39	----	"	"
48.05	188.50	149.53	2.040	1.1	38	30	3.28	40	----	SAND	120-130
48.13	220.20	174.54	2.490	1.1	44	35	3.28	41	----	"	"
48.21	226.90	179.73	2.410	1.1	45	36	3.29	41	----	"	"
48.29	236.20	186.96	2.660	1.1	47	37	3.29	42	----	"	"
48.33	234.50	185.54	2.730	1.2	47	37	3.29	42	----	"	"
48.43	252.30	199.42	4.530	1.8	50	40	3.30	42	----	"	130-140
48.51	269.90	213.15	3.590	1.3	54	43	3.31	42	----	"	"
48.58	301.70	238.07	3.700	1.2	60	48	3.31	43	----	"	"
48.68	260.60	205.42	5.670	2.2	65	51	3.32	42	----	SAND to Silty SAND	"
48.72	265.10	208.89	5.290	2.0	53	42	3.32	42	----	SAND	"
48.82	282.70	222.52	4.540	1.6	57	45	3.33	43	----	"	"
48.86	287.50	226.21	4.180	1.5	58	45	3.33	43	----	"	"
48.95	252.70	198.62	3.760	1.5	51	40	3.34	42	----	"	"
48.99	256.90	201.84	3.690	1.4	51	40	3.34	42	----	"	"
49.09	241.90	189.85	3.540	1.5	48	38	3.35	42	----	"	"
49.17	222.90	174.80	2.680	1.2	45	35	3.35	41	----	"	"
49.24	231.20	181.18	2.540	1.1	46	36	3.36	41	----	"	120-130
49.32	244.00	191.08	2.530	1.0	49	38	3.36	42	----	"	"
49.39	248.90	194.78	2.790	1.1	50	39	3.37	42	----	"	"
49.47	259.90	203.23	3.220	1.2	52	41	3.37	42	----	"	130-140
49.56	246.20	192.32	3.420	1.4	49	38	3.38	42	----	"	"
49.64	231.80	180.92	3.410	1.5	46	36	3.39	41	----	"	"
49.72	240.60	187.64	3.110	1.3	48	38	3.39	42	----	"	"
49.79	252.10	196.48	2.850	1.1	50	39	3.40	42	----	"	120-130
49.86	263.90	205.51	3.400	1.3	53	41	3.40	42	----	"	130-140
49.94	275.10	214.09	2.960	1.1	55	43	3.41	42	----	"	120-130
50.01	288.20	224.13	3.000	1.0	58	45	3.41	43	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-17
LOCATION: Santa Rosa CA DATE : 06-02-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 12:46:11
Terminated at 50.0 feet Groundwater measured at 10.1 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.54	55.10	88.16	1.290	2.3	22	35	0.06	----	7.34	Sandy SILT to Clayey SILT	130-140
0.63	58.60	93.76	1.390	2.4	23	38	0.08	----	7.81	"	"
0.72	76.30	122.08	1.830	2.4	25	41	0.09	39	----	Silty SAND to Sandy SILT	"
0.82	87.20	139.52	2.650	3.0	35	56	0.10	----	11.62	Sandy SILT to Clayey SILT	"
0.91	92.30	147.68	3.370	3.7	37	59	0.11	----	12.30	"	"
1.00	97.70	156.32	3.660	3.7	49	78	0.13	----	13.02	Clayey SILT to Silty CLAY	"
1.10	52.20	83.52	3.410	6.5	52	84	0.14	----	6.95	CLAY	"
1.19	28.00	44.80	2.920	10.4	28	45	0.15	----	3.72	"	"
1.28	15.30	24.48	2.040	12.0	15	24	0.16	----	2.03	Organic Material	"
1.37	14.00	22.40	1.740	12.0	14	22	0.18	----	1.85	"	"
1.46	12.90	20.64	1.230	9.5	13	21	0.19	----	1.71	CLAY	"
1.56	11.50	18.40	1.140	9.9	12	18	0.20	----	1.90	"	120-130
1.65	10.90	17.44	1.050	9.6	11	17	0.21	----	1.80	"	"
1.74	9.00	14.40	0.940	10.4	9	14	0.22	----	1.48	Organic Material	"
1.83	9.00	14.40	0.780	8.7	9	14	0.23	----	1.48	CLAY	"
1.93	9.30	14.88	0.610	6.6	9	15	0.25	----	1.53	"	"
2.02	8.50	13.60	0.540	6.4	9	14	0.26	----	1.67	"	110-120
2.25	7.10	11.36	0.450	6.3	7	11	0.28	----	1.39	"	"
2.34	5.70	9.12	0.280	4.9	6	9	0.29	----	1.11	"	100-110
2.43	4.10	6.56	0.180	4.4	4	7	0.30	----	0.79	"	90-100
2.52	7.10	11.36	0.090	1.3	4	6	0.31	----	1.39	Clayey SILT to Silty CLAY	"
2.62	10.80	17.28	0.070	0.6	4	7	0.32	----	1.42	Sandy SILT to Clayey SILT	"
2.71	8.60	13.76	0.160	1.9	4	7	0.33	----	1.69	Clayey SILT to Silty CLAY	100-110
2.80	8.30	13.28	0.170	2.0	4	7	0.34	----	1.63	"	"
2.89	6.60	10.56	0.210	3.2	7	11	0.35	----	1.29	CLAY	"
2.98	2.60	4.16	0.200	7.7	3	4	0.36	----	0.48	Organic Material	90-100
3.08	2.90	4.64	0.200	6.9	3	5	0.36	----	0.54	"	"
3.17	3.10	4.96	0.180	5.8	3	5	0.37	----	0.58	CLAY	"
3.26	3.60	5.76	0.220	6.1	4	6	0.38	----	0.68	"	"
3.35	4.90	7.84	0.290	5.9	5	8	0.39	----	0.94	"	100-110
3.45	7.10	11.36	0.310	4.4	7	11	0.40	----	1.38	"	110-120
3.54	6.00	9.60	0.310	5.2	6	10	0.41	----	1.16	"	100-110
3.64	5.00	8.00	0.300	6.0	5	8	0.42	----	0.96	"	"
3.73	3.90	6.24	0.290	7.4	4	6	0.43	----	0.74	Organic Material	"
3.82	4.20	6.72	0.320	7.6	4	7	0.44	----	0.80	"	"
3.92	5.00	8.00	0.400	8.0	5	8	0.45	----	0.95	CLAY	"
4.01	10.30	16.48	0.470	4.6	10	16	0.46	----	1.68	"	110-120
4.10	10.70	17.12	0.530	5.0	11	17	0.47	----	1.74	"	120-130
4.20	8.90	14.24	0.580	6.5	9	14	0.49	----	1.73	"	"
4.29	8.50	13.60	0.580	6.8	9	14	0.50	----	1.65	"	"
4.38	9.30	14.88	0.460	4.9	9	15	0.51	----	1.51	"	110-120
4.48	7.50	12.00	0.370	4.9	8	12	0.52	----	1.45	"	"
4.57	6.00	9.60	0.340	5.7	6	10	0.53	----	1.15	"	100-110
4.66	5.40	8.64	0.350	6.5	5	9	0.54	----	1.03	"	"
4.76	7.30	11.68	0.380	5.2	7	12	0.55	----	1.41	"	110-120
4.85	9.60	15.36	0.440	4.6	10	15	0.56	----	1.55	"	"
4.94	8.30	13.28	0.460	5.5	8	13	0.57	----	1.60	"	"

5.04	7.10	11.36	0.470	6.6	7	11	0.58	----	1.36	"	"
5.13	6.40	10.24	0.560	8.8	6	10	0.59	----	1.22	"	"
5.23	8.60	13.76	0.660	7.7	9	14	0.60	----	1.66	"	120-130
5.32	11.80	18.88	0.800	6.8	12	19	0.62	----	1.92	"	"
5.50	18.30	29.28	0.940	5.1	18	29	0.64	----	2.40	"	130-140
5.60	16.90	27.04	0.970	5.7	17	27	0.65	----	2.21	"	120-130
5.69	15.20	24.32	0.960	6.3	15	24	0.66	----	1.98	"	"
5.78	16.50	26.40	0.940	5.7	17	26	0.68	----	2.15	"	"
5.88	17.30	27.68	1.060	6.1	17	28	0.69	----	2.26	"	130-140
5.97	18.50	29.60	1.070	5.8	19	30	0.70	----	2.42	"	"
6.06	17.50	28.00	1.150	6.6	18	28	0.71	----	2.29	"	"
6.15	15.50	24.80	1.180	7.6	16	25	0.73	----	2.02	"	"
6.25	14.90	23.84	1.150	7.7	15	24	0.74	----	1.94	"	"
6.34	12.80	20.48	1.060	8.3	13	20	0.75	----	1.66	"	120-130
6.43	13.50	21.60	0.990	7.3	14	22	0.76	----	1.75	"	"
6.53	13.20	21.12	0.890	6.7	13	21	0.77	----	1.71	"	"
6.62	12.30	19.68	0.810	6.6	12	20	0.79	----	1.59	"	"
6.71	15.10	24.16	0.780	5.2	15	24	0.80	----	1.96	"	"
6.81	9.70	15.43	0.650	6.7	10	15	0.81	----	1.55	"	"
6.90	10.40	16.43	0.690	6.6	10	16	0.82	----	1.66	"	"
7.00	9.50	14.89	0.780	8.2	10	15	0.83	----	1.51	"	"
7.09	16.00	24.90	0.780	4.9	16	25	0.84	----	2.08	"	"
7.19	18.50	28.56	0.800	4.3	19	29	0.86	----	2.41	"	"
7.28	20.10	30.80	0.830	4.1	13	21	0.87	----	2.62	Silty CLAY to CLAY	"
7.37	21.10	32.09	0.780	3.7	14	21	0.88	----	2.75	"	"
7.46	18.30	27.62	0.740	4.0	12	18	0.89	----	2.38	"	"
7.55	13.90	20.82	0.700	5.0	14	21	0.90	----	1.79	CLAY	"
7.65	10.70	15.90	0.600	5.6	11	16	0.91	----	1.71	"	"
7.74	9.10	13.43	0.520	5.7	9	13	0.92	----	1.44	"	110-120
7.83	9.30	13.62	0.470	5.1	9	14	0.94	----	1.47	"	"
7.93	10.10	14.69	0.470	4.7	10	15	0.95	----	1.60	"	"
8.02	11.30	16.30	0.560	5.0	11	16	0.96	----	1.80	"	120-130
8.11	13.20	18.89	0.660	5.0	13	19	0.97	----	1.70	"	"
8.21	15.80	22.42	0.690	4.4	16	22	0.98	----	2.04	"	"
8.30	16.90	23.79	0.750	4.4	17	24	0.99	----	2.19	"	"
8.39	17.40	24.33	0.810	4.7	17	24	1.00	----	2.25	"	"
8.49	18.60	25.89	0.900	4.8	19	26	1.02	----	2.41	"	"
8.58	19.60	27.15	0.980	5.0	20	27	1.03	----	2.54	"	130-140
8.67	20.20	27.85	1.030	5.1	20	28	1.04	----	2.62	"	"
8.76	20.40	27.99	1.100	5.4	20	28	1.05	----	2.65	"	"
8.86	19.20	26.22	1.150	6.0	19	26	1.07	----	2.49	"	"
8.95	18.90	25.69	1.180	6.2	19	26	1.08	----	2.45	"	"
9.04	19.00	25.71	1.170	6.2	19	26	1.09	----	2.46	"	"
9.13	17.90	24.10	1.130	6.3	18	24	1.10	----	2.31	"	"
9.23	17.00	22.78	1.080	6.4	17	23	1.12	----	2.19	"	"
9.32	15.40	20.54	1.000	6.5	15	21	1.13	----	1.98	"	120-130
9.41	14.30	18.99	0.960	6.7	14	19	1.14	----	1.83	"	"
9.50	14.10	18.64	0.950	6.7	14	19	1.15	----	1.80	"	"
9.59	14.50	19.08	0.960	6.6	15	19	1.16	----	1.86	"	"
9.69	14.20	18.60	0.940	6.6	14	19	1.17	----	1.82	"	"
9.78	14.00	18.26	0.680	4.9	14	18	1.18	----	1.79	"	"
9.87	13.80	17.91	0.630	4.6	14	18	1.20	----	1.76	"	"
9.96	13.40	17.31	0.590	4.4	13	17	1.21	----	1.71	"	"
10.02	8.90	11.46	0.560	6.3	9	11	1.22	----	1.66	"	"
10.08	6.60	8.48	0.530	8.0	7	8	1.22	----	1.20	"	110-120

10.15	5.60	7.18	0.480	8.6	6	7	1.23	----	1.00	Organic Material	"
10.24	5.10	6.53	0.430	8.4	5	7	1.23	----	0.90	"	100-110
10.33	4.90	6.27	0.360	7.3	5	6	1.23	----	0.86	CLAY	"
10.42	4.30	5.49	0.320	7.4	4	5	1.24	----	0.73	"	"
10.53	4.80	6.12	0.290	6.0	5	6	1.24	----	0.83	"	"
10.64	6.00	7.63	0.280	4.7	6	8	1.25	----	1.07	"	"
10.77	7.30	9.26	0.270	3.7	7	9	1.25	----	1.33	"	"
10.88	6.50	8.24	0.260	4.0	7	8	1.26	----	1.17	"	"
10.98	6.40	8.10	0.270	4.2	6	8	1.26	----	1.15	"	"
11.10	7.30	9.21	0.320	4.4	7	9	1.27	----	1.33	"	110-120
11.23	8.20	10.32	0.390	4.8	8	10	1.27	----	1.51	"	"
11.35	12.20	15.31	0.550	4.5	12	15	1.28	----	1.54	"	120-130
11.47	21.20	26.52	0.880	4.2	14	18	1.29	----	2.73	Silty CLAY to CLAY	130-140
11.58	24.40	30.43	0.790	3.2	12	15	1.30	----	3.16	Clayey SILT to Silty CLAY	"
11.69	23.20	28.85	0.690	3.0	12	14	1.31	----	3.00	"	120-130
11.73	45.40	56.40	0.670	1.5	15	19	1.31	35	----	Silty SAND to Sandy SILT	"
11.82	66.60	82.56	0.630	0.9	17	21	1.31	37	----	SAND to Silty SAND	"
11.91	62.60	77.43	0.570	0.9	16	19	1.32	37	----	"	"
12.01	50.30	62.07	0.690	1.4	17	21	1.32	35	----	Silty SAND to Sandy SILT	"
12.10	33.70	41.48	0.900	2.7	13	17	1.33	----	4.40	Sandy SILT to Clayey SILT	130-140
12.19	21.50	26.40	0.730	3.4	11	13	1.34	----	2.77	Clayey SILT to Silty CLAY	120-130
12.29	17.00	20.83	0.680	4.0	11	14	1.34	----	2.17	Silty CLAY to CLAY	"
12.38	12.10	14.79	0.590	4.9	12	15	1.35	----	1.51	CLAY	"
12.47	10.90	13.29	0.510	4.7	11	13	1.35	----	1.69	"	"
12.57	7.70	9.37	0.380	4.9	8	9	1.36	----	1.39	"	110-120
12.66	6.50	7.90	0.340	5.2	7	8	1.36	----	1.15	"	100-110
12.75	6.50	7.89	0.270	4.2	7	8	1.37	----	1.15	"	"
12.84	6.80	8.24	0.220	3.2	7	8	1.37	----	1.21	"	"
12.94	7.50	9.07	0.230	3.1	8	9	1.38	----	1.34	"	"
13.03	8.10	9.78	0.250	3.1	5	7	1.38	----	1.46	Silty CLAY to CLAY	"
13.12	8.20	9.89	0.270	3.3	8	10	1.38	----	1.48	CLAY	"
13.21	8.70	10.47	0.270	3.1	6	7	1.39	----	1.58	Silty CLAY to CLAY	"
13.31	8.60	10.33	0.280	3.3	9	10	1.39	----	1.56	CLAY	110-120
13.40	8.30	9.95	0.290	3.5	8	10	1.40	----	1.50	"	"
13.49	7.80	9.34	0.280	3.6	8	9	1.40	----	1.40	"	100-110
13.58	8.10	9.68	0.260	3.2	8	10	1.41	----	1.46	"	"
13.67	7.70	9.19	0.250	3.2	8	9	1.41	----	1.38	"	"
13.77	7.50	8.94	0.270	3.6	8	9	1.41	----	1.34	"	"
13.86	7.30	8.69	0.260	3.6	7	9	1.42	----	1.29	"	"
13.95	7.00	8.31	0.320	4.6	7	8	1.42	----	1.23	"	110-120
14.04	8.70	10.31	0.330	3.8	9	10	1.43	----	1.57	"	"
14.13	9.80	11.59	0.370	3.8	10	12	1.43	----	1.49	"	"
14.23	9.10	10.74	0.400	4.4	9	11	1.44	----	1.38	"	"
14.32	10.40	12.25	0.460	4.4	10	12	1.44	----	1.59	"	"
14.41	11.20	13.17	0.520	4.6	11	13	1.45	----	1.72	"	120-130
14.50	11.80	13.84	0.540	4.6	12	14	1.45	----	1.82	"	"
14.72	9.70	11.32	0.490	5.1	10	11	1.46	----	1.47	"	110-120
14.81	8.80	10.25	0.410	4.7	9	10	1.47	----	1.58	"	"
14.90	9.20	10.70	0.370	4.0	9	11	1.47	----	1.39	"	"
14.99	8.10	9.40	0.330	4.1	8	9	1.48	----	1.44	"	"
15.08	8.70	10.08	0.320	3.7	9	10	1.48	----	1.56	"	"
15.17	8.60	9.94	0.310	3.6	9	10	1.49	----	1.54	"	"
15.26	9.20	10.61	0.310	3.4	9	11	1.49	----	1.38	"	"
15.35	8.80	10.13	0.330	3.8	9	10	1.50	----	1.58	"	"
15.45	8.50	9.77	0.350	4.1	9	10	1.50	----	1.52	"	"

15.54	9.60	11.02	0.360	3.8	10	11	1.51	----	1.45	"	"
15.63	9.50	10.88	0.370	3.9	10	11	1.51	----	1.43	"	"
15.73	8.80	10.07	0.380	4.3	9	10	1.52	----	1.57	"	"
15.82	7.90	9.02	0.390	4.9	8	9	1.52	----	1.39	"	"
15.91	7.60	8.67	0.370	4.9	8	9	1.53	----	1.33	"	"
16.00	8.60	9.79	0.400	4.7	9	10	1.53	----	1.53	"	"
16.10	9.50	10.80	0.440	4.6	10	11	1.54	----	1.42	"	"
16.19	9.10	10.33	0.410	4.5	9	10	1.54	----	1.36	"	"
16.28	7.50	8.50	0.360	4.8	8	8	1.55	----	1.31	"	"
16.38	6.90	7.81	0.330	4.8	7	8	1.55	----	1.19	"	"
16.47	6.70	7.57	0.300	4.5	7	8	1.56	----	1.14	"	100-110
16.56	6.50	7.34	0.270	4.2	7	7	1.56	----	1.10	"	"
16.65	6.50	7.33	0.270	4.2	7	7	1.56	----	1.10	"	"
16.75	6.20	6.98	0.280	4.5	6	7	1.57	----	1.04	"	"
16.84	6.30	7.08	0.280	4.4	6	7	1.57	----	1.06	"	"
16.93	6.50	7.30	0.260	4.0	7	7	1.57	----	1.10	"	"
17.02	6.60	7.40	0.240	3.6	7	7	1.58	----	1.12	"	"
17.11	6.90	7.73	0.230	3.3	7	8	1.58	----	1.18	"	"
17.21	6.90	7.72	0.230	3.3	7	8	1.59	----	1.18	"	"
17.30	6.80	7.60	0.240	3.5	7	8	1.59	----	1.16	"	"
17.39	6.90	7.70	0.250	3.6	7	8	1.59	----	1.17	"	"
17.48	7.70	8.58	0.240	3.1	8	9	1.60	----	1.33	"	"
17.57	8.40	9.35	0.220	2.6	6	6	1.60	----	1.47	Silty CLAY to CLAY	"
17.67	7.80	8.67	0.240	3.1	5	6	1.61	----	1.35	"	"
17.76	7.70	8.55	0.330	4.3	8	9	1.61	----	1.33	CLAY	110-120
17.85	8.40	9.31	0.290	3.5	8	9	1.62	----	1.47	"	"
17.94	9.40	10.41	0.250	2.7	6	7	1.62	----	1.39	Silty CLAY to CLAY	100-110
18.01	8.80	9.73	0.230	2.6	6	6	1.62	----	1.55	"	"
18.10	6.70	7.40	0.200	3.0	7	7	1.63	----	1.13	CLAY	"
18.19	5.90	6.51	0.170	2.9	6	7	1.63	----	0.97	"	90-100
18.29	5.90	6.50	0.160	2.7	6	7	1.63	----	0.97	"	"
18.38	6.50	7.16	0.150	2.3	4	5	1.64	----	1.08	Silty CLAY to CLAY	"
18.47	6.30	6.93	0.150	2.4	4	5	1.64	----	1.04	"	"
18.57	7.00	7.69	0.170	2.4	5	5	1.64	----	1.18	"	100-110
18.66	7.20	7.90	0.180	2.5	5	5	1.65	----	1.22	"	"
18.75	7.30	8.00	0.200	2.7	5	5	1.65	----	1.24	"	"
18.85	7.50	8.21	0.210	2.8	5	5	1.65	----	1.28	"	"
18.94	6.70	7.32	0.210	3.1	7	7	1.66	----	1.12	CLAY	"
19.03	5.80	6.33	0.220	3.8	6	6	1.66	----	0.94	"	"
19.12	5.30	5.78	0.230	4.3	5	6	1.67	----	0.84	"	"
19.22	5.10	5.55	0.230	4.5	5	6	1.67	----	0.80	"	"
19.31	5.40	5.87	0.250	4.6	5	6	1.67	----	0.85	"	"
19.40	5.40	5.86	0.290	5.4	5	6	1.68	----	0.85	"	"
19.49	6.30	6.83	0.280	4.4	6	7	1.68	----	1.03	"	"
19.59	5.70	6.17	0.240	4.2	6	6	1.69	----	0.91	"	"
19.68	6.10	6.60	0.210	3.4	6	7	1.69	----	0.99	"	"
19.77	5.20	5.62	0.170	3.3	5	6	1.69	----	0.81	"	90-100
19.85	5.90	6.37	0.130	2.2	4	4	1.70	----	0.95	Silty CLAY to CLAY	"
19.92	5.50	5.93	0.120	2.2	4	4	1.70	----	0.87	"	"
20.01	5.60	6.04	0.110	2.0	4	4	1.70	----	0.89	"	"
20.10	6.30	6.78	0.110	1.7	4	5	1.70	----	1.03	"	"
20.19	6.70	7.21	0.120	1.8	4	5	1.71	----	1.11	"	"
20.28	6.30	6.77	0.130	2.1	4	5	1.71	----	1.03	"	"
20.37	6.00	6.44	0.140	2.3	4	4	1.71	----	0.96	"	"
20.46	6.30	6.76	0.160	2.5	4	5	1.72	----	1.02	"	"

20.56	6.90	7.39	0.210	3.0	7	7	1.72	----	1.14	CLAY	100-110
20.65	8.00	8.56	0.270	3.4	8	9	1.72	----	1.36	"	"
20.74	11.50	12.28	0.240	2.1	6	6	1.73	----	1.72	Clayey SILT to Silty CLAY	"
20.83	11.80	12.59	0.180	1.5	6	6	1.73	----	1.77	"	"
20.92	9.60	10.23	0.170	1.8	5	5	1.74	----	1.40	"	"
21.02	8.60	9.15	0.180	2.1	4	5	1.74	----	1.48	"	"
21.11	8.60	9.14	0.250	2.9	6	6	1.74	----	1.48	Silty CLAY to CLAY	"
21.20	8.30	8.80	0.310	3.7	8	9	1.75	----	1.42	CLAY	110-120
21.29	8.80	9.32	0.310	3.5	9	9	1.75	----	1.51	"	"
21.51	7.50	7.93	0.230	3.1	8	8	1.76	----	1.25	"	100-110
21.60	6.30	6.65	0.180	2.9	6	7	1.77	----	1.01	"	"
21.70	5.80	6.12	0.140	2.4	4	4	1.77	----	0.91	Silty CLAY to CLAY	90-100
21.79	5.80	6.12	0.140	2.4	4	4	1.77	----	0.91	"	"
21.88	6.50	6.85	0.150	2.3	4	5	1.78	----	1.05	"	"
21.98	6.50	6.85	0.160	2.5	4	5	1.78	----	1.05	"	"
22.07	6.40	6.73	0.180	2.8	6	7	1.78	----	1.03	CLAY	100-110
22.16	6.20	6.52	0.210	3.4	6	7	1.79	----	0.99	"	"
22.26	7.00	7.35	0.240	3.4	7	7	1.79	----	1.15	"	"
22.35	7.10	7.45	0.250	3.5	7	7	1.79	----	1.16	"	"
22.44	7.70	8.07	0.260	3.4	8	8	1.80	----	1.28	"	"
22.53	7.50	7.86	0.260	3.5	8	8	1.80	----	1.24	"	"
22.63	6.90	7.22	0.290	4.2	7	7	1.81	----	1.12	"	"
22.72	8.70	9.10	0.310	3.6	9	9	1.81	----	1.48	"	110-120
22.81	10.40	10.86	0.320	3.1	7	7	1.82	----	1.52	Silty CLAY to CLAY	"
22.90	9.90	10.33	0.330	3.3	7	7	1.82	----	1.43	"	"
23.00	10.00	10.42	0.350	3.5	10	10	1.83	----	1.45	CLAY	"
23.09	9.50	9.89	0.340	3.6	10	10	1.83	----	1.36	"	"
23.18	8.80	9.15	0.340	3.9	9	9	1.83	----	1.49	"	"
23.27	8.60	8.93	0.340	4.0	9	9	1.84	----	1.45	"	"
23.37	9.80	10.17	0.340	3.5	10	10	1.84	----	1.41	"	"
23.46	9.50	9.84	0.330	3.5	10	10	1.85	----	1.36	"	"
23.55	9.90	10.25	0.330	3.3	7	7	1.85	----	1.43	Silty CLAY to CLAY	"
23.64	9.50	9.82	0.320	3.4	6	7	1.86	----	1.36	"	"
23.73	9.20	9.50	0.300	3.3	6	6	1.86	----	1.31	"	"
23.83	8.70	8.97	0.280	3.2	6	6	1.87	----	1.47	"	"
23.92	9.20	9.48	0.270	2.9	6	6	1.87	----	1.31	"	"
24.01	9.00	9.26	0.270	3.0	6	6	1.88	----	1.27	"	"
24.10	9.90	10.18	0.270	2.7	7	7	1.88	----	1.42	"	"
24.19	10.10	10.37	0.260	2.6	7	7	1.89	----	1.45	"	"
24.29	10.70	10.97	0.280	2.6	7	7	1.89	----	1.55	"	"
24.38	10.40	10.65	0.340	3.3	7	7	1.90	----	1.50	"	"
24.48	10.00	10.23	0.390	3.9	10	10	1.90	----	1.43	CLAY	"
24.57	9.30	9.51	0.400	4.3	9	10	1.91	----	1.32	"	"
24.80	9.30	9.48	0.340	3.7	9	9	1.92	----	1.31	"	"
24.90	9.80	9.98	0.310	3.2	7	7	1.93	----	1.40	Silty CLAY to CLAY	"
24.99	8.80	8.95	0.310	3.5	9	9	1.93	----	1.47	CLAY	"
25.08	8.90	9.04	0.330	3.7	9	9	1.93	----	1.49	"	"
25.17	9.80	9.94	0.370	3.8	10	10	1.94	----	1.39	"	"
25.27	10.70	10.84	0.390	3.6	11	11	1.94	----	1.54	"	"
25.36	9.40	9.51	0.390	4.1	9	10	1.95	----	1.32	"	"
25.45	8.50	8.59	0.390	4.6	9	9	1.95	----	1.41	"	"
25.55	6.70	6.77	0.340	5.1	7	7	1.96	----	1.05	"	"
25.64	6.00	6.05	0.250	4.2	6	6	1.96	----	0.91	"	100-110
25.73	5.70	5.74	0.230	4.0	6	6	1.97	----	0.85	"	"
25.82	5.40	5.44	0.190	3.5	5	5	1.97	----	0.78	"	"

25.92	5.10	5.13	0.200	3.9	5	5	1.98	----	0.72	"	"
26.01	5.60	5.63	0.240	4.3	6	6	1.98	----	0.82	"	"
26.10	5.80	5.82	0.280	4.8	6	6	1.98	----	0.86	"	"
26.19	6.40	6.42	0.310	4.8	6	6	1.99	----	0.98	"	"
26.29	6.00	6.01	0.310	5.2	6	6	1.99	----	0.90	"	"
26.38	6.10	6.11	0.310	5.1	6	6	1.99	----	0.92	"	"
26.47	6.70	6.70	0.300	4.5	7	7	2.00	----	1.04	"	"
26.56	6.60	6.60	0.270	4.1	7	7	2.00	----	1.02	"	"
26.66	7.50	7.50	0.300	4.0	8	7	2.01	----	1.20	"	110-120
26.75	9.10	9.10	0.350	3.8	9	9	2.01	----	1.26	"	"
26.84	12.80	12.80	0.380	3.0	9	9	2.02	----	1.50	Silty CLAY to CLAY	"
26.94	14.10	14.09	0.410	2.9	7	7	2.02	----	1.67	Clayey SILT to Silty CLAY	120-130
27.03	14.30	14.29	0.460	3.2	10	10	2.03	----	1.70	Silty CLAY to CLAY	"
27.12	14.00	13.99	0.470	3.4	9	9	2.03	----	1.66	"	"
27.21	13.80	13.79	0.460	3.3	9	9	2.04	----	1.63	"	"
27.30	12.90	12.89	0.430	3.3	9	9	2.05	----	1.51	"	"
27.40	11.60	11.59	0.410	3.5	8	8	2.05	----	1.67	"	110-120
27.49	10.20	10.19	0.370	3.6	10	10	2.06	----	1.44	CLAY	"
27.58	10.00	9.99	0.350	3.5	10	10	2.06	----	1.40	"	"
27.68	10.10	10.09	0.400	4.0	10	10	2.07	----	1.42	"	"
27.77	9.80	9.79	0.450	4.6	10	10	2.07	----	1.37	"	"
27.86	9.70	9.69	0.470	4.8	10	10	2.08	----	1.35	"	"
28.11	10.10	10.08	0.380	3.8	10	10	2.09	----	1.42	"	"
28.20	9.60	9.58	0.350	3.6	10	10	2.09	----	1.33	"	"
28.30	8.70	8.68	0.350	4.0	9	9	2.10	----	1.42	"	"
28.39	9.00	8.98	0.340	3.8	9	9	2.10	----	1.23	"	"
28.48	8.70	8.68	0.320	3.7	9	9	2.11	----	1.41	"	"
28.58	8.30	8.28	0.330	4.0	8	8	2.11	----	1.33	"	"
28.67	8.40	8.38	0.360	4.3	8	8	2.12	----	1.35	"	"
28.76	8.50	8.48	0.390	4.6	9	8	2.12	----	1.37	"	"
28.86	9.50	9.48	0.390	4.1	10	9	2.13	----	1.31	"	"
28.95	9.80	9.77	0.430	4.4	10	10	2.13	----	1.36	"	"
29.04	9.10	9.07	0.430	4.7	9	9	2.14	----	1.24	"	"
29.14	9.50	9.47	0.410	4.3	10	9	2.14	----	1.31	"	"
29.23	8.80	8.77	0.390	4.4	9	9	2.15	----	1.43	"	"
29.32	8.50	8.47	0.390	4.6	9	8	2.15	----	1.36	"	"
29.42	8.90	8.87	0.410	4.6	9	9	2.16	----	1.44	"	"
29.51	10.70	10.67	0.430	4.0	11	11	2.16	----	1.50	"	"
29.60	14.30	14.25	0.450	3.1	10	10	2.17	----	1.68	Silty CLAY to CLAY	120-130
29.70	12.10	12.06	0.400	3.3	8	8	2.17	----	1.39	"	110-120
29.79	8.00	7.97	0.370	4.6	8	8	2.18	----	1.26	CLAY	"
29.88	6.80	6.78	0.360	5.3	7	7	2.18	----	1.02	"	"
29.97	7.50	7.47	0.400	5.3	8	7	2.19	----	1.16	"	"
30.07	9.20	9.16	0.520	5.7	9	9	2.19	----	1.25	"	"
30.16	10.90	10.86	0.600	5.5	11	11	2.20	----	1.53	"	120-130
30.25	11.20	11.15	0.620	5.5	11	11	2.20	----	1.58	"	"
30.34	10.20	10.16	0.610	6.0	10	10	2.21	----	1.41	"	"
30.43	8.70	8.66	0.580	6.7	9	9	2.22	----	1.39	"	"
30.52	10.20	10.15	0.630	6.2	10	10	2.22	----	1.41	"	"
30.61	16.20	16.13	0.830	5.1	16	16	2.23	----	1.93	"	"
30.70	15.40	15.33	0.970	6.3	15	15	2.23	----	1.82	"	"
30.79	10.70	10.65	0.880	8.2	11	11	2.24	----	1.49	"	"
30.97	10.90	10.85	0.450	4.1	11	11	2.25	----	1.52	"	110-120
31.06	9.70	9.65	0.340	3.5	10	10	2.25	----	1.32	"	"
31.16	9.90	9.85	0.320	3.2	7	7	2.26	----	1.35	Silty CLAY to CLAY	"

31.25	10.00	9.95	0.340	3.4	7	7	2.26	----	1.37	"	"
31.34	10.40	10.34	0.360	3.5	7	7	2.27	----	1.43	"	"
31.43	10.60	10.54	0.400	3.8	11	11	2.27	----	1.47	CLAY	"
31.52	11.50	11.44	0.440	3.8	12	11	2.28	----	1.62	"	120-130
31.62	12.20	12.13	0.490	4.0	12	12	2.28	----	1.38	"	"
31.71	13.70	13.62	0.560	4.1	14	14	2.29	----	1.58	"	"
31.80	15.10	15.01	0.640	4.2	15	15	2.29	----	1.77	"	"
31.89	16.70	16.60	0.730	4.4	17	17	2.30	----	1.98	"	"
31.98	17.50	17.39	0.790	4.5	18	17	2.31	----	2.09	"	"
32.05	17.30	17.19	0.810	4.7	17	17	2.31	----	2.06	"	"
32.15	17.60	17.49	0.840	4.8	18	17	2.32	----	2.10	"	"
32.24	18.00	17.88	0.840	4.7	18	18	2.32	----	2.15	"	"
32.33	18.60	18.48	0.860	4.6	19	18	2.33	----	2.23	"	"
32.42	19.60	19.47	0.890	4.5	20	19	2.33	----	2.36	"	130-140
32.51	21.30	21.15	0.930	4.4	14	14	2.34	----	2.59	Silty CLAY to CLAY	"
32.60	22.60	22.44	0.960	4.2	15	15	2.35	----	2.76	"	"
32.70	23.60	23.43	1.010	4.3	16	16	2.35	----	2.90	"	"
32.78	24.20	24.03	1.010	4.2	16	16	2.36	----	2.97	"	"
32.88	23.40	23.23	1.030	4.4	16	15	2.37	----	2.87	"	"
32.97	22.80	22.63	1.030	4.5	23	23	2.37	----	2.79	CLAY	"
33.06	21.60	21.44	1.020	4.7	22	21	2.38	----	2.63	"	"
33.15	22.10	21.93	0.990	4.5	22	22	2.39	----	2.69	"	"
33.24	23.30	23.12	0.980	4.2	16	15	2.39	----	2.85	Silty CLAY to CLAY	"
33.33	22.80	22.62	0.980	4.3	15	15	2.40	----	2.78	"	"
33.42	22.40	22.22	0.970	4.3	15	15	2.41	----	2.73	"	"
33.52	20.90	20.73	0.950	4.5	21	21	2.41	----	2.53	CLAY	"
33.61	19.20	19.04	0.960	5.0	19	19	2.42	----	2.30	"	"
33.70	17.70	17.55	0.990	5.6	18	18	2.43	----	2.10	"	"
33.79	15.90	15.76	0.640	4.0	11	11	2.43	----	1.86	Silty CLAY to CLAY	120-130
33.88	14.80	14.67	0.680	4.6	15	15	2.44	----	1.71	CLAY	"
33.98	13.90	13.78	0.910	6.5	14	14	2.44	----	1.59	"	"
34.07	13.80	13.68	0.760	5.5	14	14	2.45	----	1.58	"	"
34.10	13.10	12.98	0.710	5.4	13	13	2.45	----	1.48	"	"
34.21	14.30	14.17	0.630	4.4	14	14	2.46	----	1.64	"	"
34.29	14.00	13.87	0.600	4.3	14	14	2.46	----	1.60	"	"
34.38	14.20	14.07	0.630	4.4	14	14	2.47	----	1.63	"	"
34.47	15.10	14.96	0.740	4.9	15	15	2.48	----	1.75	"	"
34.57	19.40	19.21	0.930	4.8	19	19	2.48	----	2.32	"	130-140
34.66	24.00	23.77	1.150	4.8	24	24	2.49	----	2.93	"	"
34.75	30.20	29.90	1.440	4.8	30	30	2.50	----	3.76	"	"
34.84	30.90	30.57	1.680	5.4	31	31	2.50	----	3.85	"	"
34.93	30.00	29.61	2.000	6.7	30	30	2.51	----	3.73	"	"
35.02	27.50	27.08	2.240	8.1	28	27	2.52	----	3.40	"	"
35.11	28.40	27.91	2.310	8.1	28	28	2.52	----	3.51	"	"
35.20	30.80	30.20	2.210	7.2	31	30	2.53	----	3.83	"	"
35.30	30.00	29.35	2.030	6.8	30	29	2.54	----	3.73	"	"
35.39	34.00	33.19	1.730	5.1	34	33	2.54	----	4.26	"	"
35.47	47.80	46.56	1.660	3.5	24	23	2.55	----	6.10	Clayey SILT to Silty CLAY	"
35.57	50.60	49.17	1.740	3.4	25	25	2.56	----	6.47	"	"
35.66	46.90	45.48	1.720	3.7	23	23	2.56	----	5.98	"	"
35.75	40.60	39.28	1.760	4.3	27	26	2.57	----	5.14	Silty CLAY to CLAY	"
35.84	32.20	31.08	2.150	6.7	32	31	2.57	----	4.01	CLAY	"
35.93	33.30	32.07	2.550	7.7	33	32	2.58	----	4.16	"	"
36.02	40.80	39.21	2.810	6.9	41	39	2.59	----	5.16	"	"
36.11	42.70	40.94	3.090	7.2	43	41	2.59	----	5.41	"	"

36.20	49.90	47.74	3.190	6.4	50	48	2.60	----	6.37	"	"
36.29	53.10	50.69	3.200	6.0	53	51	2.61	----	6.80	"	"
36.37	52.80	50.29	3.360	6.4	53	50	2.61	----	6.76	"	"
36.46	45.80	43.53	3.410	7.4	46	44	2.62	----	5.82	"	"
36.55	41.40	39.26	3.130	7.6	41	39	2.63	----	5.23	"	"
36.64	34.10	32.27	2.860	8.4	34	32	2.63	----	4.26	"	"
36.73	26.00	24.55	2.430	9.3	26	25	2.64	----	3.18	"	"
36.81	25.00	23.55	2.030	8.1	25	24	2.65	----	3.05	"	"
36.90	22.80	21.43	1.600	7.0	23	21	2.65	----	2.75	"	"
36.99	20.40	19.13	1.250	6.1	20	19	2.66	----	2.43	"	"
37.08	17.30	16.19	1.050	6.1	17	16	2.66	----	2.02	"	"
37.17	15.70	14.66	0.990	6.3	16	15	2.67	----	1.80	"	120-130
37.25	16.80	15.68	0.070	0.4	7	6	2.67	----	1.95	Sandy SILT to Clayey SILT	85-90
37.34	17.80	16.57	1.400	7.9	18	17	2.68	----	2.08	CLAY	130-140
37.43	18.10	16.81	1.410	7.8	18	17	2.69	----	2.12	"	"
37.51	16.80	15.57	1.410	8.4	17	16	2.69	----	1.95	"	"
37.54	18.60	17.23	1.410	7.6	19	17	2.69	----	2.19	"	"
37.58	20.50	18.97	1.430	7.0	21	19	2.70	----	2.44	"	"
37.67	18.80	17.36	1.490	7.9	19	17	2.70	----	2.21	"	"
37.76	20.70	19.07	1.510	7.3	21	19	2.71	----	2.46	"	"
37.85	21.00	19.30	1.550	7.4	21	19	2.72	----	2.50	"	"
37.93	20.20	18.52	1.520	7.5	20	19	2.72	----	2.40	"	"
38.02	21.50	19.67	1.440	6.7	22	20	2.73	----	2.57	"	"
38.11	21.10	19.25	1.300	6.2	21	19	2.73	----	2.51	"	"
38.20	18.80	17.12	1.210	6.4	19	17	2.74	----	2.21	"	"
38.29	18.00	16.35	1.190	6.6	18	16	2.75	----	2.10	"	"
38.38	17.50	15.86	1.210	6.9	18	16	2.75	----	2.03	"	"
38.47	19.60	17.72	1.210	6.2	20	18	2.76	----	2.31	"	"
38.55	19.50	17.59	1.150	5.9	20	18	2.77	----	2.30	"	"
38.64	15.40	13.86	1.050	6.8	15	14	2.77	----	1.75	"	"
38.73	12.70	11.40	0.900	7.1	13	11	2.78	----	1.39	"	120-130
38.82	10.90	9.77	0.720	6.6	11	10	2.78	----	1.44	"	"
38.91	10.70	9.57	0.570	5.3	11	10	2.79	----	1.40	"	"
39.00	12.60	11.24	0.520	4.1	13	11	2.80	----	1.37	"	"
39.09	13.80	12.29	0.530	3.8	9	8	2.80	----	1.53	Silty CLAY to CLAY	"
39.18	12.30	10.93	0.580	4.7	12	11	2.81	----	1.33	CLAY	"
39.27	11.90	10.55	0.640	5.4	12	11	2.81	----	1.60	"	"
39.36	12.90	11.42	0.660	5.1	13	11	2.82	----	1.41	"	"
39.45	14.40	12.72	0.750	5.2	14	13	2.82	----	1.61	"	"
39.54	15.50	13.66	0.910	5.9	16	14	2.83	----	1.76	"	"
39.63	18.20	16.00	1.000	5.5	18	16	2.84	----	2.11	"	130-140
39.72	19.90	17.45	1.000	5.0	20	17	2.84	----	2.34	"	"
39.81	16.30	14.26	0.970	6.0	16	14	2.85	----	1.86	"	120-130
39.90	14.50	12.66	0.900	6.2	15	13	2.85	----	1.62	"	"
39.99	12.80	11.15	0.830	6.5	13	11	2.86	----	1.39	"	"
40.08	12.80	11.13	0.890	7.0	13	11	2.87	----	1.39	"	"
40.17	14.20	12.32	1.110	7.8	14	12	2.87	----	1.58	"	"
40.26	17.50	15.15	1.270	7.3	18	15	2.88	----	2.02	"	130-140
40.35	22.90	19.77	1.370	6.0	23	20	2.88	----	2.74	"	"
40.44	21.30	18.34	1.520	7.1	21	18	2.89	----	2.52	"	"
40.53	21.60	18.55	1.700	7.9	22	19	2.90	----	2.56	"	"
40.62	27.70	23.73	1.700	6.1	28	24	2.90	----	3.37	"	"
40.71	40.50	34.61	1.770	4.4	27	23	2.91	----	5.08	Silty CLAY to CLAY	"
40.80	52.50	44.76	1.920	3.7	26	22	2.92	----	6.68	Clayey SILT to Silty CLAY	"
40.89	51.00	43.37	1.880	3.7	26	22	2.92	----	6.48	"	"

40.95	45.90	38.96	1.820	4.0	23	19	2.93	----	5.80	"	"
41.04	35.50	30.06	2.050	5.8	36	30	2.93	----	4.41	CLAY	"
41.13	31.50	26.60	2.340	7.4	32	27	2.94	----	3.87	"	"
41.23	32.70	27.55	2.290	7.0	33	28	2.95	----	4.03	"	"
41.32	34.80	29.24	2.120	6.1	35	29	2.95	----	4.31	"	"
41.40	41.70	34.95	1.990	4.8	28	23	2.96	----	5.23	Silty CLAY to CLAY	"
41.49	45.40	37.95	1.880	4.1	23	19	2.97	----	5.72	Clayey SILT to Silty CLAY	"
41.58	44.00	36.69	1.770	4.0	22	18	2.97	----	5.54	"	"
41.67	40.10	33.35	1.780	4.4	27	22	2.98	----	5.02	Silty CLAY to CLAY	"
41.76	38.80	32.19	1.980	5.1	39	32	2.99	----	4.84	CLAY	"
41.85	38.90	32.19	2.130	5.5	39	32	2.99	----	4.86	"	"
41.93	33.20	27.40	2.280	6.9	33	27	3.00	----	4.09	"	"
42.02	27.00	22.26	2.410	8.9	27	22	3.01	----	3.27	"	"
42.11	24.00	19.77	2.520	10.5	24	20	3.01	----	2.87	"	"
42.19	22.70	18.68	2.570	11.3	23	19	3.02	----	2.69	"	"
42.28	21.30	17.51	2.370	11.1	21	18	3.02	----	2.50	"	"
42.37	19.40	15.94	2.100	10.8	19	16	3.03	----	2.25	"	"
42.46	16.40	13.46	1.940	11.8	16	13	3.04	----	1.85	Organic Material	"
42.55	14.70	12.05	1.810	12.0	15	12	3.04	----	1.62	"	"
42.63	14.90	12.21	1.610	10.8	15	12	3.05	----	1.65	CLAY	"
42.72	13.40	10.97	1.420	10.6	13	11	3.06	----	1.45	"	"
42.81	10.60	8.67	1.220	11.5	11	9	3.06	----	1.34	Organic Material	120-130
42.89	8.90	7.27	0.980	11.0	9	7	3.07	----	1.27	"	"
42.98	8.20	6.70	0.770	9.4	8	7	3.07	----	1.13	CLAY	"
43.07	9.00	7.34	0.630	7.0	9	7	3.08	----	1.07	"	"
43.15	8.80	7.18	0.530	6.0	9	7	3.08	----	1.25	"	110-120
43.24	9.10	7.42	0.500	5.5	9	7	3.09	----	1.09	"	"
43.32	7.90	6.43	0.490	6.2	8	6	3.09	----	1.06	"	"
43.41	7.60	6.19	0.460	6.1	8	6	3.10	----	1.00	"	"
43.50	7.80	6.35	0.420	5.4	8	6	3.10	----	1.04	"	"
43.59	8.00	6.50	0.390	4.9	8	7	3.10	----	1.08	"	"
43.68	7.90	6.42	0.370	4.7	8	6	3.11	----	1.06	"	"
43.76	7.30	5.93	0.360	4.9	7	6	3.11	----	0.94	"	"
43.85	6.60	5.35	0.340	5.2	7	5	3.12	----	0.80	"	"
43.94	5.70	4.62	0.320	5.6	6	5	3.12	----	0.62	"	100-110
44.03	6.30	5.11	0.300	4.8	6	5	3.13	----	0.74	"	"
44.12	5.90	4.78	0.290	4.9	6	5	3.13	----	0.65	"	"
44.20	6.10	4.94	0.290	4.8	6	5	3.13	----	0.69	"	"
44.29	7.10	5.75	0.300	4.2	7	6	3.14	----	0.89	"	"
44.38	7.30	5.90	0.300	4.1	7	6	3.14	----	0.93	"	"
44.47	7.00	5.66	0.290	4.1	7	6	3.15	----	0.87	"	"
44.56	7.80	6.30	0.290	3.7	8	6	3.15	----	1.03	"	"
44.65	8.30	6.70	0.280	3.4	8	7	3.15	----	1.13	"	"
44.74	7.60	6.13	0.270	3.6	8	6	3.16	----	0.99	"	"
44.81	7.30	5.89	0.260	3.6	7	6	3.16	----	0.93	"	"
44.90	6.80	5.48	0.240	3.5	7	5	3.16	----	0.83	"	"
44.99	6.30	5.08	0.240	3.8	6	5	3.17	----	0.73	"	"
45.07	6.40	5.15	0.260	4.1	6	5	3.17	----	0.74	"	"
45.17	7.20	5.79	0.370	5.1	7	6	3.18	----	0.90	"	110-120
45.26	8.70	7.00	0.610	7.0	9	7	3.18	----	1.20	"	120-130
45.35	18.70	15.03	0.760	4.1	12	10	3.19	----	2.13	Silty CLAY to CLAY	"
45.44	30.40	24.40	0.830	2.7	12	10	3.19	----	3.69	Sandy SILT to Clayey SILT	130-140
45.53	35.90	28.79	0.920	2.6	14	12	3.20	----	4.43	"	"
45.62	39.40	31.57	0.860	2.2	16	13	3.21	----	4.89	"	"
45.71	42.40	33.94	0.770	1.8	17	14	3.21	----	5.29	"	"

45.80	43.20	34.55	0.830	1.9	17	14	3.22	----	5.40	"	"
45.89	41.00	32.76	0.900	2.2	16	13	3.23	----	5.10	"	"
45.98	39.10	31.21	0.920	2.4	16	12	3.23	----	4.85	"	"
46.07	35.80	28.55	0.880	2.5	14	11	3.24	----	4.41	"	"
46.16	34.00	27.09	0.820	2.4	14	11	3.25	----	4.17	"	"
46.25	32.00	25.47	0.750	2.3	13	10	3.25	----	3.90	"	"
46.34	30.30	24.09	0.800	2.6	12	10	3.26	----	3.67	"	"
46.43	27.30	21.69	0.950	3.5	14	11	3.27	----	3.27	Clayey SILT to Silty CLAY	"
46.52	26.60	21.11	1.040	3.9	18	14	3.27	----	3.18	Silty CLAY to CLAY	"
46.61	45.90	36.39	1.150	2.5	18	15	3.28	----	5.75	Sandy SILT to Clayey SILT	"
46.68	69.50	55.07	1.170	1.7	23	18	3.28	35	----	Silty SAND to Sandy SILT	"
46.75	87.60	69.37	1.170	1.3	22	17	3.29	36	----	SAND to Silty SAND	120-130
46.84	87.30	69.06	1.260	1.4	29	23	3.29	36	----	Silty SAND to Sandy SILT	130-140
46.93	91.00	71.92	1.280	1.4	23	18	3.30	36	----	SAND to Silty SAND	"
47.02	93.30	73.68	1.250	1.3	23	18	3.31	36	----	"	120-130
47.11	89.40	70.54	1.220	1.4	22	18	3.31	36	----	"	"
47.20	76.40	60.23	1.210	1.6	25	20	3.32	35	----	Silty SAND to Sandy SILT	130-140
47.28	57.50	45.29	1.130	2.0	19	15	3.33	33	----	"	"
47.38	38.70	30.45	1.080	2.8	15	12	3.33	----	4.78	Sandy SILT to Clayey SILT	"
47.47	24.50	19.26	0.970	4.0	16	13	3.34	----	2.89	Silty CLAY to CLAY	"
47.55	17.60	13.82	0.820	4.7	18	14	3.34	----	1.97	CLAY	120-130
47.59	15.50	12.17	0.760	4.9	16	12	3.35	----	1.69	"	"
47.68	10.50	8.24	0.630	6.0	11	8	3.35	----	1.28	"	"
47.77	10.20	8.00	0.460	4.5	10	8	3.36	----	1.22	"	110-120
47.86	11.00	8.62	0.280	2.5	6	4	3.36	----	1.36	Clayey SILT to Silty CLAY	"
47.95	10.50	8.22	0.230	2.2	5	4	3.37	----	1.27	"	100-110
48.04	10.40	8.14	0.220	2.1	5	4	3.37	----	1.26	"	"
48.13	10.60	8.29	0.240	2.3	5	4	3.37	----	1.29	"	"
48.22	11.20	8.75	0.250	2.2	6	4	3.38	----	1.39	"	110-120
48.30	11.30	8.83	0.240	2.1	6	4	3.38	----	1.40	"	100-110
48.39	11.70	9.13	0.250	2.1	6	5	3.39	----	1.47	"	110-120
48.48	11.30	8.82	0.250	2.2	6	4	3.39	----	1.40	"	"
48.57	11.50	8.96	0.260	2.3	6	4	3.40	----	1.43	"	"
48.66	12.10	9.43	0.260	2.1	6	5	3.40	----	1.23	"	"
48.75	12.00	9.34	0.280	2.3	6	5	3.40	----	1.21	"	"
48.84	12.90	10.04	0.320	2.5	6	5	3.41	----	1.33	"	"
48.93	13.30	10.34	0.350	2.6	7	5	3.41	----	1.38	"	"
49.02	15.20	11.81	0.390	2.6	8	6	3.42	----	1.64	"	120-130
49.11	16.30	12.65	0.460	2.8	8	6	3.43	----	1.78	"	"
49.20	18.10	14.04	0.560	3.1	9	7	3.43	----	2.02	"	"
49.29	20.80	16.12	0.680	3.3	10	8	3.44	----	2.38	"	"
49.38	23.30	18.04	0.770	3.3	12	9	3.44	----	2.71	"	130-140
49.47	22.60	17.48	0.770	3.4	11	9	3.45	----	2.62	"	120-130
49.56	18.60	14.37	0.780	4.2	12	10	3.45	----	2.09	Silty CLAY to CLAY	"
49.63	16.60	12.82	0.740	4.5	17	13	3.46	----	1.82	CLAY	"
49.70	14.50	11.19	0.710	4.9	15	11	3.46	----	1.54	"	"
49.78	13.30	10.26	0.680	5.1	13	10	3.47	----	1.38	"	"
49.86	12.90	9.94	0.660	5.1	13	10	3.47	----	1.32	"	"
49.95	14.40	11.09	0.740	5.1	14	11	3.48	----	1.52	"	"
50.04	13.10	10.08	0.930	7.1	13	10	3.48	----	1.35	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-18
LOCATION: Santa Rosa CA DATE : 06-02-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 11:42:11
Terminated at 35.0 feet Groundwater measured at 9.0 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.52	69.70	111.52	2.700	3.9	35	56	0.06	----	9.29	Clayey SILT to Silty CLAY	130-140
0.62	51.80	82.88	3.010	5.8	52	83	0.07	----	6.90	CLAY	"
0.71	42.90	68.64	3.100	7.2	43	69	0.09	----	5.71	"	"
0.80	36.60	58.56	2.750	7.5	37	59	0.10	----	4.87	"	"
0.89	31.60	50.56	2.610	8.3	32	51	0.11	----	4.21	"	"
0.98	29.30	46.88	2.270	7.7	29	47	0.12	----	3.90	"	"
1.08	23.10	36.96	1.880	8.1	23	37	0.14	----	3.07	"	"
1.17	20.20	32.32	1.530	7.6	20	32	0.15	----	2.68	"	"
1.26	18.20	29.12	1.360	7.5	18	29	0.16	----	2.42	"	"
1.35	17.20	27.52	1.240	7.2	17	28	0.17	----	2.28	"	"
1.44	19.70	31.52	1.190	6.0	20	32	0.18	----	2.61	"	"
1.53	14.50	23.20	1.090	7.5	15	23	0.20	----	1.92	"	120-130
1.62	13.60	21.76	0.960	7.1	14	22	0.21	----	1.80	"	"
1.72	15.80	25.28	1.000	6.3	16	25	0.22	----	2.09	"	"
1.81	14.70	23.52	1.010	6.9	15	24	0.23	----	1.94	"	"
1.90	15.50	24.80	1.050	6.8	16	25	0.24	----	2.05	"	130-140
1.99	13.30	21.28	1.070	8.0	13	21	0.25	----	1.76	"	120-130
2.08	13.80	22.08	0.850	6.2	14	22	0.27	----	1.82	"	"
2.17	13.10	20.96	0.780	6.0	13	21	0.28	----	1.73	"	"
2.26	11.80	18.88	0.750	6.4	12	19	0.29	----	1.94	"	"
2.37	13.00	20.80	0.780	6.0	13	21	0.30	----	1.71	"	"
2.46	14.20	22.72	0.720	5.1	14	23	0.31	----	1.87	"	"
2.56	13.30	21.28	0.730	5.5	13	21	0.32	----	1.75	"	"
2.65	12.50	20.00	0.710	5.7	13	20	0.34	----	1.64	"	"
2.74	12.40	19.84	0.690	5.6	12	20	0.35	----	1.63	"	"
2.83	11.10	17.76	0.620	5.6	11	18	0.36	----	1.82	"	"
2.92	9.90	15.84	0.600	6.1	10	16	0.37	----	1.62	"	"
3.01	8.50	13.60	0.560	6.6	9	14	0.38	----	1.66	"	110-120
3.11	8.50	13.60	0.610	7.2	9	14	0.39	----	1.66	"	120-130
3.20	8.60	13.76	0.670	7.8	9	14	0.40	----	1.68	"	"
3.29	11.80	18.88	0.760	6.4	12	19	0.42	----	1.93	"	"
3.39	15.10	24.16	0.840	5.6	15	24	0.43	----	1.98	"	"
3.48	14.30	22.88	0.900	6.3	14	23	0.44	----	1.88	"	"
3.57	12.40	19.84	1.000	8.1	12	20	0.45	----	1.62	"	"
3.66	19.30	30.88	1.110	5.8	19	31	0.46	----	2.54	"	130-140
3.76	22.60	36.16	1.190	5.3	23	36	0.48	----	2.98	"	"
3.85	20.70	33.12	1.130	5.5	21	33	0.49	----	2.73	"	"
3.94	13.40	21.44	1.150	8.6	13	21	0.50	----	1.75	"	120-130
4.04	10.20	16.32	1.010	9.9	10	16	0.51	----	1.66	"	"
4.13	7.90	12.64	0.740	9.4	8	13	0.52	----	1.53	"	"
4.22	6.50	10.40	0.590	9.1	7	10	0.53	----	1.25	Organic Material	110-120
4.32	6.20	9.92	0.550	8.9	6	10	0.54	----	1.19	"	"
4.41	6.70	10.72	0.560	8.4	7	11	0.56	----	1.28	CLAY	"
4.50	8.30	13.28	0.540	6.5	8	13	0.57	----	1.60	"	"
4.59	8.90	14.24	0.620	7.0	9	14	0.58	----	1.72	"	120-130
4.69	8.50	13.60	0.640	7.5	9	14	0.59	----	1.64	"	"
4.78	8.50	13.60	0.630	7.4	9	14	0.60	----	1.64	"	"

4.87	7.60	12.16	0.540	7.1	8	12	0.61	----	1.46	"	110-120
4.97	7.60	12.16	0.470	6.2	8	12	0.62	----	1.46	"	"
5.06	6.60	10.56	0.420	6.4	7	11	0.63	----	1.26	"	"
5.15	6.70	10.72	0.570	8.5	7	11	0.64	----	1.28	"	"
5.24	11.60	18.56	0.730	6.3	12	19	0.66	----	1.88	"	120-130
5.34	19.80	31.68	0.830	4.2	13	21	0.67	----	2.60	Silty CLAY to CLAY	"
5.40	20.90	33.44	0.870	4.2	14	22	0.68	----	2.74	"	130-140
5.49	17.40	27.84	0.910	5.2	17	28	0.69	----	2.27	CLAY	120-130
5.59	13.70	21.92	0.790	5.8	14	22	0.70	----	1.78	"	"
5.68	10.70	17.12	0.650	6.1	11	17	0.71	----	1.72	"	"
5.77	8.90	14.24	0.520	5.8	9	14	0.72	----	1.71	"	110-120
5.87	8.30	13.28	0.530	6.4	8	13	0.73	----	1.59	"	"
5.96	9.40	15.04	0.590	6.3	9	15	0.74	----	1.50	"	120-130
6.05	13.40	21.44	0.620	4.6	13	21	0.75	----	1.74	"	"
6.14	12.40	19.84	0.620	5.0	12	20	0.77	----	1.60	"	"
6.23	9.80	15.68	0.620	6.3	10	16	0.78	----	1.57	"	"
6.33	8.80	14.08	0.600	6.8	9	14	0.79	----	1.68	"	"
6.42	9.40	15.03	0.570	6.1	9	15	0.80	----	1.50	"	"
6.52	8.20	13.02	0.520	6.3	8	13	0.81	----	1.56	"	110-120
6.61	8.40	13.25	0.510	6.1	8	13	0.82	----	1.60	"	"
6.70	7.00	10.96	0.450	6.4	7	11	0.83	----	1.32	"	"
6.80	6.80	10.58	0.420	6.2	7	11	0.84	----	1.28	"	"
6.89	6.90	10.66	0.410	5.9	7	11	0.86	----	1.29	"	"
6.98	6.30	9.66	0.470	7.5	6	10	0.87	----	1.17	"	"
7.08	7.60	11.57	0.740	9.7	8	12	0.88	----	1.43	Organic Material	120-130
7.17	9.70	14.65	0.630	6.5	10	15	0.89	----	1.54	CLAY	"
7.26	40.90	61.28	0.800	2.0	16	25	0.90	----	5.39	Sandy SILT to Clayey SILT	130-140
7.35	84.40	125.46	1.560	1.8	28	42	0.91	39	----	Silty SAND to Sandy SILT	"
7.44	86.90	128.08	2.080	2.4	29	43	0.93	39	----	"	"
7.54	74.00	108.14	2.800	3.8	37	54	0.94	----	9.80	Clayey SILT to Silty CLAY	"
7.63	51.20	74.18	2.680	5.2	51	74	0.95	----	6.76	CLAY	"
7.72	31.20	44.81	2.450	7.9	31	45	0.96	----	4.10	"	"
7.81	25.70	36.59	2.270	8.8	26	37	0.98	----	3.36	"	"
7.91	15.60	22.02	1.410	9.0	16	22	0.99	----	2.01	"	"
8.00	16.30	22.82	0.890	5.5	16	23	1.00	----	2.11	"	120-130
8.09	17.40	24.26	0.830	4.8	17	24	1.01	----	2.25	"	"
8.18	17.40	24.15	0.870	5.0	17	24	1.02	----	2.25	"	"
8.27	18.00	24.87	0.950	5.3	18	25	1.04	----	2.33	"	130-140
8.37	17.90	24.61	0.960	5.4	18	25	1.05	----	2.32	"	"
8.46	18.00	24.64	0.860	4.8	18	25	1.06	----	2.33	"	120-130
8.56	16.70	22.76	0.850	5.1	17	23	1.07	----	2.16	"	"
8.65	16.00	21.71	0.820	5.1	16	22	1.08	----	2.06	"	"
8.77	20.10	27.11	0.780	3.9	13	18	1.10	----	2.61	Silty CLAY to CLAY	"
8.86	20.00	26.86	0.770	3.8	13	18	1.11	----	2.59	"	"
8.95	20.30	27.14	0.800	3.9	14	18	1.12	----	2.63	"	"
9.05	20.90	27.87	0.880	4.2	14	19	1.13	----	2.71	"	130-140
9.14	21.20	28.19	0.960	4.5	21	28	1.13	----	2.75	CLAY	"
9.23	21.30	28.25	1.040	4.9	21	28	1.14	----	2.76	"	"
9.32	20.90	27.65	1.100	5.3	21	28	1.15	----	2.71	"	"
9.41	21.10	27.84	1.160	5.5	21	28	1.15	----	2.73	"	"
9.50	21.70	28.56	1.190	5.5	22	29	1.16	----	2.81	"	"
9.60	21.50	28.22	1.220	5.7	22	28	1.17	----	2.79	"	"
9.69	21.50	28.15	1.230	5.7	22	28	1.17	----	2.79	"	"
9.78	20.30	26.50	1.300	6.4	20	27	1.18	----	2.62	"	"
9.88	19.50	25.39	1.320	6.8	20	25	1.19	----	2.52	"	"

9.97	19.50	25.32	1.310	6.7	20	25	1.20	----	2.52	"	"
10.06	19.50	25.25	1.320	6.8	20	25	1.20	----	2.52	"	"
10.15	19.20	24.80	1.270	6.6	19	25	1.21	----	2.47	"	"
10.25	17.60	22.67	1.170	6.6	18	23	1.22	----	2.26	"	"
10.34	17.10	21.97	1.130	6.6	17	22	1.22	----	2.19	"	"
10.43	16.70	21.39	1.060	6.3	17	21	1.23	----	2.14	"	"
10.53	15.60	19.94	1.030	6.6	16	20	1.23	----	1.99	"	120-130
10.62	15.00	19.13	0.990	6.6	15	19	1.24	----	1.91	"	"
10.71	14.20	18.06	0.950	6.7	14	18	1.25	----	1.80	"	"
10.80	13.90	17.64	0.880	6.3	14	18	1.25	----	1.76	"	"
10.90	13.40	16.97	0.830	6.2	13	17	1.26	----	1.69	"	"
10.99	13.70	17.31	0.780	5.7	14	17	1.26	----	1.73	"	"
11.08	12.90	16.26	0.730	5.7	13	16	1.27	----	1.63	"	"
11.17	11.50	14.47	0.720	6.3	12	14	1.28	----	1.80	"	"
11.26	12.00	15.06	0.720	6.0	12	15	1.28	----	1.50	"	"
11.36	11.60	14.53	0.670	5.8	12	15	1.29	----	1.81	"	"
11.45	10.00	12.50	0.600	6.0	10	12	1.29	----	1.55	"	"
11.54	8.00	9.98	0.540	6.8	8	10	1.30	----	1.45	"	110-120
11.63	7.50	9.34	0.490	6.5	8	9	1.30	----	1.35	"	"
11.73	7.50	9.32	0.450	6.0	8	9	1.31	----	1.35	"	"
11.82	8.00	9.92	0.440	5.5	8	10	1.31	----	1.45	"	"
11.91	8.90	11.02	0.470	5.3	9	11	1.32	----	1.63	"	"
12.00	8.00	9.89	0.480	6.0	8	10	1.32	----	1.45	"	"
12.10	9.10	11.22	0.470	5.2	9	11	1.33	----	1.39	"	"
12.19	8.60	10.59	0.440	5.1	9	11	1.33	----	1.57	"	"
12.28	8.90	10.94	0.390	4.4	9	11	1.34	----	1.63	"	"
12.37	9.50	11.65	0.400	4.2	10	12	1.34	----	1.45	"	"
12.46	10.20	12.49	0.390	3.8	10	12	1.35	----	1.57	"	"
12.56	10.10	12.34	0.370	3.7	10	12	1.35	----	1.55	"	"
12.65	10.70	13.05	0.350	3.3	7	9	1.36	----	1.65	Silty CLAY to CLAY	"
12.74	10.00	12.17	0.330	3.3	7	8	1.36	----	1.53	"	"
12.84	9.20	11.17	0.360	3.9	9	11	1.37	----	1.40	CLAY	"
12.93	9.50	11.52	0.410	4.3	10	12	1.37	----	1.45	"	"
13.02	9.00	10.89	0.400	4.4	9	11	1.38	----	1.36	"	"
13.12	8.70	10.51	0.380	4.4	9	11	1.38	----	1.58	"	"
13.21	9.30	11.21	0.350	3.8	9	11	1.38	----	1.41	"	"
13.30	9.60	11.55	0.310	3.2	6	8	1.39	----	1.46	Silty CLAY to CLAY	"
13.40	9.30	11.16	0.310	3.3	6	7	1.39	----	1.41	"	"
13.49	9.40	11.26	0.340	3.6	9	11	1.40	----	1.43	CLAY	"
13.58	9.20	11.00	0.360	3.9	9	11	1.40	----	1.39	"	"
13.67	9.70	11.58	0.360	3.7	10	12	1.41	----	1.47	"	"
13.77	8.60	10.24	0.340	4.0	9	10	1.41	----	1.55	"	"
13.86	7.50	8.92	0.330	4.4	8	9	1.42	----	1.33	"	"
13.95	6.60	7.83	0.310	4.7	7	8	1.42	----	1.15	"	100-110
14.05	5.90	6.99	0.290	4.9	6	7	1.43	----	1.01	"	"
14.14	6.30	7.45	0.280	4.4	6	7	1.43	----	1.08	"	"
14.23	6.30	7.44	0.280	4.4	6	7	1.43	----	1.08	"	"
14.32	7.20	8.49	0.280	3.9	7	8	1.44	----	1.26	"	"
14.41	7.00	8.24	0.280	4.0	7	8	1.44	----	1.22	"	"
14.51	6.90	8.11	0.280	4.1	7	8	1.45	----	1.20	"	"
14.60	7.20	8.45	0.290	4.0	7	8	1.45	----	1.26	"	"
14.69	8.00	9.37	0.310	3.9	8	9	1.46	----	1.42	"	110-120
14.79	9.70	11.34	0.340	3.5	10	11	1.46	----	1.46	"	"
14.88	10.70	12.48	0.380	3.6	7	8	1.47	----	1.63	Silty CLAY to CLAY	"
14.97	11.40	13.27	0.460	4.0	11	13	1.47	----	1.75	CLAY	120-130

15.07	9.90	11.49	0.540	5.5	10	11	1.48	----	1.50	"	"
15.16	10.70	12.39	0.520	4.9	11	12	1.48	----	1.63	"	"
15.25	10.90	12.60	0.510	4.7	11	13	1.49	----	1.66	"	"
15.28	11.80	13.63	0.520	4.4	12	14	1.49	----	1.81	"	"
15.37	12.80	14.74	0.550	4.3	13	15	1.50	----	1.58	"	"
15.46	13.40	15.40	0.570	4.3	13	15	1.50	----	1.66	"	"
15.55	14.00	16.06	0.570	4.1	14	16	1.51	----	1.74	"	"
15.64	13.50	15.46	0.580	4.3	14	15	1.51	----	1.67	"	"
15.74	12.10	13.83	0.570	4.7	12	14	1.52	----	1.48	"	"
15.83	11.50	13.12	0.520	4.5	12	13	1.52	----	1.75	"	"
15.92	11.10	12.64	0.500	4.5	11	13	1.53	----	1.69	"	"
16.01	10.70	12.17	0.480	4.5	11	12	1.54	----	1.62	"	"
16.11	10.40	11.80	0.480	4.6	10	12	1.54	----	1.57	"	"
16.20	11.20	12.69	0.480	4.3	11	13	1.55	----	1.70	"	"
16.29	12.10	13.68	0.530	4.4	12	14	1.55	----	1.48	"	"
16.38	12.10	13.66	0.530	4.4	12	14	1.56	----	1.48	"	"
16.48	12.30	13.86	0.520	4.2	12	14	1.57	----	1.50	"	"
16.57	10.90	12.26	0.510	4.7	11	12	1.57	----	1.65	"	"
16.66	10.50	11.79	0.470	4.5	11	12	1.58	----	1.58	"	110-120
16.75	10.40	11.66	0.430	4.1	10	12	1.58	----	1.56	"	"
16.85	9.60	10.74	0.410	4.3	10	11	1.59	----	1.43	"	"
16.94	8.80	9.83	0.400	4.5	9	10	1.59	----	1.55	"	"
17.03	8.50	9.48	0.380	4.5	9	9	1.60	----	1.49	"	"
17.12	8.30	9.24	0.380	4.6	8	9	1.60	----	1.45	"	"
17.22	6.70	7.45	0.350	5.2	7	7	1.61	----	1.13	"	"
17.31	7.00	7.77	0.300	4.3	7	8	1.61	----	1.19	"	100-110
17.40	7.00	7.76	0.280	4.0	7	8	1.61	----	1.19	"	"
17.49	8.00	8.86	0.280	3.5	8	9	1.62	----	1.38	"	"
17.59	8.40	9.29	0.280	3.3	8	9	1.62	----	1.46	"	"
17.68	8.50	9.39	0.310	3.6	9	9	1.63	----	1.48	"	110-120
17.77	8.00	8.82	0.300	3.8	8	9	1.63	----	1.38	"	"
17.86	7.30	8.04	0.280	3.8	7	8	1.63	----	1.24	"	100-110
17.96	6.10	6.71	0.260	4.3	6	7	1.64	----	1.00	"	"
18.05	4.00	4.40	0.220	5.5	4	4	1.64	----	0.58	"	90-100
18.14	3.40	3.73	0.190	5.6	3	4	1.64	----	0.46	"	"
18.23	2.90	3.18	0.180	6.2	3	3	1.65	----	0.36	"	"
18.33	2.60	2.85	0.160	6.2	3	3	1.65	----	0.30	Organic Material	"
18.42	3.20	3.50	0.140	4.4	3	4	1.65	----	0.42	CLAY	"
18.49	5.00	5.47	0.140	2.8	5	5	1.66	----	0.77	"	"
18.58	6.20	6.77	0.160	2.6	4	5	1.66	----	1.01	Silty CLAY to CLAY	"
18.68	7.70	8.40	0.190	2.5	5	6	1.66	----	1.31	"	100-110
18.77	9.40	10.24	0.390	4.1	9	10	1.67	----	1.38	CLAY	110-120
18.86	13.10	14.25	0.640	4.9	13	14	1.67	----	1.59	"	120-130
18.96	21.00	22.79	0.800	3.8	14	15	1.68	----	2.65	Silty CLAY to CLAY	"
19.05	27.80	30.10	1.010	3.6	14	15	1.69	----	3.55	Clayey SILT to Silty CLAY	130-140
19.14	32.90	35.55	1.250	3.8	16	18	1.69	----	4.23	"	"
19.23	33.10	35.69	1.310	4.0	17	18	1.70	----	4.26	"	"
19.33	29.90	32.16	1.190	4.0	20	21	1.71	----	3.83	Silty CLAY to CLAY	"
19.42	26.50	28.44	0.930	3.5	13	14	1.71	----	3.38	Clayey SILT to Silty CLAY	"
19.51	18.40	19.71	0.670	3.6	12	13	1.72	----	2.29	Silty CLAY to CLAY	120-130
19.61	11.90	12.72	0.430	3.6	8	8	1.72	----	1.78	"	"
19.70	8.50	9.07	0.310	3.6	9	9	1.73	----	1.46	CLAY	110-120
19.79	7.80	8.31	0.260	3.3	8	8	1.73	----	1.32	"	100-110
19.88	7.60	8.09	0.190	2.5	5	5	1.74	----	1.28	Silty CLAY to CLAY	"
19.98	6.40	6.80	0.170	2.7	4	5	1.74	----	1.04	"	"

20.07	5.10	5.42	0.170	3.3	5	5	1.74	----	0.78	CLAY	90-100
20.16	4.60	4.88	0.170	3.7	5	5	1.75	----	0.68	"	"
20.25	3.90	4.13	0.170	4.4	4	4	1.75	----	0.53	"	"
20.35	4.20	4.45	0.180	4.3	4	4	1.75	----	0.59	"	"
20.44	4.00	4.23	0.190	4.8	4	4	1.76	----	0.55	"	"
20.53	5.20	5.50	0.210	4.0	5	5	1.76	----	0.79	"	100-110
20.62	5.80	6.13	0.200	3.4	6	6	1.76	----	0.91	"	"
20.71	5.90	6.23	0.200	3.4	6	6	1.77	----	0.93	"	"
20.80	5.90	6.22	0.190	3.2	6	6	1.77	----	0.93	"	"
20.90	4.90	5.16	0.180	3.7	5	5	1.78	----	0.73	"	90-100
20.99	5.50	5.79	0.170	3.1	6	6	1.78	----	0.85	"	"
21.08	6.00	6.31	0.180	3.0	6	6	1.78	----	0.95	"	100-110
21.17	5.70	5.99	0.200	3.5	6	6	1.79	----	0.89	"	"
21.26	5.80	6.09	0.210	3.6	6	6	1.79	----	0.90	"	"
21.35	6.90	7.24	0.200	2.9	7	7	1.79	----	1.12	"	"
21.45	6.40	6.71	0.190	3.0	6	7	1.80	----	1.02	"	"
21.54	6.50	6.81	0.270	4.2	7	7	1.80	----	1.04	"	"
21.63	6.40	6.70	0.480	7.5	6	7	1.81	----	1.02	"	110-120
21.72	7.50	7.84	0.590	7.9	8	8	1.81	----	1.24	"	"
21.81	10.80	11.27	0.670	6.2	11	11	1.82	----	1.58	"	120-130
21.87	17.60	18.36	0.700	4.0	12	12	1.82	----	2.17	Silty CLAY to CLAY	"
21.96	20.40	21.25	0.700	3.4	10	11	1.83	----	2.54	Clayey SILT to Silty CLAY	"
22.05	18.30	19.04	0.610	3.3	9	10	1.83	----	2.26	"	"
22.14	12.70	13.19	0.550	4.3	13	13	1.84	----	1.52	CLAY	"
22.23	11.50	11.93	0.410	3.6	8	8	1.84	----	1.69	Silty CLAY to CLAY	110-120
22.33	10.40	10.78	0.280	2.7	7	7	1.85	----	1.51	"	"
22.42	8.00	8.29	0.250	3.1	5	6	1.85	----	1.33	"	100-110
22.51	5.90	6.11	0.240	4.1	6	6	1.86	----	0.91	CLAY	"
22.60	5.90	6.10	0.200	3.4	6	6	1.86	----	0.91	"	"
22.70	6.00	6.20	0.180	3.0	6	6	1.86	----	0.93	"	"
22.79	5.40	5.57	0.170	3.1	5	6	1.87	----	0.81	"	90-100
22.88	4.70	4.85	0.170	3.6	5	5	1.87	----	0.67	"	"
22.97	4.90	5.05	0.170	3.5	5	5	1.87	----	0.71	"	"
23.06	5.40	5.56	0.190	3.5	5	6	1.88	----	0.80	"	100-110
23.16	6.20	6.38	0.230	3.7	6	6	1.88	----	0.96	"	"
23.25	7.00	7.20	0.260	3.7	7	7	1.88	----	1.12	"	"
23.34	8.40	8.62	0.290	3.5	8	9	1.89	----	1.40	"	110-120
23.43	8.70	8.92	0.330	3.8	9	9	1.89	----	1.46	"	"
23.52	8.40	8.60	0.360	4.3	8	9	1.90	----	1.40	"	"
23.62	9.40	9.62	0.390	4.1	9	10	1.90	----	1.33	"	"
23.71	10.20	10.43	0.430	4.2	10	10	1.91	----	1.46	"	"
23.80	10.80	11.03	0.450	4.2	11	11	1.91	----	1.56	"	"
23.89	9.70	9.89	0.450	4.6	10	10	1.92	----	1.38	"	"
23.98	10.50	10.70	0.440	4.2	11	11	1.92	----	1.51	"	"
24.07	8.70	8.85	0.400	4.6	9	9	1.93	----	1.45	"	"
24.16	8.70	8.84	0.360	4.1	9	9	1.93	----	1.45	"	"
24.24	9.10	9.24	0.360	4.0	9	9	1.94	----	1.28	"	"
24.33	9.60	9.74	0.360	3.8	10	10	1.94	----	1.36	"	"
24.42	8.80	8.92	0.360	4.1	9	9	1.95	----	1.47	"	"
24.51	9.50	9.61	0.360	3.8	10	10	1.95	----	1.34	"	"
24.61	9.80	9.91	0.380	3.9	10	10	1.96	----	1.39	"	"
24.70	8.70	8.78	0.430	4.9	9	9	1.96	----	1.45	"	"
24.79	9.50	9.58	0.480	5.1	10	10	1.96	----	1.34	"	"
24.88	10.70	10.78	0.480	4.5	11	11	1.97	----	1.54	"	120-130
25.09	9.70	9.74	0.490	5.1	10	10	1.98	----	1.37	"	110-120

25.18	8.60	8.63	0.470	5.5	9	9	1.99	----	1.42	"	"
25.27	9.00	9.02	0.450	5.0	9	9	1.99	----	1.25	"	"
25.36	6.80	6.81	0.410	6.0	7	7	2.00	----	1.06	"	"
25.45	5.60	5.60	0.360	6.4	6	6	2.00	----	0.82	"	100-110
25.55	5.40	5.40	0.280	5.2	5	5	2.00	----	0.78	"	"
25.64	4.50	4.50	0.220	4.9	5	4	2.01	----	0.60	"	"
25.73	4.80	4.80	0.250	5.2	5	5	2.01	----	0.65	"	"
25.82	5.10	5.10	0.310	6.1	5	5	2.02	----	0.71	"	"
25.91	8.20	8.20	0.380	4.6	8	8	2.02	----	1.33	"	110-120
26.01	9.90	9.90	0.470	4.7	10	10	2.03	----	1.39	"	"
26.10	8.10	8.10	0.490	6.0	8	8	2.03	----	1.31	"	"
26.19	7.10	7.10	0.440	6.2	7	7	2.03	----	1.11	"	"
26.28	5.10	5.10	0.400	7.8	5	5	2.04	----	0.71	"	100-110
26.37	5.50	5.50	0.340	6.2	6	5	2.04	----	0.79	"	"
26.46	5.50	5.49	0.310	5.6	6	5	2.05	----	0.79	"	"
26.56	6.70	6.69	0.290	4.3	7	7	2.05	----	1.03	"	"
26.65	8.00	7.99	0.300	3.8	8	8	2.06	----	1.28	"	110-120
26.74	8.60	8.59	0.320	3.7	9	9	2.06	----	1.40	"	"
26.83	8.60	8.59	0.320	3.7	9	9	2.06	----	1.40	"	"
26.92	9.40	9.39	0.300	3.2	6	6	2.07	----	1.30	Silty CLAY to CLAY	"
27.02	9.70	9.69	0.310	3.2	6	6	2.07	----	1.35	"	"
27.11	9.50	9.48	0.340	3.6	10	9	2.08	----	1.32	CLAY	"
27.20	8.40	8.39	0.340	4.0	8	8	2.08	----	1.36	"	"
27.29	7.30	7.29	0.290	4.0	7	7	2.09	----	1.14	"	100-110
27.38	7.00	6.99	0.260	3.7	7	7	2.09	----	1.08	"	"
27.47	6.90	6.89	0.250	3.6	7	7	2.10	----	1.05	"	"
27.56	6.80	6.79	0.230	3.4	7	7	2.10	----	1.03	"	"
27.65	7.40	7.38	0.250	3.4	7	7	2.10	----	1.15	"	"
27.74	9.40	9.38	0.310	3.3	6	6	2.11	----	1.29	Silty CLAY to CLAY	110-120
27.83	11.30	11.27	0.380	3.4	8	8	2.11	----	1.61	"	"
27.93	13.70	13.67	0.420	3.1	9	9	2.12	----	1.61	"	120-130
28.02	13.20	13.17	0.440	3.3	9	9	2.12	----	1.54	"	"
28.11	12.10	12.07	0.530	4.4	12	12	2.13	----	1.39	CLAY	"
28.20	11.80	11.77	0.620	5.3	12	12	2.14	----	1.69	"	"
28.29	11.70	11.67	0.620	5.3	12	12	2.14	----	1.67	"	"
28.51	12.50	12.46	0.540	4.3	13	12	2.16	----	1.44	"	"
28.61	12.50	12.46	0.530	4.2	13	12	2.16	----	1.44	"	"
28.70	12.50	12.46	0.510	4.1	13	12	2.17	----	1.44	"	"
28.79	11.30	11.26	0.480	4.2	11	11	2.17	----	1.60	"	"
28.88	10.40	10.36	0.460	4.4	10	10	2.18	----	1.45	"	110-120
28.97	8.20	8.17	0.420	5.1	8	8	2.18	----	1.30	"	"
29.06	7.10	7.07	0.370	5.2	7	7	2.19	----	1.08	"	"
29.15	8.20	8.17	0.350	4.3	8	8	2.19	----	1.29	"	"
29.24	8.70	8.67	0.360	4.1	9	9	2.20	----	1.39	"	"
29.33	9.60	9.56	0.370	3.9	10	10	2.20	----	1.31	"	"
29.42	10.30	10.26	0.400	3.9	10	10	2.21	----	1.43	"	"
29.52	9.90	9.86	0.440	4.4	10	10	2.21	----	1.36	"	"
29.61	10.40	10.35	0.490	4.7	10	10	2.22	----	1.44	"	120-130
29.70	11.70	11.65	0.610	5.2	12	12	2.22	----	1.66	"	"
29.79	15.90	15.83	0.770	4.8	16	16	2.23	----	1.88	"	"
29.88	19.10	19.01	0.970	5.1	19	19	2.23	----	2.31	"	130-140
29.97	22.90	22.79	1.180	5.2	23	23	2.24	----	2.82	"	"
30.06	23.90	23.78	1.270	5.3	24	24	2.25	----	2.95	"	"
30.15	23.60	23.48	1.200	5.1	24	23	2.25	----	2.91	"	"
30.24	20.20	20.09	1.080	5.3	20	20	2.26	----	2.45	"	"

30.33	16.90	16.81	0.960	5.7	17	17	2.27	----	2.01	"	120-130
30.42	13.80	13.72	0.810	5.9	14	14	2.27	----	1.60	"	"
30.51	11.90	11.83	0.650	5.5	12	12	2.28	----	1.68	"	"
30.60	9.80	9.74	0.480	4.9	10	10	2.28	----	1.33	"	110-120
30.69	8.90	8.85	0.360	4.0	9	9	2.29	----	1.42	"	"
30.78	8.20	8.15	0.320	3.9	8	8	2.29	----	1.27	"	"
30.87	8.50	8.45	0.300	3.5	9	8	2.30	----	1.33	"	"
30.96	8.50	8.45	0.290	3.4	9	8	2.30	----	1.33	"	"
31.05	7.90	7.85	0.290	3.7	8	8	2.31	----	1.21	"	"
31.12	7.80	7.75	0.290	3.7	8	8	2.31	----	1.19	"	100-110
31.21	7.70	7.65	0.280	3.6	8	8	2.31	----	1.17	"	"
31.30	8.10	8.05	0.180	2.2	5	5	2.32	----	1.25	Silty CLAY to CLAY	"
31.40	8.30	8.25	0.340	4.1	8	8	2.32	----	1.29	CLAY	110-120
31.49	9.00	8.94	0.390	4.3	9	9	2.33	----	1.19	"	"
31.57	9.70	9.64	0.400	4.1	10	10	2.33	----	1.30	"	"
31.63	10.90	10.83	0.420	3.9	11	11	2.33	----	1.50	"	"
31.69	11.20	11.12	0.450	4.0	11	11	2.34	----	1.55	"	120-130
31.78	11.70	11.62	0.490	4.2	12	12	2.34	----	1.64	"	"
31.87	12.80	12.71	0.490	3.8	13	13	2.35	----	1.45	"	"
31.95	12.40	12.31	0.490	4.0	12	12	2.35	----	1.40	"	"
32.05	11.50	11.42	0.530	4.6	12	11	2.36	----	1.60	"	"
32.14	11.40	11.32	0.530	4.6	11	11	2.37	----	1.58	"	"
32.22	11.40	11.32	0.530	4.6	11	11	2.37	----	1.58	"	"
32.31	12.20	12.11	0.540	4.4	12	12	2.38	----	1.37	"	"
32.41	11.90	11.81	0.560	4.7	12	12	2.38	----	1.66	"	"
32.50	11.50	11.41	0.580	5.0	12	11	2.39	----	1.60	"	"
32.59	11.40	11.31	0.610	5.4	11	11	2.39	----	1.58	"	"
32.68	12.60	12.50	0.590	4.7	13	12	2.40	----	1.42	"	"
32.77	13.90	13.79	0.570	4.1	14	14	2.41	----	1.59	"	"
32.86	13.10	12.99	0.550	4.2	13	13	2.41	----	1.49	"	"
32.95	12.60	12.49	0.530	4.2	13	12	2.42	----	1.42	"	"
33.04	13.10	12.99	0.520	4.0	13	13	2.42	----	1.48	"	"
33.13	12.30	12.19	0.510	4.1	12	12	2.43	----	1.38	"	"
33.22	12.90	12.79	0.490	3.8	9	9	2.43	----	1.46	Silty CLAY to CLAY	"
33.31	12.90	12.79	0.510	4.0	13	13	2.44	----	1.46	CLAY	"
33.40	13.00	12.88	0.520	4.0	13	13	2.45	----	1.47	"	"
33.50	13.90	13.77	0.590	4.2	14	14	2.45	----	1.59	"	"
33.59	19.70	19.52	0.720	3.7	13	13	2.46	----	2.36	Silty CLAY to CLAY	"
33.68	21.40	21.20	0.990	4.6	21	21	2.46	----	2.59	CLAY	130-140
33.76	23.70	23.48	1.050	4.4	16	16	2.47	----	2.89	Silty CLAY to CLAY	"
33.86	25.20	24.96	1.020	4.0	17	17	2.48	----	3.09	"	"
33.94	17.70	17.53	0.960	5.4	18	18	2.48	----	2.09	CLAY	"
34.03	14.70	14.56	0.910	6.2	15	15	2.49	----	1.69	"	120-130
34.13	13.40	13.27	0.700	5.2	13	13	2.49	----	1.52	"	"
34.22	13.30	13.17	0.580	4.4	13	13	2.50	----	1.50	"	"
34.31	16.70	16.50	0.590	3.5	11	11	2.51	----	1.95	Silty CLAY to CLAY	"
34.40	18.10	17.85	0.590	3.3	9	9	2.51	----	2.14	Clayey SILT to Silty CLAY	"
34.46	19.60	19.31	0.590	3.0	10	10	2.51	----	2.34	"	"
34.56	25.30	24.87	0.640	2.5	13	12	2.52	----	3.10	"	"
34.65	26.20	25.70	0.710	2.7	13	13	2.53	----	3.22	"	130-140
34.79	28.50	27.86	0.760	2.7	14	14	2.54	----	3.52	"	"
34.94	38.20	37.20	0.920	2.4	15	15	2.55	----	4.82	Sandy SILT to Clayey SILT	"
35.17	48.90	47.36	2.460	5.0	33	32	2.57	----	6.24	Silty CLAY to CLAY	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-19
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 10:12:11
Terminated at 35.0 feet Groundwater measured at 3.7 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.59	48.20	77.12	1.930	4.0	24	39	0.07	----	6.42	Clayey SILT to Silty CLAY	"
0.69	42.20	67.52	1.890	4.5	28	45	0.08	----	5.62	Silty CLAY to CLAY	"
0.79	36.40	58.24	1.790	4.9	36	58	0.10	----	4.85	CLAY	"
0.90	28.70	45.92	1.730	6.0	29	46	0.11	----	3.82	"	"
1.00	25.00	40.00	1.640	6.6	25	40	0.12	----	3.33	"	"
1.10	22.20	35.52	1.520	6.8	22	36	0.14	----	2.95	"	"
1.20	20.70	33.12	1.390	6.7	21	33	0.15	----	2.75	"	"
1.30	19.60	31.36	1.220	6.2	20	31	0.17	----	2.60	"	"
1.40	17.80	28.48	1.110	6.2	18	28	0.18	----	2.36	"	"
1.50	15.20	24.32	1.030	6.8	15	24	0.19	----	2.01	"	120-130
1.60	15.00	24.00	0.940	6.3	15	24	0.20	----	1.99	"	"
1.70	13.80	22.08	0.840	6.1	14	22	0.22	----	1.83	"	"
1.80	12.80	20.48	0.800	6.3	13	20	0.23	----	1.69	"	"
1.90	12.00	19.20	0.780	6.5	12	19	0.24	----	1.58	"	"
2.00	11.20	17.92	0.760	6.8	11	18	0.25	----	1.85	"	"
2.10	11.40	18.24	0.750	6.6	11	18	0.27	----	1.88	"	"
2.33	11.60	18.56	0.770	6.6	12	19	0.30	----	1.91	"	"
2.43	12.00	19.20	0.770	6.4	12	19	0.31	----	1.58	"	"
2.53	11.60	18.56	0.770	6.6	12	19	0.32	----	1.91	"	"
2.63	11.90	19.04	0.770	6.5	12	19	0.33	----	1.96	"	"
2.73	10.60	16.96	0.730	6.9	11	17	0.35	----	1.74	"	"
2.83	9.60	15.36	0.670	7.0	10	15	0.36	----	1.57	"	"
2.94	9.50	15.20	0.600	6.3	10	15	0.37	----	1.55	"	"
3.04	9.10	14.56	0.560	6.2	9	15	0.38	----	1.48	"	"
3.14	8.50	13.60	0.570	6.7	9	14	0.40	----	1.66	"	"
3.24	8.40	13.44	0.620	7.4	8	13	0.41	----	1.64	"	"
3.34	9.40	15.04	0.560	6.0	9	15	0.42	----	1.53	"	"
3.45	7.80	12.48	0.530	6.8	8	12	0.43	----	1.52	"	110-120
3.55	7.20	11.52	0.440	6.1	7	12	0.45	----	1.40	"	"
3.65	8.50	13.60	0.400	4.7	9	14	0.46	----	1.65	"	"
3.76	10.20	16.32	0.350	3.4	7	11	0.46	----	1.66	Silty CLAY to CLAY	"
3.86	10.10	16.16	0.350	3.5	7	11	0.47	----	1.64	"	"
3.96	9.50	15.20	0.300	3.2	6	10	0.47	----	1.54	"	"
4.06	8.50	13.60	0.270	3.2	6	9	0.48	----	1.65	"	100-110
4.17	8.30	13.28	0.280	3.4	8	13	0.48	----	1.61	CLAY	"
4.27	8.10	12.96	0.270	3.3	8	13	0.49	----	1.57	"	"
4.37	8.00	12.80	0.260	3.3	8	13	0.49	----	1.55	"	"
4.47	6.80	10.88	0.240	3.5	7	11	0.50	----	1.31	"	"
4.58	6.90	11.04	0.230	3.3	7	11	0.50	----	1.32	"	"
4.68	6.50	10.40	0.220	3.4	7	10	0.50	----	1.24	"	"
4.78	6.80	10.88	0.220	3.2	7	11	0.51	----	1.30	"	"
4.86	7.20	11.52	0.220	3.1	7	12	0.51	----	1.38	"	"
4.97	7.10	11.36	0.220	3.1	7	11	0.52	----	1.36	"	"
5.07	7.90	12.64	0.270	3.4	8	13	0.52	----	1.52	"	"
5.17	8.20	13.12	0.310	3.8	8	13	0.53	----	1.58	"	110-120
5.28	8.90	14.24	0.340	3.8	9	14	0.53	----	1.72	"	"
5.38	10.10	16.16	0.320	3.2	7	11	0.54	----	1.63	Silty CLAY to CLAY	"

5.48	8.30	13.28	0.300	3.6	8	13	0.54	----	1.59	CLAY	"
5.59	9.20	14.72	0.260	2.8	6	10	0.55	----	1.48	Silty CLAY to CLAY	100-110
5.70	9.80	15.68	0.250	2.6	7	10	0.55	----	1.58	"	"
5.80	9.60	15.36	0.250	2.6	6	10	0.56	----	1.54	"	"
5.90	8.90	14.24	0.230	2.6	6	9	0.56	----	1.71	"	"
6.01	8.90	14.24	0.210	2.4	6	9	0.57	----	1.71	"	"
6.11	8.50	13.60	0.190	2.2	6	9	0.57	----	1.63	"	"
6.22	8.30	13.28	0.190	2.3	6	9	0.57	----	1.59	"	"
6.32	8.70	13.92	0.200	2.3	6	9	0.58	----	1.67	"	"
6.42	9.70	15.52	0.260	2.7	6	10	0.58	----	1.55	"	110-120
6.53	9.30	14.88	0.290	3.1	6	10	0.59	----	1.49	"	"
6.63	9.40	15.04	0.320	3.4	9	15	0.59	----	1.50	CLAY	"
6.73	10.20	16.32	0.360	3.5	10	16	0.60	----	1.63	"	"
6.84	11.50	18.40	0.440	3.8	12	18	0.61	----	1.85	"	120-130
6.94	12.30	19.68	0.490	4.0	12	20	0.61	----	1.59	"	"
7.05	14.30	22.88	0.540	3.8	10	15	0.62	----	1.85	Silty CLAY to CLAY	"
7.15	15.00	24.00	0.590	3.9	10	16	0.63	----	1.94	"	"
7.25	16.30	26.08	0.610	3.7	11	17	0.63	----	2.12	"	"
7.35	16.70	26.72	0.620	3.7	11	18	0.64	----	2.17	"	"
7.46	17.30	27.68	0.640	3.7	12	18	0.65	----	2.25	"	"
7.56	16.80	26.88	0.670	4.0	11	18	0.65	----	2.18	"	"
7.66	17.40	27.84	0.690	4.0	12	19	0.66	----	2.26	"	"
7.77	16.60	26.56	0.730	4.4	17	27	0.66	----	2.15	CLAY	"
7.87	15.80	25.28	0.720	4.6	16	25	0.67	----	2.04	"	"
7.97	16.50	26.40	0.720	4.4	17	26	0.68	----	2.14	"	"
8.07	15.80	25.28	0.720	4.6	16	25	0.68	----	2.04	"	"
8.18	15.10	24.16	0.710	4.7	15	24	0.69	----	1.95	"	"
8.28	15.70	25.12	0.720	4.6	16	25	0.70	----	2.03	"	"
8.38	14.60	23.36	0.740	5.1	15	23	0.70	----	1.88	"	"
8.48	15.40	24.64	0.750	4.9	15	25	0.71	----	1.99	"	"
8.58	15.40	24.64	0.720	4.7	15	25	0.72	----	1.99	"	"
8.75	15.40	24.64	0.630	4.1	15	25	0.73	----	1.98	"	"
8.86	14.00	22.40	0.620	4.4	14	22	0.73	----	1.80	"	"
8.96	14.40	23.04	0.650	4.5	14	23	0.74	----	1.85	"	"
9.06	13.90	22.24	0.640	4.6	14	22	0.75	----	1.78	"	"
9.17	12.60	20.16	0.610	4.8	13	20	0.75	----	1.61	"	"
9.27	11.30	18.08	0.570	5.0	11	18	0.76	----	1.79	"	"
9.37	11.10	17.76	0.470	4.2	11	18	0.77	----	1.76	"	"
9.48	9.30	14.88	0.380	4.1	9	15	0.77	----	1.46	"	110-120
9.58	7.60	12.16	0.280	3.7	8	12	0.78	----	1.41	"	100-110
9.68	7.30	11.68	0.220	3.0	7	12	0.78	----	1.34	"	"
9.78	7.40	11.84	0.180	2.4	5	8	0.78	----	1.36	Silty CLAY to CLAY	"
9.89	6.60	10.56	0.180	2.7	4	7	0.79	----	1.20	"	"
9.99	7.00	11.20	0.180	2.6	5	7	0.79	----	1.28	"	"
10.10	7.40	11.84	0.210	2.8	5	8	0.80	----	1.36	"	"
10.20	9.00	14.39	0.230	2.6	6	10	0.80	----	1.40	"	"
10.30	8.80	14.03	0.240	2.7	6	9	0.81	----	1.64	"	"
10.40	7.70	12.24	0.220	2.9	5	8	0.81	----	1.42	"	"
10.51	6.70	10.62	0.180	2.7	4	7	0.81	----	1.22	"	"
10.61	5.80	9.18	0.150	2.6	6	9	0.82	----	1.03	CLAY	90-100
10.71	4.80	7.58	0.130	2.7	5	8	0.82	----	0.83	"	"
10.82	5.60	8.82	0.110	2.0	4	6	0.82	----	0.99	Silty CLAY to CLAY	"
10.92	4.90	7.70	0.090	1.8	3	5	0.83	----	0.85	"	"
11.02	3.90	6.12	0.080	2.1	4	6	0.83	----	0.65	CLAY	"
11.12	3.50	5.48	0.070	2.0	2	3	0.83	----	0.57	Sensitive Fine Grained	85-90

11.23	3.10	4.85	0.070	2.3	3	5	0.84	----	0.49	CLAY	"
11.33	3.10	4.84	0.050	1.6	2	2	0.84	----	0.49	Sensitive Fine Grained	"
11.43	3.70	5.77	0.040	1.1	2	3	0.84	----	0.61	"	"
11.54	3.20	4.98	0.040	1.3	2	2	0.84	----	0.51	"	"
11.64	2.80	4.35	0.050	1.8	1	2	0.85	----	0.43	"	"
11.74	2.90	4.50	0.050	1.7	1	2	0.85	----	0.44	"	"
11.85	3.40	5.26	0.050	1.5	2	3	0.85	----	0.54	"	"
11.95	4.40	6.80	0.070	1.6	2	3	0.85	----	0.74	"	"
12.06	4.80	7.40	0.090	1.9	3	5	0.86	----	0.82	Silty CLAY to CLAY	90-100
12.16	5.00	7.69	0.110	2.2	3	5	0.86	----	0.86	"	"
12.26	5.80	8.90	0.120	2.1	4	6	0.86	----	1.02	"	"
12.37	6.00	9.19	0.130	2.2	4	6	0.87	----	1.06	"	"
12.47	5.80	8.86	0.140	2.4	4	6	0.87	----	1.02	"	"
12.57	6.20	9.45	0.150	2.4	4	6	0.88	----	1.10	"	"
12.68	6.60	10.04	0.130	2.0	4	7	0.88	----	1.18	"	"
12.78	6.60	10.02	0.120	1.8	4	7	0.88	----	1.17	"	"
12.89	6.70	10.15	0.120	1.8	4	7	0.89	----	1.19	"	"
12.99	7.30	11.03	0.140	1.9	5	7	0.89	----	1.31	"	"
13.09	7.60	11.45	0.170	2.2	5	8	0.89	----	1.37	"	100-110
13.20	9.10	13.67	0.240	2.6	6	9	0.90	----	1.39	"	"
13.30	10.00	14.97	0.320	3.2	7	10	0.90	----	1.54	"	110-120
13.41	11.10	16.56	0.380	3.4	7	11	0.91	----	1.72	"	"
13.51	11.70	17.39	0.400	3.4	8	12	0.91	----	1.82	"	"
13.61	9.20	13.62	0.350	3.8	9	14	0.92	----	1.40	CLAY	"
13.72	6.90	10.19	0.270	3.9	7	10	0.92	----	1.22	"	100-110
13.82	5.50	8.10	0.200	3.6	6	8	0.93	----	0.94	"	"
13.92	5.10	7.49	0.190	3.7	5	7	0.93	----	0.86	"	90-100
14.02	6.00	8.78	0.200	3.3	6	9	0.94	----	1.04	"	100-110
14.13	6.40	9.34	0.180	2.8	6	9	0.94	----	1.12	"	"
14.23	6.00	8.74	0.170	2.8	6	9	0.94	----	1.04	"	90-100
14.33	5.50	7.99	0.170	3.1	6	8	0.95	----	0.94	"	"
14.43	6.20	8.99	0.160	2.6	4	6	0.95	----	1.08	Silty CLAY to CLAY	"
14.54	6.20	8.97	0.160	2.6	4	6	0.95	----	1.08	"	"
14.64	6.00	8.66	0.170	2.8	6	9	0.96	----	1.04	CLAY	"
14.74	6.20	8.92	0.200	3.2	6	9	0.96	----	1.07	"	100-110
14.84	7.00	10.04	0.200	2.9	5	7	0.97	----	1.23	Silty CLAY to CLAY	"
14.95	7.00	10.01	0.210	3.0	7	10	0.97	----	1.23	CLAY	"
15.05	6.80	9.69	0.200	2.9	7	10	0.97	----	1.19	"	"
15.15	6.80	9.66	0.200	2.9	7	10	0.98	----	1.19	"	"
15.20	7.10	10.08	0.200	2.8	5	7	0.98	----	1.25	Silty CLAY to CLAY	"
15.30	8.20	11.60	0.220	2.7	5	8	0.99	----	1.47	"	"
15.41	9.20	12.98	0.260	2.8	6	9	0.99	----	1.39	"	"
15.51	10.00	14.05	0.320	3.2	7	9	1.00	----	1.52	"	110-120
15.61	10.30	14.42	0.350	3.4	7	10	1.00	----	1.57	"	"
15.71	10.50	14.67	0.360	3.4	7	10	1.01	----	1.60	"	"
15.82	9.80	13.66	0.340	3.5	10	14	1.01	----	1.49	CLAY	"
15.92	9.00	12.52	0.310	3.4	9	13	1.02	----	1.35	"	"
16.03	9.60	13.33	0.270	2.8	6	9	1.02	----	1.45	Silty CLAY to CLAY	"
16.13	10.20	14.13	0.270	2.6	7	9	1.03	----	1.55	"	"
16.23	9.30	12.86	0.280	3.0	6	9	1.03	----	1.40	"	"
16.33	11.00	15.18	0.290	2.6	6	8	1.04	----	1.68	Clayey SILT to Silty CLAY	"
16.44	10.50	14.46	0.280	2.7	7	10	1.04	----	1.60	Silty CLAY to CLAY	"
16.54	9.30	12.78	0.300	3.2	6	9	1.05	----	1.40	"	"
16.64	8.40	11.53	0.280	3.3	8	12	1.05	----	1.49	CLAY	100-110
16.75	7.60	10.41	0.260	3.4	8	10	1.06	----	1.33	"	"

16.85	7.00	9.57	0.240	3.4	7	10	1.06	----	1.21	"	"
16.95	7.50	10.24	0.270	3.6	8	10	1.07	----	1.31	"	"
17.06	8.40	11.44	0.290	3.5	8	11	1.07	----	1.49	"	110-120
17.16	8.20	11.15	0.290	3.5	8	11	1.08	----	1.45	"	"
17.26	7.50	10.18	0.270	3.6	8	10	1.08	----	1.31	"	100-110
17.37	7.00	9.49	0.240	3.4	7	9	1.09	----	1.21	"	"
17.47	7.20	9.74	0.230	3.2	7	10	1.09	----	1.24	"	"
17.57	8.40	11.34	0.240	2.9	6	8	1.10	----	1.48	Silty CLAY to CLAY	"
17.67	9.60	12.94	0.280	2.9	6	9	1.10	----	1.44	"	110-120
17.77	10.20	13.72	0.350	3.4	7	9	1.11	----	1.53	"	"
17.88	8.60	11.54	0.370	4.3	9	12	1.11	----	1.52	CLAY	"
17.98	7.70	10.31	0.330	4.3	8	10	1.12	----	1.34	"	"
18.08	8.00	10.69	0.330	4.1	8	11	1.12	----	1.40	"	"
18.19	8.90	11.87	0.450	5.1	9	12	1.13	----	1.58	"	"
18.29	11.10	14.77	0.580	5.2	11	15	1.13	----	1.68	"	120-130
18.39	12.50	16.59	0.680	5.4	13	17	1.14	----	1.53	"	"
18.63	15.50	20.45	0.770	5.0	16	20	1.16	----	1.93	"	"
18.73	15.60	20.53	0.870	5.6	16	21	1.16	----	1.94	"	"
18.84	19.70	25.85	0.890	4.5	20	26	1.17	----	2.49	"	130-140
18.94	31.50	41.21	0.940	3.0	16	21	1.18	----	4.06	Clayey SILT to Silty CLAY	"
19.04	41.80	54.52	0.970	2.3	17	22	1.18	----	5.43	Sandy SILT to Clayey SILT	"
19.14	47.70	62.04	0.790	1.7	16	21	1.19	35	----	Silty SAND to Sandy SILT	"
19.24	48.10	62.40	0.780	1.6	16	21	1.20	35	----	"	120-130
19.34	47.20	61.04	1.000	2.1	19	24	1.21	----	6.15	Sandy SILT to Clayey SILT	130-140
19.45	46.10	59.44	1.290	2.8	18	24	1.21	----	6.00	"	"
19.55	47.00	60.42	1.620	3.4	24	30	1.22	----	6.12	Clayey SILT to Silty CLAY	"
19.65	44.70	57.30	1.610	3.6	22	29	1.23	----	5.81	"	"
19.75	40.90	52.27	1.630	4.0	20	26	1.23	----	5.30	"	"
19.85	43.00	54.79	1.680	3.9	22	27	1.24	----	5.58	"	"
19.96	46.70	59.32	1.390	3.0	19	24	1.25	----	6.08	Sandy SILT to Clayey SILT	"
20.06	50.70	64.22	1.260	2.5	20	26	1.26	----	6.61	"	"
20.16	46.30	58.49	1.300	2.8	19	23	1.26	----	6.02	"	"
20.26	35.60	44.85	1.160	3.3	18	22	1.27	----	4.59	Clayey SILT to Silty CLAY	"
20.36	24.40	30.65	0.960	3.9	16	20	1.28	----	3.10	Silty CLAY to CLAY	"
20.46	16.10	20.18	0.860	5.3	16	20	1.29	----	1.99	CLAY	120-130
20.56	12.60	15.75	0.830	6.6	13	16	1.29	----	1.52	"	"
20.66	14.70	18.33	0.710	4.8	15	18	1.30	----	1.80	"	"
20.76	11.70	14.56	0.630	5.4	12	15	1.30	----	1.75	"	"
20.86	8.40	10.43	0.470	5.6	8	10	1.31	----	1.44	"	110-120
20.96	7.50	9.30	0.290	3.9	8	9	1.31	----	1.26	"	100-110
21.06	7.10	8.79	0.220	3.1	7	9	1.32	----	1.18	"	"
21.16	7.10	8.77	0.190	2.7	5	6	1.32	----	1.18	Silty CLAY to CLAY	"
21.26	7.30	9.00	0.280	3.8	7	9	1.33	----	1.22	CLAY	"
21.36	7.90	9.72	0.390	4.9	8	10	1.33	----	1.34	"	110-120
21.46	8.30	10.20	0.450	5.4	8	10	1.34	----	1.42	"	"
21.72	9.00	11.00	0.420	4.7	9	11	1.35	----	1.29	"	"
21.82	9.40	11.46	0.390	4.1	9	11	1.36	----	1.36	"	"
21.92	9.10	11.07	0.390	4.3	9	11	1.36	----	1.31	"	"
22.02	9.50	11.53	0.430	4.5	10	12	1.37	----	1.37	"	"
22.12	10.70	12.96	0.450	4.2	11	13	1.37	----	1.57	"	"
22.22	11.10	13.42	0.560	5.0	11	13	1.38	----	1.64	"	120-130
22.32	13.90	16.76	0.610	4.4	14	17	1.38	----	1.68	"	"
22.43	14.60	17.56	0.650	4.5	15	18	1.39	----	1.78	"	"
22.53	12.10	14.51	0.680	5.6	12	15	1.40	----	1.44	"	"
22.63	10.50	12.56	0.670	6.4	11	13	1.40	----	1.53	"	"

22.73	15.40	18.37	1.240	8.1	15	18	1.41	----	1.88	"	130-140
22.84	41.10	48.87	1.580	3.8	21	24	1.42	----	5.31	Clayey SILT to Silty CLAY	"
22.94	42.80	50.74	1.560	3.6	21	25	1.43	----	5.53	"	"
23.04	24.20	28.61	1.560	6.4	24	29	1.43	----	3.05	CLAY	"
23.14	13.70	16.15	1.330	9.7	14	16	1.44	----	1.65	"	"
23.25	11.50	13.52	0.890	7.7	12	14	1.45	----	1.69	"	120-130
23.35	10.80	12.66	0.670	6.2	11	13	1.45	----	1.58	"	"
23.45	10.30	12.04	0.550	5.3	10	12	1.46	----	1.49	"	"
23.55	8.90	10.38	0.490	5.5	9	10	1.47	----	1.51	"	110-120
23.66	8.10	9.43	0.440	5.4	8	9	1.47	----	1.35	"	"
23.76	8.00	9.29	0.400	5.0	8	9	1.48	----	1.33	"	"
23.86	9.70	11.24	0.430	4.4	10	11	1.48	----	1.39	"	"
23.96	9.70	11.22	0.450	4.6	10	11	1.49	----	1.39	"	"
24.06	11.30	13.03	0.470	4.2	11	13	1.49	----	1.65	"	120-130
24.16	12.10	13.92	0.470	3.9	12	14	1.50	----	1.43	"	"
24.26	13.10	15.04	0.490	3.7	9	10	1.51	----	1.56	Silty CLAY to CLAY	"
24.37	13.90	15.92	0.540	3.9	9	11	1.51	----	1.67	"	"
24.47	13.60	15.55	0.580	4.3	14	16	1.52	----	1.63	CLAY	"
24.57	14.70	16.77	0.600	4.1	15	17	1.52	----	1.77	"	"
24.67	15.70	17.88	0.620	3.9	10	12	1.53	----	1.90	Silty CLAY to CLAY	"
24.77	16.10	18.30	0.630	3.9	11	12	1.54	----	1.96	"	"
25.00	18.60	21.04	0.660	3.5	12	14	1.55	----	2.29	"	"
25.11	18.70	21.11	0.670	3.6	12	14	1.56	----	2.30	"	"
25.21	19.00	21.41	0.680	3.6	13	14	1.56	----	2.34	"	"
25.31	19.20	21.59	0.690	3.6	13	14	1.57	----	2.37	"	"
25.41	18.80	21.10	0.710	3.8	13	14	1.58	----	2.31	"	"
25.51	19.80	22.17	0.740	3.7	13	15	1.58	----	2.44	"	"
25.62	20.50	22.91	0.790	3.9	14	15	1.59	----	2.54	"	"
25.72	18.60	20.74	0.850	4.6	19	21	1.60	----	2.28	CLAY	"
25.82	16.60	18.47	0.840	5.1	17	18	1.60	----	2.01	"	"
25.92	15.60	17.32	0.810	5.2	16	17	1.61	----	1.88	"	"
26.03	16.40	18.18	0.800	4.9	16	18	1.62	----	1.99	"	"
26.13	18.70	20.68	0.800	4.3	19	21	1.62	----	2.29	"	"
26.23	19.60	21.63	0.790	4.0	13	14	1.63	----	2.41	Silty CLAY to CLAY	"
26.33	21.00	23.13	0.820	3.9	14	15	1.64	----	2.60	"	"
26.44	21.90	24.06	0.840	3.8	15	16	1.64	----	2.72	"	130-140
26.54	19.50	21.38	0.870	4.5	20	21	1.65	----	2.39	CLAY	120-130
26.64	15.80	17.29	0.850	5.4	16	17	1.66	----	1.90	"	"
26.74	14.10	15.39	0.770	5.5	14	15	1.66	----	1.67	"	"
26.84	14.10	15.36	0.700	5.0	14	15	1.67	----	1.67	"	"
26.95	12.60	13.70	0.630	5.0	13	14	1.67	----	1.47	"	"
27.05	12.10	13.13	0.580	4.8	12	13	1.68	----	1.40	"	"
27.15	10.80	11.69	0.550	5.1	11	12	1.69	----	1.54	"	"
27.25	10.30	11.13	0.490	4.8	10	11	1.69	----	1.45	"	"
27.35	9.70	10.46	0.430	4.4	10	10	1.70	----	1.35	"	110-120
27.45	8.70	9.36	0.430	4.9	9	9	1.70	----	1.42	"	"
27.56	9.40	10.10	0.400	4.3	9	10	1.71	----	1.30	"	"
27.66	10.50	11.26	0.410	3.9	11	11	1.72	----	1.48	"	"
27.76	10.90	11.67	0.460	4.2	11	12	1.72	----	1.55	"	120-130
27.86	10.80	11.53	0.560	5.2	11	12	1.73	----	1.53	"	"
27.97	11.60	12.36	0.670	5.8	12	12	1.73	----	1.66	"	"
28.07	11.30	12.02	0.740	6.5	11	12	1.74	----	1.61	"	"
28.32	13.40	14.18	0.690	5.1	13	14	1.76	----	1.57	"	"
28.42	14.40	15.22	0.860	6.0	14	15	1.76	----	1.70	"	"
28.53	20.10	21.21	1.180	5.9	20	21	1.77	----	2.46	"	130-140

28.63	34.70	36.55	1.600	4.6	23	24	1.78	----	4.40	Silty CLAY to CLAY	"
28.73	39.00	41.01	1.790	4.6	26	27	1.79	----	4.98	"	"
28.83	36.10	37.90	2.010	5.6	36	38	1.79	----	4.59	CLAY	"
28.93	28.90	30.29	1.940	6.7	29	30	1.80	----	3.63	"	"
29.01	28.10	29.41	1.840	6.5	28	29	1.81	----	3.52	"	"
29.12	26.80	28.00	1.600	6.0	27	28	1.81	----	3.35	"	"
29.22	20.00	20.86	1.260	6.3	20	21	1.82	----	2.44	"	"
29.32	16.80	17.49	1.040	6.2	17	17	1.83	----	2.01	"	"
29.42	13.60	14.14	0.880	6.5	14	14	1.83	----	1.58	"	120-130
29.52	14.80	15.37	0.850	5.7	15	15	1.84	----	1.74	"	"
29.63	14.60	15.14	0.910	6.2	15	15	1.85	----	1.72	"	"
29.73	14.60	15.11	1.040	7.1	15	15	1.85	----	1.71	"	"
29.83	16.70	17.26	1.200	7.2	17	17	1.86	----	1.99	"	130-140
29.93	20.60	21.25	1.250	6.1	21	21	1.87	----	2.51	"	"
30.03	18.20	18.74	1.160	6.4	18	19	1.88	----	2.19	"	"
30.13	16.50	16.96	1.070	6.5	17	17	1.88	----	1.96	"	"
30.23	16.50	16.94	0.980	5.9	17	17	1.89	----	1.96	"	120-130
30.33	18.50	18.96	1.250	6.8	19	19	1.90	----	2.23	"	130-140
30.43	22.70	23.23	1.630	7.2	23	23	1.90	----	2.79	"	"
30.53	27.20	27.78	1.770	6.5	27	28	1.91	----	3.39	"	"
30.63	24.60	25.09	1.750	7.1	25	25	1.92	----	3.04	"	"
30.73	21.60	21.99	1.820	8.4	22	22	1.93	----	2.64	"	"
30.83	22.10	22.46	1.760	8.0	22	22	1.93	----	2.70	"	"
30.92	23.70	24.04	1.830	7.7	24	24	1.94	----	2.92	"	"
31.02	23.70	24.00	2.090	8.8	24	24	1.95	----	2.92	"	"
31.12	25.90	26.19	2.380	9.2	26	26	1.95	----	3.21	"	"
31.22	30.50	30.78	2.270	7.4	31	31	1.96	----	3.82	"	"
31.32	47.60	47.96	2.120	4.5	32	32	1.97	----	6.10	Silty CLAY to CLAY	"
31.42	60.30	60.66	2.020	3.3	24	24	1.98	----	7.79	Sandy SILT to Clayey SILT	"
31.66	34.90	34.96	1.770	5.1	35	35	1.99	----	4.40	CLAY	"
31.76	20.10	20.10	1.570	7.8	20	20	2.00	----	2.43	"	"
31.86	18.00	18.00	1.200	6.7	18	18	2.01	----	2.15	"	"
31.96	15.10	15.10	0.730	4.8	15	15	2.01	----	1.76	"	120-130
32.06	13.10	13.09	0.530	4.0	13	13	2.02	----	1.49	"	"
32.16	12.30	12.29	0.460	3.7	8	8	2.03	----	1.39	Silty CLAY to CLAY	"
32.26	13.00	12.99	0.380	2.9	9	9	2.03	----	1.48	"	110-120
32.36	12.50	12.49	0.360	2.9	8	8	2.04	----	1.41	"	"
32.46	13.90	13.89	0.430	3.1	9	9	2.04	----	1.60	"	120-130
32.55	14.90	14.89	0.490	3.3	10	10	2.05	----	1.73	"	"
32.65	15.70	15.68	0.560	3.6	10	10	2.06	----	1.84	"	"
32.75	17.50	17.48	0.620	3.5	12	12	2.06	----	2.07	"	"
32.85	17.40	17.38	0.710	4.1	12	12	2.07	----	2.06	"	"
32.95	16.80	16.78	0.890	5.3	17	17	2.07	----	1.98	CLAY	"
33.05	18.80	18.77	1.130	6.0	19	19	2.08	----	2.25	"	130-140
33.15	20.90	20.86	1.370	6.6	21	21	2.09	----	2.52	"	"
33.25	22.40	22.36	1.650	7.4	22	22	2.10	----	2.72	"	"
33.34	22.90	22.85	1.860	8.1	23	23	2.10	----	2.79	"	"
33.44	24.00	23.95	2.110	8.8	24	24	2.11	----	2.94	"	"
33.54	27.60	27.54	2.330	8.4	28	28	2.12	----	3.41	"	"
33.64	33.70	33.62	2.300	6.8	34	34	2.12	----	4.23	"	"
33.74	33.40	33.31	2.400	7.2	33	33	2.13	----	4.19	"	"
33.84	32.90	32.81	2.750	8.4	33	33	2.14	----	4.12	"	"
33.93	38.10	37.99	2.850	7.5	38	38	2.15	----	4.81	"	"
34.03	53.50	53.34	2.600	4.9	36	36	2.15	----	6.86	Silty CLAY to CLAY	"
34.13	71.30	71.07	2.310	3.2	29	28	2.16	----	9.24	Sandy SILT to Clayey SILT	"

34.23	84.80	84.52	2.250	2.7	34	34	2.17	----	11.04	"	"
34.28	87.60	87.30	2.310	2.6	35	35	2.17	----	11.41	"	"
34.41	79.60	79.31	2.470	3.1	32	32	2.18	----	10.34	"	"
34.51	68.80	68.54	2.590	3.8	34	34	2.19	----	8.90	Clayey SILT to Silty CLAY	"
34.80	25.50	25.39	2.530	9.9	26	25	2.21	----	3.12	CLAY	"
34.90	18.70	18.62	1.970	10.5	19	19	2.22	----	2.22	"	"
35.00	17.70	17.62	1.370	7.7	18	18	2.22	----	2.08	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-20
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 10:35:11
Terminated at 30.0 feet Groundwater measured at 3.1 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.57	28.50	45.60	1.460	5.1	29	46	0.07	----	3.80	"	"
0.66	26.40	42.24	1.220	4.6	26	42	0.08	----	3.51	"	"
0.75	23.30	37.28	1.040	4.5	23	37	0.09	----	3.10	"	"
0.84	21.10	33.76	0.900	4.3	14	23	0.10	----	2.81	Silty CLAY to CLAY	"
0.93	19.30	30.88	0.800	4.1	13	21	0.11	----	2.57	"	120-130
1.02	17.60	28.16	0.770	4.4	18	28	0.13	----	2.34	CLAY	"
1.11	15.00	24.00	0.810	5.4	15	24	0.14	----	1.99	"	"
1.19	13.90	22.24	0.920	6.6	14	22	0.15	----	1.84	"	"
1.28	13.20	21.12	0.980	7.4	13	21	0.16	----	1.75	"	"
1.37	12.30	19.68	0.990	8.0	12	20	0.17	----	1.63	"	"
1.46	12.40	19.84	0.990	8.0	12	20	0.18	----	1.64	"	"
1.55	12.90	20.64	1.010	7.8	13	21	0.19	----	1.71	"	"
1.64	12.00	19.20	1.010	8.4	12	19	0.20	----	1.59	"	"
1.73	11.50	18.40	1.010	8.8	12	18	0.21	----	1.90	"	"
1.82	11.90	19.04	1.010	8.5	12	19	0.23	----	1.96	"	"
1.90	10.80	17.28	1.010	9.4	11	17	0.24	----	1.78	"	"
1.99	12.00	19.20	1.010	8.4	12	19	0.25	----	1.58	"	"
2.08	12.20	19.52	1.030	8.4	12	20	0.26	----	1.61	"	"
2.33	12.00	19.20	1.070	8.9	12	19	0.29	----	1.58	"	"
2.42	12.00	19.20	1.020	8.5	12	19	0.30	----	1.58	"	"
2.51	11.10	17.76	0.930	8.4	11	18	0.31	----	1.82	"	"
2.60	10.40	16.64	0.850	8.2	10	17	0.32	----	1.71	"	"
2.69	10.70	17.12	0.790	7.4	11	17	0.33	----	1.76	"	"
2.77	10.20	16.32	0.760	7.5	10	16	0.34	----	1.67	"	"
2.86	10.70	17.12	0.720	6.7	11	17	0.36	----	1.75	"	"
2.95	10.80	17.28	0.710	6.6	11	17	0.37	----	1.77	"	"
3.04	10.30	16.48	0.710	6.9	10	16	0.38	----	1.69	"	"
3.13	10.60	16.96	0.740	7.0	11	17	0.38	----	1.73	"	"
3.22	10.90	17.44	0.760	7.0	11	17	0.39	----	1.78	"	"
3.31	10.80	17.28	0.750	6.9	11	17	0.40	----	1.77	"	"
3.40	9.10	14.56	0.720	7.9	9	15	0.40	----	1.48	"	"
3.49	7.80	12.48	0.680	8.7	8	12	0.41	----	1.52	"	"
3.58	8.00	12.80	0.630	7.9	8	13	0.41	----	1.56	"	"
3.67	7.40	11.84	0.540	7.3	7	12	0.42	----	1.43	"	110-120
3.76	7.30	11.68	0.440	6.0	7	12	0.42	----	1.41	"	"
3.85	6.50	10.40	0.370	5.7	7	10	0.43	----	1.25	"	"
3.94	6.30	10.08	0.320	5.1	6	10	0.43	----	1.21	"	100-110
4.03	5.80	9.28	0.300	5.2	6	9	0.43	----	1.11	"	"
4.12	5.90	9.44	0.300	5.1	6	9	0.44	----	1.13	"	"
4.21	7.00	11.20	0.290	4.1	7	11	0.44	----	1.35	"	"
4.30	7.10	11.36	0.330	4.6	7	11	0.45	----	1.37	"	110-120
4.39	7.30	11.68	0.340	4.7	7	12	0.45	----	1.41	"	"
4.48	8.30	13.28	0.320	3.9	8	13	0.46	----	1.61	"	"
4.57	7.10	11.36	0.320	4.5	7	11	0.46	----	1.36	"	"
4.66	7.60	12.16	0.340	4.5	8	12	0.47	----	1.46	"	"
4.75	7.70	12.32	0.340	4.4	8	12	0.47	----	1.48	"	"
4.84	9.90	15.84	0.310	3.1	7	11	0.48	----	1.60	Silty CLAY to CLAY	"

4.93	25.90	41.44	0.310	1.2	10	17	0.48	----	3.41	Sandy SILT to Clayey SILT	"
5.02	37.00	59.20	0.350	0.9	12	20	0.48	35	----	Silty SAND to Sandy SILT	"
5.11	38.30	61.28	0.400	1.0	13	20	0.49	35	----	"	"
5.20	37.20	59.52	0.500	1.3	12	20	0.49	35	----	"	120-130
5.29	34.40	55.04	0.590	1.7	14	22	0.50	----	4.54	Sandy SILT to Clayey SILT	"
5.38	28.30	45.28	0.680	2.4	11	18	0.51	----	3.73	"	"
5.61	14.20	22.72	0.630	4.4	14	23	0.52	----	1.85	CLAY	"
5.70	11.00	17.60	0.620	5.6	11	18	0.53	----	1.78	"	"
5.79	14.10	22.56	0.540	3.8	9	15	0.53	----	1.83	Silty CLAY to CLAY	"
5.88	12.50	20.00	0.470	3.8	8	13	0.54	----	1.62	"	"
5.97	13.20	21.12	0.480	3.6	9	14	0.54	----	1.71	"	"
6.06	10.50	16.80	0.400	3.8	11	17	0.55	----	1.69	CLAY	110-120
6.15	8.10	12.96	0.300	3.7	8	13	0.55	----	1.55	"	"
6.24	6.20	9.92	0.220	3.5	6	10	0.56	----	1.16	"	100-110
6.33	6.00	9.60	0.200	3.3	6	10	0.56	----	1.12	"	"
6.42	5.90	9.44	0.190	3.2	6	9	0.56	----	1.10	"	"
6.51	6.20	9.92	0.190	3.1	6	10	0.57	----	1.16	"	"
6.60	7.10	11.36	0.210	3.0	7	11	0.57	----	1.34	"	"
6.69	7.10	11.36	0.250	3.5	7	11	0.58	----	1.34	"	"
6.78	7.10	11.36	0.270	3.8	7	11	0.58	----	1.34	"	"
6.87	7.70	12.32	0.290	3.8	8	12	0.58	----	1.46	"	"
6.96	8.70	13.92	0.310	3.6	9	14	0.59	----	1.66	"	110-120
7.05	8.60	13.76	0.340	4.0	9	14	0.59	----	1.64	"	"
7.14	10.40	16.64	0.370	3.6	10	17	0.60	----	1.66	"	"
7.23	11.00	17.60	0.430	3.9	11	18	0.60	----	1.76	"	"
7.32	12.40	19.84	0.500	4.0	12	20	0.61	----	1.60	"	120-130
7.41	13.70	21.92	0.510	3.7	9	15	0.61	----	1.77	Silty CLAY to CLAY	"
7.50	13.00	20.80	0.540	4.2	13	21	0.62	----	1.67	CLAY	"
7.59	13.00	20.80	0.580	4.5	13	21	0.62	----	1.67	"	"
7.68	12.70	20.32	0.600	4.7	13	20	0.63	----	1.63	"	"
7.77	13.30	21.28	0.610	4.6	13	21	0.64	----	1.71	"	"
7.86	14.20	22.72	0.630	4.4	14	23	0.64	----	1.83	"	"
7.95	13.50	21.60	0.640	4.7	14	22	0.65	----	1.74	"	"
8.04	13.80	22.08	0.670	4.9	14	22	0.65	----	1.78	"	"
8.13	15.70	25.12	0.710	4.5	16	25	0.66	----	2.03	"	"
8.22	16.60	26.56	0.770	4.6	17	27	0.66	----	2.15	"	"
8.31	16.30	26.08	0.800	4.9	16	26	0.67	----	2.11	"	"
8.40	15.10	24.16	0.300	2.0	8	12	0.67	----	1.95	Clayey SILT to Silty CLAY	110-120
8.49	14.40	23.04	0.770	5.3	14	23	0.68	----	1.85	CLAY	120-130
8.58	13.80	22.08	0.720	5.2	14	22	0.69	----	1.77	"	"
8.67	13.70	21.92	0.680	5.0	14	22	0.69	----	1.76	"	"
8.70	14.00	22.40	0.650	4.6	14	22	0.69	----	1.80	"	"
8.74	14.70	23.52	0.620	4.2	15	24	0.70	----	1.89	"	"
8.83	13.40	21.44	0.550	4.1	13	21	0.70	----	1.72	"	"
8.92	11.70	18.72	0.510	4.4	12	19	0.71	----	1.86	"	"
9.01	11.20	17.92	0.470	4.2	11	18	0.71	----	1.78	"	"
9.11	10.70	17.12	0.460	4.3	11	17	0.72	----	1.69	"	110-120
9.20	11.10	17.76	0.480	4.3	11	18	0.72	----	1.76	"	120-130
9.29	10.70	17.12	0.470	4.4	11	17	0.73	----	1.69	"	"
9.38	9.70	15.52	0.450	4.6	10	16	0.73	----	1.52	"	110-120
9.47	8.90	14.24	0.430	4.8	9	14	0.74	----	1.67	"	"
9.56	8.80	14.08	0.360	4.1	9	14	0.74	----	1.65	"	"
9.65	7.90	12.64	0.320	4.1	8	13	0.75	----	1.46	"	"
9.74	7.30	11.68	0.310	4.2	7	12	0.75	----	1.34	"	"
9.83	6.60	10.56	0.280	4.2	7	11	0.76	----	1.20	"	100-110

9.92	6.20	9.92	0.250	4.0	6	10	0.76	----	1.12	"	"
10.01	5.90	9.44	0.250	4.2	6	9	0.76	----	1.06	"	"
10.10	6.40	10.24	0.260	4.1	6	10	0.77	----	1.16	"	"
10.19	9.20	14.72	0.270	2.9	6	10	0.77	----	1.43	Silty CLAY to CLAY	110-120
10.28	10.50	16.80	0.290	2.8	7	11	0.78	----	1.65	"	"
10.38	10.90	17.44	0.320	2.9	7	12	0.78	----	1.71	"	"
10.46	11.50	18.40	0.330	2.9	8	12	0.79	----	1.81	"	"
10.55	11.20	17.92	0.320	2.9	7	12	0.79	----	1.76	"	"
10.64	11.60	18.56	0.320	2.8	8	12	0.80	----	1.83	"	"
10.74	11.60	18.54	0.320	2.8	8	12	0.80	----	1.83	"	"
10.83	11.90	18.96	0.320	2.7	6	9	0.81	----	1.88	Clayey SILT to Silty CLAY	"
10.91	11.20	17.80	0.330	2.9	7	12	0.81	----	1.76	Silty CLAY to CLAY	"
11.01	11.50	18.22	0.320	2.8	8	12	0.82	----	1.81	"	"
11.09	12.20	19.27	0.320	2.6	6	10	0.82	----	1.54	Clayey SILT to Silty CLAY	"
11.18	12.70	20.00	0.320	2.5	6	10	0.83	----	1.60	"	"
11.28	12.20	19.15	0.330	2.7	6	10	0.83	----	1.54	"	"
11.37	13.10	20.51	0.350	2.7	7	10	0.83	----	1.66	"	"
11.45	14.70	22.93	0.380	2.6	7	11	0.84	----	1.87	"	120-130
11.55	15.10	23.47	0.410	2.7	8	12	0.85	----	1.92	"	"
11.64	14.30	22.14	0.400	2.8	7	11	0.85	----	1.81	"	"
11.73	13.40	20.67	0.400	3.0	9	14	0.86	----	1.69	Silty CLAY to CLAY	"
11.82	11.70	17.98	0.440	3.8	12	18	0.86	----	1.83	CLAY	"
11.91	11.80	18.08	0.420	3.6	8	12	0.87	----	1.85	Silty CLAY to CLAY	110-120
12.00	13.10	20.01	0.380	2.9	7	10	0.87	----	1.65	Clayey SILT to Silty CLAY	"
12.04	16.00	24.40	0.370	2.3	8	12	0.87	----	2.04	"	120-130
12.13	14.40	21.88	0.380	2.6	7	11	0.88	----	1.82	"	"
12.21	12.40	18.78	0.400	3.2	8	13	0.89	----	1.56	Silty CLAY to CLAY	110-120
12.30	12.10	18.26	0.430	3.6	8	12	0.89	----	1.52	"	120-130
12.39	14.00	21.05	0.460	3.3	9	14	0.90	----	1.77	"	"
12.48	16.30	24.42	0.500	3.1	8	12	0.90	----	2.07	Clayey SILT to Silty CLAY	"
12.57	18.30	27.31	0.540	3.0	9	14	0.91	----	2.34	"	"
12.66	17.60	26.17	0.580	3.3	9	13	0.91	----	2.25	"	"
12.75	16.80	24.88	0.570	3.4	11	17	0.92	----	2.14	Silty CLAY to CLAY	"
12.84	15.80	23.31	0.550	3.5	11	16	0.92	----	2.00	"	"
12.94	14.50	21.31	0.500	3.4	10	14	0.93	----	1.83	"	"
13.03	14.00	20.50	0.460	3.3	9	14	0.94	----	1.76	"	"
13.11	14.00	20.42	0.470	3.4	9	14	0.94	----	1.76	"	"
13.20	15.60	22.66	0.530	3.4	10	15	0.95	----	1.97	"	"
13.30	17.20	24.89	0.530	3.1	9	12	0.95	----	2.19	Clayey SILT to Silty CLAY	"
13.39	16.30	23.50	0.470	2.9	8	12	0.96	----	2.07	"	"
13.48	12.90	18.52	0.410	3.2	9	12	0.96	----	1.61	Silty CLAY to CLAY	"
13.57	10.20	14.60	0.390	3.8	10	15	0.97	----	1.56	CLAY	110-120
13.66	9.30	13.26	0.430	4.6	9	13	0.97	----	1.41	"	"
13.75	11.30	16.05	0.530	4.7	11	16	0.98	----	1.75	"	120-130
13.84	17.60	24.90	0.580	3.3	9	12	0.98	----	2.24	Clayey SILT to Silty CLAY	"
13.93	22.50	31.71	0.550	2.4	11	16	0.99	----	2.89	"	"
14.02	19.70	27.65	0.480	2.4	10	14	1.00	----	2.51	"	"
14.11	14.50	20.29	0.390	2.7	7	10	1.00	----	1.82	"	"
14.20	11.10	15.50	0.250	2.3	6	8	1.01	----	1.71	"	110-120
14.29	9.10	12.69	0.200	2.2	5	6	1.01	----	1.37	"	100-110
14.38	7.40	10.31	0.210	2.8	5	7	1.01	----	1.31	Silty CLAY to CLAY	"
14.47	7.20	10.01	0.260	3.6	7	10	1.02	----	1.27	CLAY	"
14.56	8.40	11.66	0.390	4.6	8	12	1.02	----	1.51	"	110-120
14.64	10.60	14.69	0.450	4.2	11	15	1.03	----	1.62	"	"
14.73	15.80	21.85	0.510	3.2	11	15	1.03	----	1.99	Silty CLAY to CLAY	120-130

14.82	13.30	18.35	0.490	3.7	9	12	1.04	----	1.66	"	"	
14.91	13.30	18.31	0.480	3.6	9	12	1.04	----	1.65	"	"	
15.00	13.00	17.86	0.460	3.5	9	12	1.05	----	1.61	"	"	
15.28	12.70	17.35	0.350	2.8	6	9	1.06	----	1.57	Clayey SILT to Silty CLAY	110-120	
15.37	12.80	17.46	0.340	2.7	6	9	1.07	----	1.58	"	"	
15.46	12.10	16.47	0.350	2.9	8	11	1.07	----	1.49	Silty CLAY to CLAY	"	
15.55	11.50	15.63	0.330	2.9	8	10	1.08	----	1.76	"	"	
15.64	11.20	15.19	0.330	2.9	7	10	1.08	----	1.71	"	"	
15.73	11.30	15.30	0.340	3.0	8	10	1.09	----	1.73	"	"	
15.82	11.60	15.68	0.340	2.9	8	10	1.09	----	1.78	"	"	
15.91	11.60	15.65	0.360	3.1	8	10	1.10	----	1.77	"	"	
16.00	12.10	16.29	0.380	3.1	8	11	1.10	----	1.49	"	"	
16.09	11.70	15.73	0.360	3.1	8	10	1.11	----	1.79	"	"	
16.18	11.90	15.97	0.350	2.9	8	11	1.11	----	1.82	"	"	
16.27	11.90	15.94	0.360	3.0	8	11	1.12	----	1.82	"	"	
16.36	13.10	17.51	0.380	2.9	7	9	1.12	----	1.62	Clayey SILT to Silty CLAY	"	
16.46	13.50	18.01	0.370	2.7	7	9	1.13	----	1.67	"	"	
16.55	12.60	16.78	0.390	3.1	8	11	1.13	----	1.55	Silty CLAY to CLAY	"	
16.64	13.10	17.41	0.380	2.9	7	9	1.14	----	1.61	Clayey SILT to Silty CLAY	"	
16.73	13.60	18.04	0.380	2.8	7	9	1.14	----	1.68	"	120-130	
16.82	12.10	16.02	0.410	3.4	8	11	1.15	----	1.48	Silty CLAY to CLAY	110-120	
16.91	12.30	16.25	0.420	3.4	8	11	1.15	----	1.51	"	120-130	
17.00	12.80	16.87	0.420	3.3	9	11	1.16	----	1.57	"	"	
17.09	12.90	16.97	0.420	3.3	9	11	1.16	----	1.58	"	"	
17.18	12.10	15.88	0.420	3.5	8	11	1.17	----	1.48	"	"	
17.27	12.20	15.98	0.400	3.3	8	11	1.17	----	1.49	"	110-120	
17.36	12.90	16.86	0.420	3.3	9	11	1.18	----	1.58	"	120-130	
17.45	13.10	17.08	0.440	3.4	9	11	1.18	----	1.61	"	"	
17.53	14.50	18.87	0.460	3.2	10	13	1.19	----	1.79	"	"	
17.63	15.10	19.60	0.470	3.1	8	10	1.20	----	1.87	Clayey SILT to Silty CLAY	"	
17.71	15.60	20.21	0.470	3.0	8	10	1.20	----	1.94	"	"	
17.81	15.30	19.77	0.490	3.2	10	13	1.21	----	1.90	Silty CLAY to CLAY	"	
17.90	15.20	19.60	0.520	3.4	10	13	1.21	----	1.88	"	"	
17.98	15.00	19.30	0.530	3.5	10	13	1.22	----	1.86	"	"	
18.08	14.30	18.35	0.650	4.5	14	18	1.22	----	1.76	CLAY	"	
18.17	13.90	17.80	0.750	5.4	14	18	1.23	----	1.71	"	"	
18.26	13.70	17.50	0.700	5.1	14	18	1.24	----	1.68	"	"	
18.45	12.40	15.77	0.700	5.6	12	16	1.25	----	1.51	"	"	
18.54	14.70	18.65	0.670	4.6	15	19	1.25	----	1.81	"	"	
18.63	16.90	21.39	0.630	3.7	11	14	1.26	----	2.10	Silty CLAY to CLAY	"	
18.72	14.40	18.19	0.620	4.3	14	18	1.26	----	1.77	CLAY	"	
18.81	11.30	14.24	0.610	5.4	11	14	1.27	----	1.70	"	"	
18.90	10.10	12.70	0.590	5.8	10	13	1.28	----	1.49	"	"	
18.99	10.10	12.68	0.500	5.0	10	13	1.28	----	1.49	"	"	
19.08	10.60	13.28	0.440	4.2	11	13	1.29	----	1.58	"	110-120	
19.17	8.30	10.38	0.460	5.5	8	10	1.29	----	1.43	"	"	
19.26	8.90	11.11	0.470	5.3	9	11	1.30	----	1.55	"	"	
19.35	8.70	10.84	0.510	5.9	9	11	1.30	----	1.51	"	"	
19.44	9.70	12.06	0.750	7.7	10	12	1.31	----	1.42	"	120-130	
19.53	11.30	14.02	0.810	7.2	11	14	1.31	----	1.69	"	"	
19.62	32.70	40.46	0.860	2.6	13	16	1.32	----	4.20	Sandy SILT to Clayey SILT	130-140	
19.68	69.20	85.49	0.910	1.3	23	28	1.32	37	----	Silty SAND to Sandy SILT	120-130	
19.77	117.20	144.48	1.060	0.9	29	36	1.33	40	----	SAND to Silty SAND	"	
19.86	146.90	180.77	1.100	0.7	29	36	1.33	41	----	SAND	110-120	
19.95	163.60	201.03	0.700	0.4	33	40	1.34	42	----	"	100-110	

20.03	164.40	201.72	0.810	0.5	33	40	1.34	42	----	"	"
20.12	137.00	167.80	1.100	0.8	27	34	1.34	41	----	"	110-120
20.21	117.00	143.00	1.310	1.1	29	36	1.35	40	----	SAND to Silty SAND	120-130
20.30	87.70	106.92	1.480	1.7	29	36	1.36	38	----	Silty SAND to Sandy SILT	130-140
20.38	64.20	78.07	1.720	2.7	26	31	1.36	----	8.40	Sandy SILT to Clayey SILT	"
20.47	44.30	53.73	1.640	3.7	22	27	1.37	----	5.74	Clayey SILT to Silty CLAY	"
20.56	31.40	37.99	1.450	4.6	21	25	1.38	----	4.02	Silty CLAY to CLAY	"
20.65	25.60	30.89	1.200	4.7	26	31	1.38	----	3.25	CLAY	"
20.74	25.20	30.33	0.970	3.8	17	20	1.39	----	3.19	Silty CLAY to CLAY	"
20.83	18.00	21.62	0.720	4.0	12	14	1.39	----	2.23	"	120-130
20.92	11.40	13.66	0.630	5.5	11	14	1.40	----	1.69	CLAY	"
21.01	9.20	11.00	0.540	5.9	9	11	1.40	----	1.32	"	"
21.09	10.60	12.65	0.470	4.4	11	13	1.41	----	1.56	"	110-120
21.18	11.00	13.10	0.430	3.9	11	13	1.41	----	1.62	"	"
21.27	10.10	12.00	0.610	6.0	10	12	1.42	----	1.47	"	120-130
21.36	9.10	10.79	0.610	6.7	9	11	1.43	----	1.30	"	"
21.45	8.60	10.18	0.540	6.3	9	10	1.43	----	1.46	"	110-120
21.54	9.10	10.75	0.470	5.2	9	11	1.43	----	1.30	"	"
21.57	10.80	12.75	0.450	4.2	11	13	1.44	----	1.58	"	"
21.66	9.90	11.66	0.410	4.1	10	12	1.44	----	1.43	"	"
21.75	9.70	11.41	0.360	3.7	10	11	1.45	----	1.40	"	"
21.84	9.80	11.50	0.330	3.4	7	8	1.45	----	1.41	Silty CLAY to CLAY	"
21.93	9.80	11.48	0.320	3.3	7	8	1.46	----	1.41	"	"
22.02	10.10	11.81	0.310	3.1	7	8	1.46	----	1.46	"	"
22.11	11.20	13.07	0.340	3.0	7	9	1.46	----	1.65	"	"
22.20	11.50	13.39	0.350	3.0	8	9	1.47	----	1.69	"	"
22.28	10.90	12.67	0.370	3.4	7	8	1.47	----	1.59	"	"
22.37	10.00	11.60	0.360	3.6	10	12	1.48	----	1.44	CLAY	"
22.46	9.80	11.35	0.430	4.4	10	11	1.48	----	1.41	"	"
22.55	11.20	12.94	0.690	6.2	11	13	1.49	----	1.64	"	120-130
22.64	16.50	19.02	0.820	5.0	17	19	1.49	----	2.02	"	"
22.73	32.80	37.71	1.000	3.0	16	19	1.50	----	4.19	Clayey SILT to Silty CLAY	130-140
22.82	29.40	33.73	1.000	3.4	15	17	1.51	----	3.74	"	"
22.91	24.10	27.59	0.990	4.1	16	18	1.51	----	3.03	Silty CLAY to CLAY	"
23.00	18.30	20.91	0.970	5.3	18	21	1.52	----	2.26	CLAY	"
23.09	19.80	22.58	1.100	5.6	20	23	1.53	----	2.45	"	"
23.18	25.20	28.68	1.230	4.9	25	29	1.53	----	3.17	"	"
23.27	24.00	27.25	1.240	5.2	24	27	1.54	----	3.01	"	"
23.36	17.50	19.83	1.120	6.4	18	20	1.55	----	2.15	"	"
23.44	13.20	14.93	0.970	7.3	13	15	1.55	----	1.57	"	120-130
23.53	11.30	12.76	0.700	6.2	11	13	1.56	----	1.65	"	"
23.62	9.90	11.16	0.500	5.1	10	11	1.56	----	1.41	"	"
23.71	9.30	10.47	0.430	4.6	9	10	1.57	----	1.31	"	110-120
23.80	9.00	10.11	0.420	4.7	9	10	1.57	----	1.26	"	"
23.89	9.10	10.21	0.400	4.4	9	10	1.58	----	1.28	"	"
23.98	8.90	9.97	0.390	4.4	9	10	1.58	----	1.49	"	"
24.07	9.10	10.18	0.370	4.1	9	10	1.59	----	1.28	"	"
24.16	9.60	10.72	0.370	3.9	10	11	1.59	----	1.36	"	"
24.24	9.90	11.04	0.350	3.5	10	11	1.60	----	1.41	"	"
24.33	9.80	10.92	0.340	3.5	10	11	1.60	----	1.39	"	"
24.42	9.30	10.34	0.360	3.9	9	10	1.61	----	1.31	"	"
24.51	9.90	10.99	0.400	4.0	10	11	1.61	----	1.40	"	"
24.60	10.40	11.53	0.440	4.2	10	12	1.61	----	1.49	"	"
24.69	11.20	12.40	0.480	4.3	11	12	1.62	----	1.62	"	120-130
24.97	13.30	14.64	0.520	3.9	13	15	1.64	----	1.57	"	"

25.06	13.50	14.83	0.540	4.0	14	15	1.64	----	1.60	"	"
25.15	14.40	15.79	0.570	4.0	14	16	1.65	----	1.72	"	"
25.24	14.80	16.20	0.600	4.1	15	16	1.65	----	1.77	"	"
25.33	16.50	18.02	0.670	4.1	11	12	1.66	----	2.00	Silty CLAY to CLAY	"
25.42	19.10	20.83	0.740	3.9	13	14	1.67	----	2.34	"	"
25.51	21.00	22.85	0.770	3.7	14	15	1.67	----	2.60	"	"
25.60	20.70	22.49	0.820	4.0	14	15	1.68	----	2.55	"	"
25.69	19.70	21.35	0.880	4.5	20	21	1.68	----	2.42	CLAY	130-140
25.78	19.50	21.10	0.840	4.3	20	21	1.69	----	2.39	"	120-130
25.87	20.20	21.81	0.800	4.0	13	15	1.69	----	2.49	Silty CLAY to CLAY	"
25.96	21.10	22.74	0.850	4.0	14	15	1.70	----	2.60	"	130-140
26.05	22.80	24.52	0.910	4.0	15	16	1.71	----	2.83	"	"
26.14	22.80	24.46	0.960	4.2	15	16	1.71	----	2.83	"	"
26.22	22.80	24.41	1.000	4.4	15	16	1.72	----	2.83	"	"
26.31	22.00	23.50	1.020	4.6	22	24	1.73	----	2.72	CLAY	"
26.40	21.60	23.02	1.020	4.7	22	23	1.73	----	2.67	"	"
26.49	21.60	22.97	1.010	4.7	22	23	1.74	----	2.67	"	"
26.58	22.40	23.77	0.990	4.4	15	16	1.75	----	2.77	Silty CLAY to CLAY	"
26.67	22.90	24.26	1.000	4.4	15	16	1.75	----	2.84	"	"
26.76	22.20	23.48	1.020	4.6	22	23	1.76	----	2.74	CLAY	"
26.85	22.20	23.45	1.060	4.8	22	23	1.77	----	2.74	"	"
26.94	20.90	22.04	1.070	5.1	21	22	1.77	----	2.57	"	"
27.03	20.40	21.48	1.070	5.2	20	21	1.78	----	2.50	"	"
27.12	19.50	20.50	1.030	5.3	20	21	1.79	----	2.38	"	"
27.20	17.90	18.79	0.990	5.5	18	19	1.79	----	2.17	"	"
27.29	16.30	17.09	0.890	5.5	16	17	1.80	----	1.95	"	120-130
27.38	15.00	15.71	0.800	5.3	15	16	1.80	----	1.78	"	"
27.47	13.50	14.12	0.730	5.4	14	14	1.81	----	1.58	"	"
27.56	12.80	13.37	0.650	5.1	13	13	1.81	----	1.48	"	"
27.65	12.20	12.73	0.650	5.3	12	13	1.82	----	1.40	"	"
27.74	11.70	12.19	0.770	6.6	12	12	1.83	----	1.67	"	"
27.83	11.60	12.07	0.880	7.6	12	12	1.83	----	1.65	"	"
27.92	13.70	14.24	0.880	6.4	14	14	1.84	----	1.60	"	"
28.13	13.90	14.40	0.780	5.6	14	14	1.85	----	1.63	"	"
28.22	14.50	15.00	0.790	5.4	15	15	1.86	----	1.70	"	"
28.31	15.80	16.33	0.820	5.2	16	16	1.86	----	1.88	"	"
28.40	18.70	19.30	0.850	4.5	19	19	1.87	----	2.26	"	"
28.49	20.70	21.33	0.880	4.3	14	14	1.87	----	2.53	Silty CLAY to CLAY	130-140
28.58	18.30	18.83	0.910	5.0	18	19	1.88	----	2.21	CLAY	120-130
28.67	17.50	17.99	0.860	4.9	18	18	1.88	----	2.10	"	"
28.76	18.10	18.58	0.810	4.5	18	19	1.89	----	2.18	"	"
28.84	17.40	17.84	0.740	4.3	17	18	1.90	----	2.09	"	"
28.92	15.10	15.46	0.680	4.5	15	15	1.90	----	1.78	"	"
29.01	13.40	13.70	0.630	4.7	13	14	1.91	----	1.55	"	"
29.10	12.80	13.07	0.560	4.4	13	13	1.91	----	1.47	"	"
29.19	13.30	13.57	0.500	3.8	9	9	1.92	----	1.54	Silty CLAY to CLAY	"
29.28	12.90	13.14	0.530	4.1	13	13	1.92	----	1.48	CLAY	"
29.37	13.40	13.63	0.600	4.5	13	14	1.93	----	1.55	"	"
29.46	13.30	13.51	0.640	4.8	13	14	1.93	----	1.53	"	"
29.55	14.30	14.51	0.700	4.9	14	15	1.94	----	1.67	"	"
29.64	13.90	14.08	0.710	5.1	14	14	1.94	----	1.61	"	"
29.73	14.00	14.17	0.690	4.9	14	14	1.95	----	1.63	"	"
29.81	12.40	12.53	0.660	5.3	12	13	1.96	----	1.41	"	"
29.90	10.60	10.70	0.620	5.8	11	11	1.96	----	1.46	"	"
29.98	10.30	10.38	0.590	5.7	10	10	1.97	----	1.41	"	"

30.07	12.10	12.18	0.550	4.5	12	12	1.97	----	1.37	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-21
LOCATION: Santa Rosa CA DATE : 06-02-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 10:13:11
Terminated at 50.0 feet Groundwater measured at 3.7 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.54	26.20	41.92	0.570	2.2	10	17	0.06	----	3.49	Sandy SILT to Clayey SILT	120-130
0.63	25.00	40.00	0.570	2.3	10	16	0.07	----	3.33	"	"
0.72	23.70	37.92	0.540	2.3	9	15	0.08	----	3.15	"	"
0.80	23.00	36.80	0.550	2.4	12	18	0.10	----	3.06	Clayey SILT to Silty CLAY	"
0.89	22.40	35.84	0.610	2.7	11	18	0.11	----	2.98	"	"
0.98	22.00	35.20	0.720	3.3	11	18	0.12	----	2.93	"	"
1.07	21.90	35.04	0.820	3.7	15	23	0.13	----	2.91	Silty CLAY to CLAY	130-140
1.15	21.50	34.40	0.920	4.3	14	23	0.14	----	2.86	"	"
1.24	21.30	34.08	0.980	4.6	21	34	0.15	----	2.83	CLAY	"
1.33	20.60	32.96	0.970	4.7	21	33	0.16	----	2.74	"	"
1.41	19.20	30.72	0.930	4.8	19	31	0.18	----	2.55	"	"
1.50	18.40	29.44	0.880	4.8	18	29	0.19	----	2.44	"	120-130
1.59	16.90	27.04	0.860	5.1	17	27	0.20	----	2.24	"	"
1.67	15.70	25.12	0.870	5.5	16	25	0.21	----	2.08	"	"
1.76	15.50	24.80	0.880	5.7	16	25	0.22	----	2.05	"	"
1.84	14.30	22.88	0.880	6.2	14	23	0.23	----	1.89	"	"
1.93	13.70	21.92	0.890	6.5	14	22	0.24	----	1.81	"	"
2.22	13.50	21.60	0.920	6.8	14	22	0.28	----	1.78	"	"
2.31	12.30	19.68	0.860	7.0	12	20	0.29	----	1.62	"	"
2.40	11.70	18.72	0.770	6.6	12	19	0.30	----	1.93	"	"
2.49	8.90	14.24	0.670	7.5	9	14	0.31	----	1.75	"	"
2.58	7.50	12.00	0.580	7.7	8	12	0.32	----	1.47	"	110-120
2.67	6.90	11.04	0.500	7.2	7	11	0.33	----	1.35	"	"
2.74	6.20	9.92	0.470	7.6	6	10	0.34	----	1.21	"	"
2.83	5.50	8.80	0.430	7.8	6	9	0.35	----	1.07	"	"
2.92	4.90	7.84	0.390	8.0	5	8	0.36	----	0.94	Organic Material	100-110
3.01	4.70	7.52	0.360	7.7	5	8	0.37	----	0.90	CLAY	"
3.10	4.70	7.52	0.340	7.2	5	8	0.38	----	0.90	"	"
3.19	5.50	8.80	0.320	5.8	6	9	0.39	----	1.06	"	"
3.29	5.30	8.48	0.310	5.8	5	8	0.40	----	1.02	"	"
3.38	4.90	7.84	0.300	6.1	5	8	0.41	----	0.94	"	"
3.47	4.90	7.84	0.310	6.3	5	8	0.42	----	0.94	"	"
3.56	5.80	9.28	0.330	5.7	6	9	0.43	----	1.12	"	"
3.65	6.00	9.60	0.340	5.7	6	10	0.44	----	1.16	"	"
3.74	6.80	10.88	0.330	4.9	7	11	0.44	----	1.32	"	110-120
3.83	7.00	11.20	0.350	5.0	7	11	0.45	----	1.35	"	"
3.92	8.20	13.12	0.350	4.3	8	13	0.45	----	1.59	"	"
4.01	6.80	10.88	0.330	4.9	7	11	0.46	----	1.31	"	"
4.11	5.80	9.28	0.320	5.5	6	9	0.46	----	1.11	"	100-110
4.20	5.00	8.00	0.280	5.6	5	8	0.46	----	0.95	"	"
4.29	4.10	6.56	0.240	5.9	4	7	0.47	----	0.77	"	"
4.38	4.20	6.72	0.210	5.0	4	7	0.47	----	0.79	"	90-100
4.47	4.10	6.56	0.220	5.4	4	7	0.47	----	0.77	"	"
4.56	4.50	7.20	0.240	5.3	5	7	0.48	----	0.85	"	100-110
4.65	4.10	6.56	0.270	6.6	4	7	0.48	----	0.77	"	"
4.74	4.60	7.36	0.270	5.9	5	7	0.48	----	0.86	"	"
4.84	4.10	6.56	0.260	6.3	4	7	0.49	----	0.76	"	"

4.93	3.70	5.92	0.240	6.5	4	6	0.49	----	0.68	"	90-100
5.02	4.30	6.88	0.230	5.3	4	7	0.50	----	0.80	"	100-110
5.11	4.70	7.52	0.200	4.3	5	8	0.50	----	0.88	"	90-100
5.17	5.30	8.48	0.200	3.8	5	8	0.50	----	1.00	"	100-110
5.23	6.30	10.08	0.200	3.2	6	10	0.50	----	1.20	"	"
5.32	6.50	10.40	0.210	3.2	7	10	0.51	----	1.24	"	"
5.41	6.80	10.88	0.220	3.2	7	11	0.51	----	1.30	"	"
5.50	6.60	10.56	0.220	3.3	7	11	0.51	----	1.26	"	"
5.60	6.50	10.40	0.200	3.1	7	10	0.52	----	1.24	"	"
5.69	6.40	10.24	0.190	3.0	6	10	0.52	----	1.22	"	"
5.78	6.00	9.60	0.170	2.8	6	10	0.53	----	1.13	"	90-100
5.87	6.60	10.56	0.160	2.4	4	7	0.53	----	1.25	Silty CLAY to CLAY	"
5.96	7.00	11.20	0.150	2.1	5	7	0.53	----	1.33	"	"
6.05	7.10	11.36	0.160	2.3	5	8	0.54	----	1.35	"	100-110
6.15	7.30	11.68	0.180	2.5	5	8	0.54	----	1.39	"	"
6.24	7.50	12.00	0.210	2.8	5	8	0.54	----	1.43	"	"
6.33	8.10	12.96	0.270	3.3	8	13	0.55	----	1.55	CLAY	"
6.42	8.60	13.76	0.330	3.8	9	14	0.55	----	1.65	"	110-120
6.51	9.90	15.84	0.370	3.7	10	16	0.56	----	1.59	"	"
6.61	10.10	16.16	0.410	4.1	10	16	0.56	----	1.62	"	"
6.70	9.60	15.36	0.440	4.6	10	15	0.57	----	1.54	"	"
6.79	9.30	14.88	0.480	5.2	9	15	0.57	----	1.49	"	"
6.88	10.50	16.80	0.510	4.9	11	17	0.58	----	1.69	"	120-130
6.95	11.50	18.40	0.490	4.3	12	18	0.58	----	1.85	"	"
7.02	12.30	19.68	0.470	3.8	12	20	0.59	----	1.59	"	"
7.09	13.40	21.44	0.520	3.9	13	21	0.59	----	1.73	"	"
7.18	14.10	22.56	0.600	4.3	14	23	0.60	----	1.83	"	"
7.24	14.80	23.68	0.640	4.3	15	24	0.60	----	1.92	"	"
7.29	15.10	24.16	0.680	4.5	15	24	0.60	----	1.96	"	"
7.34	15.80	25.28	0.740	4.7	16	25	0.61	----	2.05	"	"
7.42	17.90	28.64	0.840	4.7	18	29	0.61	----	2.33	"	"
7.51	19.20	30.72	0.930	4.8	19	31	0.62	----	2.50	"	130-140
7.60	20.20	32.32	0.990	4.9	20	32	0.62	----	2.64	"	"
7.70	20.90	33.44	1.040	5.0	21	33	0.63	----	2.73	"	"
7.79	20.00	32.00	1.080	5.4	20	32	0.64	----	2.61	"	"
7.88	18.70	29.92	1.020	5.5	19	30	0.64	----	2.43	"	"
7.97	16.90	27.04	1.070	6.3	17	27	0.65	----	2.19	"	"
8.06	16.10	25.76	1.110	6.9	16	26	0.66	----	2.08	"	"
8.15	16.20	25.92	1.050	6.5	16	26	0.66	----	2.10	"	"
8.19	15.90	25.44	1.010	6.4	16	25	0.67	----	2.06	"	120-130
8.29	17.80	28.48	0.960	5.4	18	28	0.67	----	2.31	"	130-140
8.38	17.40	27.84	0.890	5.1	17	28	0.68	----	2.26	"	120-130
8.47	16.80	26.88	0.800	4.8	17	27	0.69	----	2.17	"	"
8.56	15.60	24.96	0.750	4.8	16	25	0.69	----	2.01	"	"
8.65	13.40	21.44	0.690	5.1	13	21	0.70	----	1.72	"	"
8.75	12.90	20.64	0.640	5.0	13	21	0.70	----	1.65	"	"
8.84	12.60	20.16	0.650	5.2	13	20	0.71	----	1.61	"	"
8.92	14.00	22.40	0.730	5.2	14	22	0.71	----	1.80	"	"
9.01	15.00	24.00	0.750	5.0	15	24	0.72	----	1.93	"	"
9.09	18.00	28.80	0.780	4.3	18	29	0.72	----	2.33	"	"
9.17	16.40	26.24	0.780	4.8	16	26	0.73	----	2.12	"	"
9.26	14.50	23.20	0.780	5.4	15	23	0.73	----	1.86	"	"
9.36	14.10	22.56	0.760	5.4	14	23	0.74	----	1.81	"	"
9.45	15.10	24.16	0.750	5.0	15	24	0.75	----	1.94	"	"
9.54	16.00	25.60	0.750	4.7	16	26	0.75	----	2.06	"	"

9.63	15.90	25.44	0.760	4.8	16	25	0.76	----	2.04	"	"
9.72	16.10	25.76	0.780	4.8	16	26	0.76	----	2.07	"	"
9.81	16.40	26.24	0.800	4.9	16	26	0.77	----	2.11	"	"
9.90	16.70	26.72	0.780	4.7	17	27	0.77	----	2.15	"	"
10.00	16.50	26.40	0.740	4.5	17	26	0.78	----	2.12	"	"
10.09	14.60	23.36	0.680	4.7	15	23	0.79	----	1.87	"	"
10.18	13.40	21.44	0.620	4.6	13	21	0.79	----	1.71	"	"
10.27	11.40	18.24	0.560	4.9	11	18	0.80	----	1.80	"	"
10.36	10.30	16.45	0.500	4.9	10	16	0.80	----	1.61	"	"
10.45	9.50	15.12	0.470	4.9	10	15	0.81	----	1.48	"	110-120
10.54	9.00	14.28	0.430	4.8	9	14	0.81	----	1.40	"	"
10.64	7.30	11.55	0.370	5.1	7	12	0.82	----	1.33	"	"
10.72	5.90	9.31	0.310	5.3	6	9	0.82	----	1.05	"	100-110
10.82	4.70	7.40	0.280	6.0	5	7	0.83	----	0.81	"	"
10.91	4.80	7.54	0.280	5.8	5	8	0.83	----	0.83	"	"
11.00	5.70	8.93	0.260	4.6	6	9	0.83	----	1.01	"	"
11.09	5.80	9.06	0.270	4.7	6	9	0.84	----	1.03	"	"
11.19	6.60	10.29	0.300	4.5	7	10	0.84	----	1.19	"	"
11.28	6.50	10.11	0.340	5.2	7	10	0.85	----	1.17	"	"
11.37	6.20	9.61	0.480	7.7	6	10	0.85	----	1.11	"	110-120
11.46	5.30	8.19	0.470	8.9	5	8	0.85	----	0.93	Organic Material	"
11.55	6.40	9.86	0.440	6.9	6	10	0.86	----	1.14	CLAY	"
11.64	7.60	11.67	0.530	7.0	8	12	0.86	----	1.38	"	"
11.73	8.20	12.55	0.550	6.7	8	13	0.87	----	1.50	"	"
11.83	9.90	15.10	0.550	5.6	10	15	0.87	----	1.53	"	120-130
11.92	9.60	14.59	0.580	6.0	10	15	0.88	----	1.48	"	"
12.00	6.90	10.45	0.570	8.3	7	10	0.89	----	1.24	"	110-120
12.10	7.20	10.87	0.440	6.1	7	11	0.89	----	1.30	"	"
12.17	6.80	10.24	0.470	6.9	7	10	0.89	----	1.22	"	"
12.26	10.70	16.05	0.850	7.9	11	16	0.90	----	1.66	"	120-130
12.35	12.50	18.68	0.920	7.4	13	19	0.91	----	1.57	"	"
12.44	22.60	33.64	0.900	4.0	15	22	0.91	----	2.92	Silty CLAY to CLAY	130-140
12.53	18.00	26.69	0.900	5.0	18	27	0.92	----	2.30	CLAY	120-130
12.62	20.00	29.52	0.980	4.9	20	30	0.92	----	2.57	"	130-140
12.70	28.00	41.16	1.120	4.0	19	27	0.93	----	3.63	Silty CLAY to CLAY	"
12.79	38.60	56.51	1.160	3.0	19	28	0.94	----	5.05	Clayey SILT to Silty CLAY	"
12.87	45.60	66.49	1.160	2.5	18	27	0.94	----	5.98	Sandy SILT to Clayey SILT	"
12.95	50.60	73.48	1.060	2.1	20	29	0.95	----	6.64	"	"
13.04	61.40	88.76	0.980	1.6	20	30	0.95	37	----	Silty SAND to Sandy SILT	"
13.13	69.50	100.07	0.900	1.3	23	33	0.96	38	----	"	120-130
13.20	79.80	114.56	0.840	1.1	20	29	0.96	39	----	SAND to Silty SAND	"
13.28	89.40	127.88	0.890	1.0	22	32	0.97	39	----	"	"
13.37	84.00	119.69	1.080	1.3	21	30	0.98	39	----	"	"
13.46	79.50	112.75	1.250	1.6	27	38	0.98	39	----	Silty SAND to Sandy SILT	130-140
13.55	77.00	108.71	1.380	1.8	26	36	0.99	38	----	"	"
13.64	76.90	108.11	1.610	2.1	26	36	0.99	38	----	"	"
13.70	79.30	111.11	1.700	2.1	26	37	1.00	39	----	"	"
13.79	83.40	116.54	1.780	2.1	28	39	1.01	39	----	"	"
13.86	85.70	119.51	1.860	2.2	29	40	1.01	39	----	"	"
13.94	86.60	120.50	1.930	2.2	29	40	1.02	39	----	"	"
14.03	88.80	123.27	1.970	2.2	30	41	1.02	39	----	"	"
14.12	90.80	125.74	1.940	2.1	30	42	1.03	39	----	"	"
14.21	92.20	127.38	1.950	2.1	31	42	1.04	39	----	"	"
14.29	91.70	126.40	1.760	1.9	31	42	1.04	39	----	"	"
14.36	94.50	129.99	1.490	1.6	32	43	1.05	40	----	"	"

14.45	92.70	127.26	1.240	1.3	23	32	1.05	39	----	SAND to Silty SAND	120-130
14.53	93.40	127.96	0.900	1.0	23	32	1.06	39	----	"	"
14.62	96.60	132.11	0.660	0.7	24	33	1.06	40	----	"	110-120
14.71	102.60	140.08	0.650	0.6	21	28	1.07	40	----	SAND	"
14.78	107.10	146.04	0.570	0.5	21	29	1.07	40	----	"	100-110
14.85	109.10	148.61	0.530	0.5	22	30	1.07	40	----	"	"
14.92	115.20	156.74	0.490	0.4	23	31	1.08	41	----	"	"
15.00	113.20	153.81	0.510	0.5	23	31	1.08	40	----	"	"
15.09	110.70	150.21	0.610	0.6	22	30	1.08	40	----	"	"
15.17	104.90	142.13	0.580	0.6	21	28	1.09	40	----	"	"
15.26	97.90	132.41	0.590	0.6	24	33	1.09	40	----	SAND to Silty SAND	110-120
15.35	96.10	129.75	0.620	0.6	24	32	1.10	40	----	"	"
15.43	93.70	126.31	0.600	0.6	23	32	1.10	39	----	"	"
15.51	106.30	143.11	0.540	0.5	21	29	1.10	40	----	SAND	100-110
15.59	100.20	134.70	0.470	0.5	20	27	1.11	40	----	"	"
15.68	91.10	122.29	0.400	0.4	18	24	1.11	39	----	"	"
15.77	86.10	115.45	0.300	0.3	17	23	1.11	39	----	"	90-100
15.86	80.80	108.23	0.220	0.3	20	27	1.12	38	----	SAND to Silty SAND	"
15.94	72.60	97.14	0.270	0.4	18	24	1.12	38	----	"	"
16.03	64.50	86.18	0.360	0.6	16	22	1.12	37	----	"	100-110
16.12	58.00	77.35	0.470	0.8	15	19	1.13	37	----	"	110-120
16.20	53.00	70.56	0.420	0.8	13	18	1.13	36	----	"	"
16.29	51.00	67.77	0.420	0.8	17	23	1.14	36	----	Silty SAND to Sandy SILT	"
16.38	59.00	78.26	0.430	0.7	15	20	1.14	37	----	SAND to Silty SAND	"
16.46	64.90	85.97	0.390	0.6	16	21	1.15	37	----	"	100-110
16.55	67.40	89.15	0.390	0.6	17	22	1.15	37	----	"	"
16.64	63.40	83.73	0.320	0.5	16	21	1.15	37	----	"	"
16.73	57.70	76.12	0.260	0.5	14	19	1.16	36	----	"	90-100
16.81	49.30	64.94	0.270	0.5	12	16	1.16	36	----	"	100-110
16.90	43.90	57.74	0.310	0.7	15	19	1.16	35	----	Silty SAND to Sandy SILT	"
16.99	36.60	48.04	0.430	1.2	12	16	1.17	34	----	"	120-130
17.08	31.70	41.52	0.550	1.7	13	17	1.17	----	4.09	Sandy SILT to Clayey SILT	"
17.17	29.90	39.07	0.550	1.8	12	16	1.18	----	3.85	"	"
17.25	29.30	38.20	0.530	1.8	12	15	1.18	----	3.77	"	"
17.34	28.90	37.60	0.500	1.7	12	15	1.19	----	3.72	"	"
17.43	30.50	39.59	0.550	1.8	12	16	1.20	----	3.93	"	"
17.52	32.00	41.45	0.700	2.2	13	17	1.20	----	4.13	"	"
17.61	32.90	42.50	0.980	3.0	16	21	1.21	----	4.25	Clayey SILT to Silty CLAY	130-140
17.70	37.50	48.32	1.360	3.6	19	24	1.21	----	4.86	"	"
17.79	68.60	88.16	1.520	2.2	23	29	1.22	37	----	Silty SAND to Sandy SILT	"
17.87	139.80	179.22	2.190	1.6	35	45	1.23	41	----	SAND to Silty SAND	"
17.94	158.70	203.02	5.050	3.2	63	81	1.23	----	21.02	Sandy SILT to Clayey SILT	"
17.99	166.80	213.09	5.560	3.3	67	85	1.24	----	22.10	"	"
18.05	185.40	236.46	5.780	3.1	62	79	1.24	43	----	Silty SAND to Sandy SILT	"
18.09	214.40	273.05	5.860	2.7	71	91	1.24	44	----	"	"
18.20	254.60	323.23	5.300	2.1	64	81	1.25	45	----	SAND to Silty SAND	"
18.25	236.10	299.37	5.540	2.3	79	100	1.25	44	----	Silty SAND to Sandy SILT	"
18.29	276.00	349.51	5.510	2.0	55	70	1.26	45	----	SAND	"
18.35	316.50	400.22	5.580	1.8	63	80	1.26	46	----	"	"
18.40	283.00	357.30	7.050	2.5	94	119	1.27	45	----	Silty SAND to Sandy SILT	"
18.46	263.00	331.49	5.800	2.2	66	83	1.27	45	----	SAND to Silty SAND	"
18.54	277.50	348.98	4.590	1.7	56	70	1.28	45	----	SAND	"
18.63	290.10	363.98	5.280	1.8	58	73	1.28	45	----	"	"
18.70	265.20	332.03	5.270	2.0	53	66	1.29	45	----	"	"
18.78	285.70	356.92	5.800	2.0	57	71	1.29	45	----	"	"

18.87	280.20	349.24	5.570	2.0	56	70	1.30	45	----	"	"
18.94	274.10	340.92	5.170	1.9	55	68	1.30	45	----	"	"
19.02	284.90	353.57	4.600	1.6	57	71	1.31	45	----	"	"
19.10	272.10	336.93	4.010	1.5	54	67	1.32	45	----	"	"
19.18	247.90	306.26	3.940	1.6	50	61	1.32	44	----	"	"
19.26	235.20	289.91	3.750	1.6	47	58	1.33	44	----	"	"
19.34	242.50	298.21	3.200	1.3	49	60	1.33	44	----	"	"
19.43	234.00	287.17	2.600	1.1	47	57	1.34	44	----	"	120-130
19.51	230.40	282.20	2.410	1.0	46	56	1.34	44	----	"	"
19.59	241.20	294.84	2.240	0.9	48	59	1.35	44	----	"	"
19.67	229.00	279.38	2.340	1.0	46	56	1.35	44	----	"	"
19.75	210.00	255.69	2.410	1.1	42	51	1.36	43	----	"	"
19.83	191.10	232.14	2.610	1.4	38	46	1.37	43	----	"	130-140
19.91	196.90	238.65	3.220	1.6	39	48	1.37	43	----	"	"
19.99	202.80	245.24	3.570	1.8	51	61	1.38	43	----	SAND to Silty SAND	"
20.07	191.90	231.53	3.280	1.7	48	58	1.38	43	----	"	"
20.15	194.40	234.01	3.450	1.8	49	59	1.39	43	----	"	"
20.22	205.60	246.93	2.970	1.4	41	49	1.39	43	----	SAND	"
20.29	204.60	245.23	2.910	1.4	41	49	1.40	43	----	"	"
20.37	200.70	240.02	2.630	1.3	40	48	1.40	43	----	"	"
20.45	174.00	207.61	2.250	1.3	35	42	1.41	42	----	"	"
20.53	172.10	204.93	1.820	1.1	34	41	1.42	42	----	"	120-130
20.61	171.00	203.21	1.610	0.9	34	41	1.42	42	----	"	"
20.69	174.60	207.06	1.760	1.0	35	41	1.43	42	----	"	"
20.77	176.00	208.30	1.790	1.0	35	42	1.43	42	----	"	"
20.85	182.30	215.32	1.660	0.9	36	43	1.44	42	----	"	"
20.93	164.80	194.24	1.530	0.9	33	39	1.44	42	----	"	"
21.01	150.50	177.03	1.430	1.0	30	35	1.45	41	----	"	"
21.23	159.40	186.43	1.430	0.9	32	37	1.46	42	----	"	"
21.32	138.50	161.57	2.020	1.5	35	40	1.47	41	----	SAND to Silty SAND	130-140
21.41	100.60	117.06	2.420	2.4	34	39	1.47	39	----	Silty SAND to Sandy SILT	"
21.49	65.00	75.43	1.900	2.9	26	30	1.48	----	8.49	Sandy SILT to Clayey SILT	"
21.58	33.40	38.66	1.530	4.6	22	26	1.48	----	4.28	Silty CLAY to CLAY	"
21.67	15.10	17.43	1.350	8.9	15	17	1.49	----	1.84	CLAY	"
21.76	11.50	13.24	0.940	8.2	12	13	1.50	----	1.70	"	120-130
21.85	12.70	14.60	0.540	4.3	13	15	1.50	----	1.52	"	"
21.94	12.90	14.80	0.390	3.0	9	10	1.51	----	1.54	Silty CLAY to CLAY	110-120
22.03	11.30	12.95	0.360	3.2	8	9	1.51	----	1.66	"	"
22.12	10.60	12.13	0.380	3.6	11	12	1.52	----	1.54	CLAY	"
22.21	9.90	11.31	0.400	4.0	10	11	1.52	----	1.43	"	"
22.29	11.10	12.66	0.390	3.5	7	8	1.53	----	1.63	Silty CLAY to CLAY	"
22.38	11.80	13.44	0.380	3.2	8	9	1.53	----	1.74	"	"
22.45	12.20	13.88	0.380	3.1	8	9	1.53	----	1.45	"	"
22.54	11.50	13.07	0.380	3.3	8	9	1.54	----	1.69	"	"
22.63	10.60	12.02	0.390	3.7	11	12	1.54	----	1.54	CLAY	"
22.73	10.30	11.67	0.350	3.4	7	8	1.55	----	1.49	Silty CLAY to CLAY	"
22.82	9.90	11.20	0.320	3.2	7	7	1.55	----	1.42	"	"
22.91	10.30	11.63	0.300	2.9	7	8	1.56	----	1.49	"	"
23.00	10.50	11.84	0.290	2.8	7	8	1.56	----	1.52	"	"
23.09	10.20	11.48	0.290	2.8	7	8	1.57	----	1.47	"	"
23.19	10.10	11.35	0.310	3.1	7	8	1.57	----	1.45	"	"
23.28	10.90	12.23	0.360	3.3	7	8	1.58	----	1.58	"	"
23.37	12.20	13.67	0.480	3.9	12	14	1.58	----	1.44	CLAY	120-130
23.46	13.80	15.43	0.260	1.9	7	8	1.59	----	1.65	Clayey SILT to Silty CLAY	110-120
23.55	14.90	16.64	0.180	1.2	6	7	1.59	----	1.80	Sandy SILT to Clayey SILT	100-110

23.61	10.80	12.05	0.190	1.8	5	6	1.59	----	1.56	Clayey SILT to Silty CLAY	"
23.67	8.10	9.03	0.210	2.6	5	6	1.60	----	1.34	Silty CLAY to CLAY	"
23.75	10.90	12.14	0.250	2.3	5	6	1.60	----	1.58	Clayey SILT to Silty CLAY	110-120
23.84	15.60	17.35	0.310	2.0	8	9	1.61	----	1.89	"	"
23.93	16.30	18.09	0.360	2.2	8	9	1.61	----	1.98	"	120-130
24.01	15.80	17.51	0.400	2.5	8	9	1.62	----	1.91	"	"
24.08	14.40	15.94	0.410	2.8	7	8	1.62	----	1.73	"	"
24.16	13.90	15.36	0.390	2.8	7	8	1.63	----	1.66	"	"
24.23	12.40	13.68	0.390	3.1	8	9	1.63	----	1.46	Silty CLAY to CLAY	110-120
24.31	12.50	13.77	0.490	3.9	13	14	1.63	----	1.47	CLAY	120-130
24.38	12.60	13.86	0.580	4.6	13	14	1.64	----	1.48	"	"
24.45	12.60	13.84	0.670	5.3	13	14	1.64	----	1.48	"	"
24.52	11.90	13.05	0.640	5.4	12	13	1.65	----	1.74	"	"
24.74	11.90	12.99	0.490	4.1	12	13	1.66	----	1.74	"	"
24.84	11.50	12.53	0.440	3.8	12	13	1.67	----	1.67	"	"
24.93	10.70	11.64	0.430	4.0	11	12	1.67	----	1.53	"	110-120
25.02	10.40	11.30	0.430	4.1	10	11	1.68	----	1.48	"	"
25.12	11.80	12.80	0.420	3.6	8	9	1.68	----	1.71	Silty CLAY to CLAY	"
25.21	10.70	11.59	0.440	4.1	11	12	1.69	----	1.53	CLAY	"
25.30	11.60	12.54	0.470	4.1	12	13	1.69	----	1.68	"	120-130
25.37	10.90	11.76	0.480	4.4	11	12	1.70	----	1.56	"	"
25.47	11.60	12.49	0.460	4.0	12	12	1.70	----	1.68	"	"
25.57	12.10	13.00	0.470	3.9	12	13	1.71	----	1.41	"	"
25.64	12.40	13.31	0.480	3.9	12	13	1.71	----	1.45	"	"
25.73	13.20	14.14	0.480	3.6	9	9	1.72	----	1.55	Silty CLAY to CLAY	"
25.83	14.50	15.50	0.520	3.6	10	10	1.73	----	1.73	"	"
25.92	16.60	17.71	0.570	3.4	11	12	1.73	----	2.01	"	"
26.02	17.60	18.74	0.640	3.6	12	12	1.74	----	2.14	"	"
26.11	17.70	18.80	0.700	4.0	12	13	1.74	----	2.15	"	"
26.21	16.70	17.71	0.750	4.5	17	18	1.75	----	2.02	CLAY	"
26.30	15.10	15.99	0.750	5.0	15	16	1.76	----	1.80	"	"
26.39	15.00	15.86	0.720	4.8	15	16	1.76	----	1.79	"	"
26.49	15.70	16.58	0.740	4.7	16	17	1.77	----	1.88	"	"
26.58	18.60	19.62	0.750	4.0	12	13	1.77	----	2.27	Silty CLAY to CLAY	"
26.67	19.70	20.75	0.760	3.9	13	14	1.78	----	2.41	"	"
26.77	20.80	21.88	0.780	3.8	14	15	1.78	----	2.56	"	"
26.86	19.60	20.59	0.840	4.3	13	14	1.79	----	2.40	"	"
26.95	18.40	19.30	0.860	4.7	18	19	1.80	----	2.24	CLAY	"
27.05	19.20	20.11	0.930	4.8	19	20	1.80	----	2.34	"	130-140
27.14	20.10	21.02	0.990	4.9	20	21	1.81	----	2.46	"	"
27.23	18.20	19.00	1.020	5.6	18	19	1.82	----	2.21	"	"
27.33	15.20	15.85	1.000	6.6	15	16	1.82	----	1.81	"	120-130
27.42	13.10	13.64	1.010	7.7	13	14	1.83	----	1.53	"	"
27.51	14.00	14.56	0.930	6.6	14	15	1.83	----	1.65	"	"
27.61	12.30	12.77	0.880	7.2	12	13	1.84	----	1.42	"	"
27.70	12.40	12.86	0.830	6.7	12	13	1.85	----	1.43	"	"
27.79	12.40	12.84	0.800	6.5	12	13	1.85	----	1.43	"	"
27.85	15.00	15.52	0.780	5.2	15	16	1.85	----	1.78	"	"
27.94	14.60	15.09	0.800	5.5	15	15	1.86	----	1.72	"	"
28.03	16.10	16.62	0.800	5.0	16	17	1.87	----	1.92	"	"
28.13	14.80	15.25	0.820	5.5	15	15	1.87	----	1.75	"	"
28.22	14.90	15.34	0.790	5.3	15	15	1.88	----	1.76	"	"
28.31	15.20	15.62	0.740	4.9	15	16	1.88	----	1.80	"	"
28.41	14.10	14.47	0.730	5.2	14	14	1.89	----	1.65	"	"
28.50	13.60	13.94	0.720	5.3	14	14	1.90	----	1.58	"	"

28.59	13.20	13.51	0.690	5.2	13	14	1.90	----	1.53	"	"
28.69	16.40	16.76	0.700	4.3	16	17	1.91	----	1.96	"	"
28.78	17.40	17.76	0.690	4.0	12	12	1.91	----	2.09	Silty CLAY to CLAY	"
28.87	18.00	18.35	0.700	3.9	12	12	1.92	----	2.17	"	"
28.97	18.50	18.83	0.710	3.8	12	13	1.92	----	2.23	"	"
29.06	18.30	18.60	0.730	4.0	12	12	1.93	----	2.21	"	"
29.16	19.60	19.90	0.760	3.9	13	13	1.94	----	2.38	"	"
29.25	22.00	22.30	0.810	3.7	15	15	1.94	----	2.70	"	130-140
29.34	23.80	24.08	0.900	3.8	16	16	1.95	----	2.94	"	"
29.44	25.30	25.56	1.020	4.0	17	17	1.96	----	3.14	"	"
29.53	24.90	25.12	1.130	4.5	25	25	1.96	----	3.08	CLAY	"
29.62	20.20	20.34	1.100	5.4	20	20	1.97	----	2.45	"	"
29.71	16.80	16.90	0.950	5.7	17	17	1.98	----	2.00	"	120-130
29.81	14.30	14.36	0.780	5.5	14	14	1.98	----	1.67	"	"
29.90	14.40	14.44	0.650	4.5	14	14	1.99	----	1.68	"	"
30.00	15.20	15.22	0.640	4.2	15	15	1.99	----	1.78	"	"
30.09	15.40	15.40	0.650	4.2	15	15	2.00	----	1.81	"	"
30.18	14.90	14.90	0.650	4.4	15	15	2.01	----	1.74	"	"
30.27	15.40	15.40	0.650	4.2	15	15	2.01	----	1.81	"	"
30.37	14.10	14.10	0.650	4.6	14	14	2.02	----	1.63	"	"
30.46	14.90	14.89	0.650	4.4	15	15	2.02	----	1.74	"	"
30.55	14.10	14.09	0.720	5.1	14	14	2.03	----	1.63	"	"
30.65	13.70	13.69	0.830	6.1	14	14	2.03	----	1.58	"	"
30.74	16.30	16.29	1.040	6.4	16	16	2.04	----	1.92	"	130-140
30.83	24.70	24.68	1.260	5.1	25	25	2.05	----	3.04	"	"
30.92	37.60	37.56	1.420	3.8	19	19	2.05	----	4.76	Clayey SILT to Silty CLAY	"
31.01	43.10	43.05	1.340	3.1	17	17	2.06	----	5.50	Sandy SILT to Clayey SILT	"
31.10	36.30	36.25	1.200	3.3	18	18	2.07	----	4.59	Clayey SILT to Silty CLAY	"
31.20	21.90	21.87	1.140	5.2	22	22	2.08	----	2.67	CLAY	"
31.30	14.40	14.38	1.010	7.0	14	14	2.08	----	1.67	"	120-130
31.39	11.40	11.38	0.840	7.4	11	11	2.09	----	1.58	"	"
31.48	10.40	10.38	0.660	6.3	10	10	2.09	----	1.41	"	"
31.57	9.30	9.28	0.610	6.6	9	9	2.10	----	1.23	"	"
31.66	10.90	10.88	0.580	5.3	11	11	2.10	----	1.50	"	"
31.76	11.30	11.28	0.600	5.3	11	11	2.11	----	1.56	"	"
31.85	11.00	10.97	0.790	7.2	11	11	2.12	----	1.51	"	"
31.94	15.30	15.26	1.090	7.1	15	15	2.12	----	1.78	"	130-140
32.03	23.20	23.14	1.330	5.7	23	23	2.13	----	2.83	"	"
32.13	26.80	26.73	1.400	5.2	27	27	2.14	----	3.31	"	"
32.22	27.40	27.32	1.430	5.2	27	27	2.14	----	3.39	"	"
32.31	31.70	31.61	1.560	4.9	32	32	2.15	----	3.96	"	"
32.40	33.10	33.00	1.520	4.6	22	22	2.16	----	4.15	Silty CLAY to CLAY	"
32.49	26.40	26.31	1.350	5.1	26	26	2.16	----	3.26	CLAY	"
32.58	18.10	18.04	1.140	6.3	18	18	2.17	----	2.15	"	"
32.68	14.10	14.05	0.930	6.6	14	14	2.17	----	1.61	"	120-130
32.77	13.10	13.05	0.640	4.9	13	13	2.18	----	1.48	"	"
32.86	12.20	12.15	0.500	4.1	12	12	2.19	----	1.36	"	"
32.95	11.50	11.46	0.500	4.3	12	11	2.19	----	1.58	"	"
33.04	12.60	12.55	0.520	4.1	13	13	2.20	----	1.41	"	"
33.14	11.50	11.45	0.520	4.5	12	11	2.20	----	1.58	"	"
33.23	12.60	12.55	0.520	4.1	13	13	2.21	----	1.41	"	"
33.32	12.70	12.65	0.490	3.9	13	13	2.21	----	1.42	"	"
33.41	12.00	11.95	0.480	4.0	12	12	2.22	----	1.33	"	"
33.50	12.80	12.74	0.470	3.7	9	8	2.23	----	1.43	Silty CLAY to CLAY	"
33.59	12.00	11.94	0.500	4.2	12	12	2.23	----	1.33	CLAY	"

33.69	12.30	12.24	0.630	5.1	12	12	2.24	----	1.37	"	"
33.78	13.10	13.04	0.970	7.4	13	13	2.24	----	1.47	"	"
33.87	22.80	22.69	1.470	6.4	23	23	2.25	----	2.76	"	130-140
33.96	40.90	40.69	1.850	4.5	27	27	2.26	----	5.18	Silty CLAY to CLAY	"
34.05	50.40	50.13	2.080	4.1	25	25	2.26	----	6.44	Clayey SILT to Silty CLAY	"
34.14	48.80	48.54	2.190	4.5	33	32	2.27	----	6.23	Silty CLAY to CLAY	"
34.24	43.40	43.16	2.340	5.4	43	43	2.28	----	5.51	CLAY	"
34.33	40.10	39.87	2.440	6.1	40	40	2.28	----	5.07	"	"
34.42	39.30	39.07	2.280	5.8	39	39	2.29	----	4.96	"	"
34.60	33.40	33.20	1.800	5.4	33	33	2.30	----	4.17	"	"
34.69	28.90	28.72	1.680	5.8	29	29	2.31	----	3.57	"	"
34.79	25.50	25.34	1.480	5.8	26	25	2.32	----	3.12	"	"
34.88	18.30	18.18	1.170	6.4	18	18	2.32	----	2.16	"	"
34.97	15.10	15.00	0.870	5.8	15	15	2.33	----	1.73	"	120-130
35.06	14.50	14.40	0.680	4.7	15	14	2.34	----	1.65	"	"
35.14	14.40	14.30	0.610	4.2	14	14	2.34	----	1.63	"	"
35.20	14.00	13.90	0.580	4.1	14	14	2.34	----	1.58	"	"
35.30	12.90	12.81	0.570	4.4	13	13	2.35	----	1.43	"	"
35.39	12.90	12.81	0.540	4.2	13	13	2.36	----	1.43	"	"
35.49	12.30	12.21	0.530	4.3	12	12	2.36	----	1.35	"	"
35.58	13.00	12.90	0.510	3.9	13	13	2.37	----	1.44	"	"
35.67	12.20	12.11	0.500	4.1	12	12	2.37	----	1.34	"	"
35.76	12.70	12.60	0.510	4.0	13	13	2.38	----	1.40	"	"
35.85	12.90	12.80	0.540	4.2	13	13	2.38	----	1.43	"	"
35.94	13.30	13.20	0.540	4.1	13	13	2.39	----	1.48	"	"
36.04	12.70	12.60	0.520	4.1	13	13	2.40	----	1.40	"	"
36.13	12.40	12.30	0.520	4.2	12	12	2.40	----	1.36	"	"
36.22	12.30	12.20	0.500	4.1	12	12	2.41	----	1.34	"	"
36.29	11.40	11.31	0.490	4.3	11	11	2.41	----	1.53	"	"
36.39	10.80	10.71	0.470	4.4	11	11	2.42	----	1.43	"	"
36.48	10.20	10.11	0.470	4.6	10	10	2.42	----	1.33	"	110-120
36.57	10.10	10.01	0.450	4.5	10	10	2.43	----	1.31	"	"
36.66	10.20	10.11	0.430	4.2	10	10	2.43	----	1.33	"	"
36.75	11.00	10.90	0.440	4.0	11	11	2.44	----	1.46	"	"
36.84	12.00	11.89	0.450	3.8	12	12	2.44	----	1.30	"	120-130
36.94	12.50	12.39	0.460	3.7	8	8	2.45	----	1.36	Silty CLAY to CLAY	"
37.03	12.50	12.39	0.480	3.8	13	12	2.45	----	1.36	CLAY	"
37.12	13.20	13.08	0.490	3.7	9	9	2.46	----	1.46	Silty CLAY to CLAY	"
37.22	13.00	12.88	0.500	3.8	13	13	2.47	----	1.43	CLAY	"
37.31	12.80	12.68	0.500	3.9	13	13	2.47	----	1.40	"	"
37.40	12.50	12.38	0.500	4.0	13	12	2.48	----	1.36	"	"
37.50	12.30	12.18	0.500	4.1	12	12	2.48	----	1.33	"	"
37.59	11.20	11.09	0.580	5.2	11	11	2.49	----	1.48	"	"
37.69	11.30	11.19	0.560	5.0	11	11	2.50	----	1.50	"	"
37.77	11.00	10.89	0.540	4.9	11	11	2.50	----	1.45	"	"
37.86	11.30	11.16	0.510	4.5	11	11	2.51	----	1.50	"	"
37.96	11.10	10.94	0.500	4.5	11	11	2.51	----	1.46	"	"
38.05	11.20	11.02	0.500	4.5	11	11	2.52	----	1.48	"	"
38.14	11.00	10.80	0.500	4.5	11	11	2.52	----	1.44	"	"
38.24	11.80	11.56	0.530	4.5	12	12	2.53	----	1.58	"	"
38.33	14.20	13.89	0.600	4.2	14	14	2.54	----	1.58	"	"
38.43	15.70	15.33	0.640	4.1	16	15	2.54	----	1.78	"	"
38.52	16.40	15.98	0.690	4.2	16	16	2.55	----	1.87	"	"
38.61	17.30	16.82	0.740	4.3	17	17	2.55	----	1.99	"	"
38.71	17.90	17.37	0.750	4.2	12	12	2.56	----	2.07	Silty CLAY to CLAY	"

38.79	17.70	17.15	0.740	4.2	12	11	2.56	----	2.04	"	"
38.88	15.90	15.37	0.790	5.0	16	15	2.57	----	1.80	CLAY	"
38.97	15.80	15.25	0.880	5.6	16	15	2.58	----	1.79	"	"
39.07	17.30	16.65	1.120	6.5	17	17	2.58	----	1.99	"	130-140
39.16	22.20	21.32	1.410	6.4	22	21	2.59	----	2.64	"	"
39.25	44.70	42.84	1.930	4.3	30	29	2.60	----	5.64	Silty CLAY to CLAY	"
39.33	78.30	74.88	2.220	2.8	31	30	2.60	----	10.12	Sandy SILT to Clayey SILT	"
39.42	104.10	99.32	2.130	2.0	35	33	2.61	38	----	Silty SAND to Sandy SILT	"
39.51	102.60	97.67	1.860	1.8	34	33	2.62	38	----	"	"
39.60	100.90	95.83	1.890	1.9	34	32	2.62	38	----	"	"
39.69	109.20	103.48	1.730	1.6	27	26	2.63	38	----	SAND to Silty SAND	"
39.78	111.70	105.64	1.440	1.3	28	26	2.63	38	----	"	120-130
39.87	105.00	99.08	1.580	1.5	26	25	2.64	38	----	"	130-140
39.97	93.60	88.11	1.990	2.1	31	29	2.65	37	----	Silty SAND to Sandy SILT	"
40.06	77.60	72.88	1.970	2.5	31	29	2.65	----	10.02	Sandy SILT to Clayey SILT	"
40.15	53.60	50.22	1.860	3.5	27	25	2.66	----	6.82	Clayey SILT to Silty CLAY	"
40.24	36.90	34.49	1.770	4.8	25	23	2.67	----	4.59	Silty CLAY to CLAY	"
40.33	43.00	40.10	1.660	3.9	22	20	2.67	----	5.40	Clayey SILT to Silty CLAY	"
40.42	45.10	41.96	1.550	3.4	23	21	2.68	----	5.68	"	"
40.51	34.60	32.12	1.210	3.5	17	16	2.69	----	4.28	"	"
40.60	24.70	22.87	1.250	5.1	25	23	2.69	----	2.96	CLAY	"
40.69	22.00	20.33	1.450	6.6	22	20	2.70	----	2.60	"	"
40.78	26.80	24.70	1.620	6.0	27	25	2.71	----	3.24	"	"
40.85	31.50	28.99	1.740	5.5	32	29	2.71	----	3.86	"	"
40.94	34.90	32.04	1.770	5.1	35	32	2.72	----	4.32	"	"
41.19	31.50	28.73	1.920	6.1	32	29	2.74	----	3.86	"	"
41.28	38.10	34.67	1.820	4.8	25	23	2.74	----	4.74	Silty CLAY to CLAY	"
41.36	40.80	37.04	1.620	4.0	20	19	2.75	----	5.10	Clayey SILT to Silty CLAY	"
41.45	38.20	34.60	1.420	3.7	19	17	2.76	----	4.75	"	"
41.54	30.20	27.29	1.260	4.2	20	18	2.76	----	3.68	Silty CLAY to CLAY	"
41.63	21.40	19.29	1.000	4.7	21	19	2.77	----	2.51	CLAY	"
41.72	16.30	14.66	0.790	4.8	16	15	2.77	----	1.83	"	120-130
41.81	13.40	12.03	0.620	4.6	13	12	2.78	----	1.44	"	"
41.90	11.40	10.21	0.530	4.6	11	10	2.79	----	1.47	"	"
41.99	10.90	9.74	0.490	4.5	11	10	2.79	----	1.38	"	"
42.08	11.50	10.26	0.500	4.3	12	10	2.80	----	1.48	"	"
42.17	11.90	10.59	0.530	4.5	12	11	2.80	----	1.55	"	"
42.26	13.20	11.73	0.550	4.2	13	12	2.81	----	1.41	"	"
42.35	13.20	11.70	0.560	4.2	13	12	2.81	----	1.41	"	"
42.44	13.30	11.77	0.570	4.3	13	12	2.82	----	1.42	"	"
42.51	12.90	11.39	0.570	4.4	13	11	2.82	----	1.37	"	"
42.59	13.20	11.64	0.560	4.2	13	12	2.83	----	1.41	"	"
42.68	12.70	11.17	0.550	4.3	13	11	2.83	----	1.34	"	"
42.77	12.00	10.54	0.540	4.5	12	11	2.84	----	1.25	"	"
42.86	12.00	10.51	0.520	4.3	12	11	2.85	----	1.25	"	"
42.95	11.90	10.40	0.540	4.5	12	10	2.85	----	1.54	"	"
43.04	13.30	11.60	0.570	4.3	13	12	2.86	----	1.42	"	"
43.13	15.20	13.23	0.650	4.3	15	13	2.86	----	1.67	"	"
43.22	17.80	15.46	0.750	4.2	18	15	2.87	----	2.02	"	"
43.31	21.10	18.28	0.870	4.1	14	12	2.87	----	2.46	Silty CLAY to CLAY	130-140
43.40	24.70	21.35	0.980	4.0	16	14	2.88	----	2.94	"	"
43.49	22.70	19.57	1.060	4.7	23	20	2.89	----	2.67	CLAY	"
43.58	19.60	16.86	1.060	5.4	20	17	2.89	----	2.25	"	"
43.67	17.20	14.76	0.950	5.5	17	15	2.90	----	1.93	"	120-130
43.77	14.90	12.76	0.890	6.0	15	13	2.91	----	1.63	"	"

43.86	14.00	11.96	0.830	5.9	14	12	2.91	----	1.51	"	"
43.95	15.60	13.30	0.910	5.8	16	13	2.92	----	1.72	"	"
44.04	17.30	14.71	0.990	5.7	17	15	2.92	----	1.94	"	130-140
44.13	20.40	17.30	1.070	5.2	20	17	2.93	----	2.36	"	"
44.43	25.70	21.61	1.060	4.1	17	14	2.95	----	3.06	Silty CLAY to CLAY	"
44.52	25.30	21.22	1.030	4.1	17	14	2.96	----	3.01	"	"
44.62	24.30	20.33	0.990	4.1	16	14	2.97	----	2.87	"	"
44.71	24.10	20.11	0.970	4.0	16	13	2.97	----	2.84	"	"
44.80	23.60	19.64	0.940	4.0	16	13	2.98	----	2.78	"	"
44.89	21.50	17.84	0.900	4.2	14	12	2.99	----	2.50	"	"
44.98	19.90	16.47	0.870	4.4	20	16	2.99	----	2.28	CLAY	"
45.07	17.70	14.62	0.840	4.7	18	15	3.00	----	1.99	"	120-130
45.17	16.70	13.77	0.810	4.9	17	14	3.00	----	1.85	"	"
45.26	16.70	13.76	0.740	4.4	17	14	3.01	----	1.85	"	"
45.35	15.50	12.76	0.720	4.6	16	13	3.02	----	1.69	"	"
45.44	14.80	12.17	0.680	4.6	15	12	3.02	----	1.60	"	"
45.53	15.10	12.41	0.660	4.4	15	12	3.03	----	1.64	"	"
45.62	16.00	13.14	0.630	3.9	11	9	3.03	----	1.76	Silty CLAY to CLAY	"
45.72	15.70	12.88	0.600	3.8	10	9	3.04	----	1.72	"	"
45.81	15.70	12.87	0.600	3.8	10	9	3.04	----	1.72	"	"
45.90	14.70	12.04	0.650	4.4	15	12	3.05	----	1.58	CLAY	"
45.99	14.80	12.12	0.750	5.1	15	12	3.06	----	1.59	"	"
46.08	17.10	13.99	0.870	5.1	17	14	3.06	----	1.90	"	"
46.17	19.40	15.85	1.120	5.8	19	16	3.07	----	2.21	"	130-140
46.26	22.20	18.13	1.420	6.4	22	18	3.07	----	2.58	"	"
46.35	26.60	21.70	1.600	6.0	27	22	3.08	----	3.16	"	"
46.44	31.70	25.84	1.750	5.5	32	26	3.09	----	3.84	"	"
46.53	33.30	27.11	1.830	5.5	33	27	3.09	----	4.06	"	"
46.62	33.10	26.93	1.900	5.7	33	27	3.10	----	4.03	"	"
46.71	31.80	25.85	1.920	6.0	32	26	3.11	----	3.85	"	"
46.80	28.10	22.82	1.910	6.8	28	23	3.11	----	3.36	"	"
46.89	24.90	20.20	1.910	7.7	25	20	3.12	----	2.93	"	"
46.98	23.20	18.80	1.870	8.1	23	19	3.13	----	2.70	"	"
47.07	24.00	19.43	1.790	7.5	24	19	3.13	----	2.81	"	"
47.16	23.50	19.01	1.860	7.9	24	19	3.14	----	2.74	"	"
47.25	22.50	18.19	2.150	9.6	23	18	3.15	----	2.61	"	"
47.34	23.40	18.89	2.190	9.4	23	19	3.15	----	2.73	"	"
47.43	25.40	20.49	2.370	9.3	25	20	3.16	----	2.99	"	"
47.51	35.90	28.94	2.670	7.4	36	29	3.16	----	4.39	"	"
47.58	37.50	30.21	2.950	7.9	38	30	3.17	----	4.61	"	"
47.67	46.30	37.26	3.030	6.5	46	37	3.18	----	5.78	"	"
47.76	63.80	51.30	2.950	4.6	43	34	3.18	----	8.11	Silty CLAY to CLAY	"
47.84	80.70	64.83	3.080	3.8	40	32	3.19	----	10.36	Clayey SILT to Silty CLAY	"
47.93	105.40	84.59	2.980	2.8	42	34	3.19	----	13.66	Sandy SILT to Clayey SILT	"
48.01	120.00	96.23	2.710	2.3	40	32	3.20	38	----	Silty SAND to Sandy SILT	"
48.10	115.80	92.77	2.800	2.4	39	31	3.21	38	----	"	"
48.19	116.80	93.49	3.070	2.6	39	31	3.21	38	----	"	"
48.27	124.00	99.17	2.850	2.3	41	33	3.22	38	----	"	"
48.36	124.70	99.64	2.230	1.8	42	33	3.23	38	----	"	"
48.44	144.10	115.03	3.800	2.6	48	38	3.23	39	----	"	"
48.52	202.10	161.20	6.020	3.0	67	54	3.24	41	----	"	"
48.60	260.90	207.93	7.520	2.9	130	104	3.24	42	----	SAND to Clayey SAND *	"
48.68	304.10	242.15	6.620	2.2	61	48	3.25	43	----	SAND	"
48.76	266.40	211.95	4.730	1.8	53	42	3.26	42	----	"	"
48.84	257.80	204.94	4.570	1.8	52	41	3.26	42	----	"	"

48.93	287.10	228.03	6.340	2.2	57	46	3.27	43	----	"	"
49.01	290.90	230.85	7.370	2.5	97	77	3.27	43	----	Silty SAND to Sandy SILT	"
49.09	322.10	255.40	7.700	2.4	107	85	3.28	43	----	"	"
49.15	327.00	259.12	8.410	2.6	164	130	3.28	43	----	SAND to Clayey SAND *	"
49.21	366.40	290.15	8.720	2.4	183	145	3.29	44	----	"	"
49.26	385.80	305.33	9.560	2.5	193	153	3.29	44	----	"	"
49.32	433.00	342.48	9.900	2.3	217	171	3.30	45	----	"	"
49.38	465.50	367.96	9.990	2.1	233	184	3.30	46	----	"	"
49.44	489.90	387.01	9.980	2.0	245	194	3.30	46	----	"	"
49.49	508.70	401.63	9.610	1.9	102	80	3.31	46	----	SAND	"
49.55	529.20	417.56	9.630	1.8	106	84	3.31	46	----	"	"
49.62	552.00	435.23	8.410	1.5	110	87	3.32	46	----	"	"
49.69	544.80	429.24	7.910	1.5	109	86	3.32	46	----	"	"
49.74	528.70	416.32	6.230	1.2	106	83	3.33	46	----	"	"
49.80	512.60	403.41	7.690	1.5	103	81	3.33	46	----	"	"
49.85	525.60	413.42	7.800	1.5	105	83	3.33	46	----	"	"
49.89	550.60	432.87	7.900	1.4	110	87	3.34	46	----	"	"
49.94	512.90	403.02	7.950	1.6	103	81	3.34	46	----	"	"
49.99	631.70	496.13	8.300	1.3	126	99	3.34	47	----	"	"
50.03	492.10	386.32	7.200	1.5	98	77	3.35	46	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-22
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 15:25:47
Terminated at 30.0 feet Groundwater measured at 2.5 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.56	19.60	31.36	0.930	4.7	20	31	0.07	----	2.61	CLAY	"
0.65	18.30	29.28	0.960	5.2	18	29	0.08	----	2.43	"	"
0.74	17.40	27.84	0.980	5.6	17	28	0.09	----	2.31	"	"
0.83	15.80	25.28	0.950	6.0	16	25	0.10	----	2.10	"	120-130
0.92	13.80	22.08	0.870	6.3	14	22	0.11	----	1.83	"	"
1.01	12.10	19.36	0.780	6.4	12	19	0.12	----	1.61	"	"
1.10	10.10	16.16	0.690	6.8	10	16	0.14	----	1.67	"	"
1.19	7.80	12.48	0.590	7.6	8	12	0.15	----	1.55	"	110-120
1.27	6.20	9.92	0.490	7.9	6	10	0.15	----	1.22	"	"
1.36	4.80	7.68	0.410	8.5	5	8	0.16	----	0.94	Organic Material	100-110
1.44	4.40	7.04	0.350	8.0	4	7	0.17	----	0.86	"	"
1.52	5.50	8.80	0.320	5.8	6	9	0.18	----	1.08	CLAY	"
1.60	6.00	9.60	0.310	5.2	6	10	0.19	----	1.18	"	"
1.68	6.50	10.40	0.330	5.1	7	10	0.20	----	1.28	"	"
1.76	7.00	11.20	0.360	5.1	7	11	0.21	----	1.38	"	110-120
1.85	7.40	11.84	0.390	5.3	7	12	0.22	----	1.46	"	"
1.93	8.00	12.80	0.420	5.3	8	13	0.23	----	1.58	"	"
2.02	8.00	12.80	0.450	5.6	8	13	0.24	----	1.58	"	"
2.10	8.70	13.92	0.460	5.3	9	14	0.25	----	1.72	"	"
2.32	9.50	15.20	0.480	5.1	10	15	0.27	----	1.56	"	"
2.40	10.10	16.16	0.500	5.0	10	16	0.28	----	1.66	"	120-130
2.49	10.70	17.12	0.560	5.2	11	17	0.29	----	1.76	"	"
2.57	12.20	19.52	0.620	5.1	12	20	0.30	----	1.61	"	"
2.66	13.90	22.24	0.690	5.0	14	22	0.30	----	1.83	"	"
2.74	14.70	23.52	0.770	5.2	15	24	0.31	----	1.94	"	"
2.83	13.60	21.76	0.830	6.1	14	22	0.31	----	1.79	"	"
2.91	14.20	22.72	0.860	6.1	14	23	0.32	----	1.87	"	"
3.00	13.80	22.08	0.890	6.4	14	22	0.32	----	1.82	"	"
3.08	14.00	22.40	0.880	6.3	14	22	0.33	----	1.84	"	"
3.17	13.70	21.92	0.830	6.1	14	22	0.34	----	1.80	"	"
3.25	13.30	21.28	0.780	5.9	13	21	0.34	----	1.75	"	"
3.34	12.70	20.32	0.730	5.7	13	20	0.35	----	1.67	"	"
3.42	12.10	19.36	0.670	5.5	12	19	0.35	----	1.59	"	"
3.51	11.80	18.88	0.640	5.4	12	19	0.36	----	1.93	"	"
3.59	13.00	20.80	0.650	5.0	13	21	0.36	----	1.70	"	"
3.68	14.10	22.56	0.720	5.1	14	23	0.37	----	1.85	"	"
3.76	14.00	22.40	0.790	5.6	14	22	0.37	----	1.84	"	"
3.85	13.10	20.96	0.780	6.0	13	21	0.38	----	1.72	"	"
3.93	12.80	20.48	0.710	5.5	13	20	0.38	----	1.68	"	"
4.02	12.30	19.68	0.640	5.2	12	20	0.39	----	1.61	"	"
4.10	11.60	18.56	0.570	4.9	12	19	0.39	----	1.89	"	"
4.19	11.50	18.40	0.520	4.5	12	18	0.40	----	1.87	"	"
4.27	11.60	18.56	0.490	4.2	12	19	0.40	----	1.89	"	"
4.36	10.80	17.28	0.470	4.4	11	17	0.41	----	1.76	"	"
4.44	10.00	16.00	0.450	4.5	10	16	0.41	----	1.62	"	110-120
4.52	9.20	14.72	0.440	4.8	9	15	0.42	----	1.49	"	"
4.61	9.70	15.52	0.430	4.4	10	16	0.42	----	1.57	"	"

4.69	10.30	16.48	0.420	4.1	10	16	0.43	----	1.67	"	"
4.77	9.80	15.68	0.390	4.0	10	16	0.43	----	1.59	"	"
4.86	9.60	15.36	0.350	3.6	10	15	0.44	----	1.55	"	"
4.94	8.70	13.92	0.310	3.6	9	14	0.44	----	1.68	"	"
5.03	8.10	12.96	0.270	3.3	8	13	0.44	----	1.56	"	100-110
5.11	7.90	12.64	0.250	3.2	8	13	0.45	----	1.52	"	"
5.20	8.60	13.76	0.240	2.8	6	9	0.45	----	1.66	Silty CLAY to CLAY	"
5.28	7.30	11.68	0.230	3.2	7	12	0.45	----	1.40	CLAY	"
5.37	7.10	11.36	0.220	3.1	7	11	0.46	----	1.36	"	"
5.45	7.00	11.20	0.220	3.1	7	11	0.46	----	1.34	"	"
5.53	8.00	12.80	0.210	2.6	5	9	0.46	----	1.53	Silty CLAY to CLAY	"
5.61	7.50	12.00	0.190	2.5	5	8	0.47	----	1.43	"	"
5.70	6.90	11.04	0.170	2.5	5	7	0.47	----	1.31	"	"
5.78	7.10	11.36	0.180	2.5	5	8	0.48	----	1.35	"	"
5.87	7.50	12.00	0.170	2.3	5	8	0.48	----	1.43	"	"
5.95	7.30	11.68	0.180	2.5	5	8	0.48	----	1.39	"	"
6.04	7.50	12.00	0.200	2.7	5	8	0.49	----	1.43	"	"
6.12	6.70	10.72	0.220	3.3	7	11	0.49	----	1.27	CLAY	"
6.21	5.80	9.28	0.210	3.6	6	9	0.49	----	1.09	"	"
6.29	5.50	8.80	0.200	3.6	6	9	0.50	----	1.03	"	"
6.38	6.20	9.92	0.200	3.2	6	10	0.50	----	1.17	"	"
6.46	6.30	10.08	0.190	3.0	6	10	0.50	----	1.18	"	"
6.55	6.60	10.56	0.180	2.7	4	7	0.51	----	1.24	Silty CLAY to CLAY	"
6.63	6.30	10.08	0.170	2.7	4	7	0.51	----	1.18	"	"
6.72	6.70	10.72	0.170	2.5	4	7	0.52	----	1.26	"	"
6.80	7.20	11.52	0.180	2.5	5	8	0.52	----	1.36	"	"
6.89	7.20	11.52	0.180	2.5	5	8	0.52	----	1.36	"	"
6.97	7.20	11.52	0.190	2.6	5	8	0.53	----	1.36	"	"
7.06	7.30	11.68	0.200	2.7	5	8	0.53	----	1.38	"	"
7.14	7.40	11.84	0.220	3.0	5	8	0.53	----	1.40	"	"
7.23	7.70	12.32	0.240	3.1	8	12	0.54	----	1.46	CLAY	"
7.31	8.70	13.92	0.280	3.2	6	9	0.54	----	1.66	Silty CLAY to CLAY	110-120
7.39	9.80	15.68	0.300	3.1	7	10	0.55	----	1.56	"	"
7.48	11.30	18.08	0.330	2.9	8	12	0.55	----	1.81	"	"
7.57	12.30	19.68	0.360	2.9	8	13	0.56	----	1.58	"	"
7.65	11.90	19.04	0.390	3.3	8	13	0.56	----	1.91	"	"
7.73	11.80	18.88	0.440	3.7	12	19	0.56	----	1.89	CLAY	120-130
7.82	12.00	19.20	0.480	4.0	12	19	0.57	----	1.54	"	"
7.90	12.90	20.64	0.530	4.1	13	21	0.58	----	1.66	"	"
7.99	14.60	23.36	0.570	3.9	10	16	0.58	----	1.89	Silty CLAY to CLAY	"
8.07	16.00	25.60	0.610	3.8	11	17	0.59	----	2.07	"	"
8.15	16.80	26.88	0.650	3.9	11	18	0.59	----	2.18	"	"
8.24	17.30	27.68	0.670	3.9	12	18	0.60	----	2.24	"	"
8.32	17.40	27.84	0.670	3.9	12	19	0.60	----	2.26	"	"
8.41	16.90	27.04	0.700	4.1	11	18	0.61	----	2.19	"	"
8.49	15.80	25.28	0.700	4.4	16	25	0.61	----	2.04	CLAY	"
8.58	14.90	23.84	0.660	4.4	15	24	0.62	----	1.92	"	"
8.76	12.90	20.64	0.530	4.1	13	21	0.63	----	1.65	"	"
8.84	12.10	19.36	0.470	3.9	12	19	0.63	----	1.54	"	"
8.93	11.60	18.56	0.420	3.6	8	12	0.64	----	1.85	Silty CLAY to CLAY	110-120
9.01	11.70	18.72	0.390	3.3	8	12	0.64	----	1.86	"	"
9.09	12.40	19.84	0.380	3.1	8	13	0.65	----	1.58	"	"
9.18	13.60	21.76	0.410	3.0	9	15	0.65	----	1.74	"	120-130
9.26	13.40	21.44	0.430	3.2	9	14	0.66	----	1.71	"	"
9.35	14.00	22.40	0.450	3.2	9	15	0.66	----	1.79	"	"

9.43	13.60	21.76	0.460	3.4	9	15	0.67	----	1.74	"	"
9.51	12.70	20.32	0.470	3.7	8	14	0.67	----	1.62	"	"
9.60	12.30	19.68	0.450	3.7	8	13	0.68	----	1.57	"	"
9.69	11.30	18.08	0.460	4.1	11	18	0.68	----	1.79	CLAY	"
9.77	10.60	16.96	0.460	4.3	11	17	0.69	----	1.67	"	110-120
9.85	10.80	17.28	0.440	4.1	11	17	0.69	----	1.70	"	"
9.94	11.40	18.24	0.410	3.6	8	12	0.70	----	1.80	Silty CLAY to CLAY	"
10.02	11.10	17.76	0.380	3.4	7	12	0.70	----	1.75	"	"
10.11	11.60	18.56	0.330	2.8	8	12	0.71	----	1.83	"	"
10.19	12.40	19.84	0.290	2.3	6	10	0.71	----	1.57	Clayey SILT to Silty CLAY	"
10.27	11.90	19.04	0.300	2.5	6	10	0.72	----	1.88	"	"
10.36	12.40	19.84	0.410	3.3	8	13	0.72	----	1.57	Silty CLAY to CLAY	"
10.44	14.70	23.52	0.510	3.5	10	16	0.73	----	1.88	"	120-130
10.53	14.70	23.52	0.560	3.8	10	16	0.73	----	1.88	"	"
10.61	15.70	25.12	0.610	3.9	10	17	0.74	----	2.01	"	"
10.70	14.60	23.36	0.630	4.3	15	23	0.74	----	1.86	CLAY	"
10.78	14.10	22.56	0.540	3.8	9	15	0.75	----	1.80	Silty CLAY to CLAY	"
10.86	16.20	25.92	0.500	3.1	8	13	0.75	----	2.08	Clayey SILT to Silty CLAY	"
10.95	11.90	19.04	0.520	4.4	12	19	0.76	----	1.88	CLAY	"
11.03	10.50	16.80	0.520	5.0	11	17	0.76	----	1.64	"	"
11.11	12.90	20.64	0.560	4.3	13	21	0.77	----	1.63	"	"
11.20	13.20	21.12	0.600	4.5	13	21	0.77	----	1.67	"	"
11.28	15.50	24.80	0.580	3.7	10	17	0.78	----	1.98	Silty CLAY to CLAY	"
11.37	15.20	24.32	0.600	3.9	10	16	0.78	----	1.94	"	"
11.45	11.90	19.04	0.650	5.5	12	19	0.79	----	1.87	CLAY	"
11.53	15.90	25.44	0.710	4.5	16	25	0.79	----	2.03	"	"
11.62	16.20	25.92	0.750	4.6	16	26	0.80	----	2.07	"	"
11.70	16.90	26.97	0.790	4.7	17	27	0.80	----	2.16	"	"
11.78	24.80	39.43	0.960	3.9	17	26	0.81	----	3.21	Silty CLAY to CLAY	130-140
11.87	31.10	49.25	1.070	3.4	16	25	0.82	----	4.05	Clayey SILT to Silty CLAY	"
11.95	31.90	50.33	1.030	3.2	16	25	0.82	----	4.16	"	"
12.03	33.80	53.13	1.000	3.0	17	27	0.83	----	4.41	"	"
12.07	37.90	59.47	0.900	2.4	15	24	0.83	----	4.96	Sandy SILT to Clayey SILT	"
12.15	43.90	68.64	0.750	1.7	15	23	0.84	36	----	Silty SAND to Sandy SILT	"
12.23	49.90	77.78	0.720	1.4	17	26	0.84	37	----	"	120-130
12.31	59.20	91.96	0.660	1.1	20	31	0.85	38	----	"	"
12.39	70.90	109.77	0.630	0.9	18	27	0.85	39	----	SAND to Silty SAND	"
12.48	74.70	115.26	0.660	0.9	19	29	0.86	39	----	"	"
12.56	77.70	119.50	0.720	0.9	19	30	0.86	39	----	"	"
12.64	77.80	119.23	0.880	1.1	19	30	0.87	39	----	"	"
12.72	77.40	118.23	0.930	1.2	19	30	0.87	39	----	"	"
12.81	82.60	125.72	0.950	1.2	21	31	0.88	39	----	"	"
12.89	81.90	124.24	1.040	1.3	20	31	0.88	39	----	"	"
12.98	83.60	126.37	1.110	1.3	21	32	0.89	39	----	"	"
13.06	87.00	131.08	1.070	1.2	22	33	0.89	40	----	"	"
13.14	84.30	126.57	1.110	1.3	21	32	0.90	39	----	"	"
13.22	87.80	131.31	1.320	1.5	29	44	0.90	40	----	Silty SAND to Sandy SILT	130-140
13.31	91.10	135.69	1.440	1.6	30	45	0.91	40	----	"	"
13.39	97.10	144.06	1.400	1.4	24	36	0.92	40	----	SAND to Silty SAND	"
13.47	96.80	143.02	1.410	1.5	24	36	0.92	40	----	"	"
13.55	93.10	137.01	1.510	1.6	31	46	0.93	40	----	Silty SAND to Sandy SILT	"
13.63	96.30	141.13	1.370	1.4	24	35	0.93	40	----	SAND to Silty SAND	"
13.71	107.00	156.29	1.330	1.2	27	39	0.94	41	----	"	120-130
13.79	108.80	158.28	1.420	1.3	27	40	0.95	41	----	"	130-140
13.87	113.90	165.04	1.520	1.3	28	41	0.95	41	----	"	"

13.96	120.70	174.27	1.440	1.2	30	44	0.96	41	----		"	120-130
14.03	122.20	175.85	1.300	1.1	31	44	0.96	41	----		"	"
14.12	124.30	178.23	1.190	1.0	25	36	0.97	41	----		SAND	"
14.19	127.00	181.58	1.040	0.8	25	36	0.97	41	----		"	110-120
14.27	127.00	181.04	0.870	0.7	25	36	0.97	41	----		"	"
14.35	124.60	177.11	0.780	0.6	25	35	0.98	41	----		"	"
14.43	117.80	167.03	0.640	0.5	24	33	0.98	41	----		"	100-110
14.51	105.50	149.24	0.510	0.5	21	30	0.99	40	----		"	"
14.60	89.40	126.15	0.390	0.4	18	25	0.99	39	----		"	"
14.67	72.20	101.64	0.380	0.5	18	25	0.99	38	----		SAND to Silty SAND	"
14.76	54.50	76.48	0.480	0.9	14	19	1.00	36	----		"	110-120
14.84	37.60	52.61	0.500	1.3	13	18	1.00	34	----		Silty SAND to Sandy SILT	120-130
14.92	26.50	37.01	0.450	1.7	11	15	1.01	----	3.41		Sandy SILT to Clayey SILT	"
15.00	16.50	23.00	0.390	2.4	8	11	1.01	----	2.08		Clayey SILT to Silty CLAY	"
15.08	11.50	16.00	0.350	3.0	8	11	1.02	----	1.77		Silty CLAY to CLAY	110-120
15.18	9.40	13.06	0.280	3.0	6	9	1.02	----	1.42		"	"
15.26	8.20	11.37	0.240	2.9	5	8	1.02	----	1.46		"	100-110
15.35	8.30	11.50	0.210	2.5	6	8	1.03	----	1.48		"	"
15.43	7.30	10.10	0.200	2.7	5	7	1.03	----	1.28		"	"
15.51	7.10	9.81	0.200	2.8	5	7	1.04	----	1.24		"	"
15.59	5.40	7.45	0.210	3.9	5	7	1.04	----	0.89		CLAY	"
15.67	4.60	6.34	0.210	4.6	5	6	1.04	----	0.73		"	90-100
15.75	4.80	6.61	0.210	4.4	5	7	1.04	----	0.77		"	100-110
15.83	5.20	7.15	0.210	4.0	5	7	1.05	----	0.85		"	"
15.91	6.30	8.65	0.210	3.3	6	9	1.05	----	1.07		"	"
16.00	6.40	8.78	0.210	3.3	6	9	1.06	----	1.09		"	"
16.08	6.30	8.63	0.190	3.0	6	9	1.06	----	1.07		"	"
16.16	5.60	7.66	0.190	3.4	6	8	1.06	----	0.93		"	"
16.24	6.10	8.33	0.180	3.0	6	8	1.07	----	1.03		"	"
16.33	6.40	8.73	0.180	2.8	6	9	1.07	----	1.09		"	"
16.41	5.40	7.36	0.180	3.3	5	7	1.07	----	0.89		"	90-100
16.49	7.20	9.80	0.190	2.6	5	7	1.08	----	1.25		Silty CLAY to CLAY	100-110
16.58	6.60	8.97	0.230	3.5	7	9	1.08	----	1.12		CLAY	"
16.66	6.10	8.28	0.300	4.9	6	8	1.08	----	1.02		"	"
16.74	8.50	11.51	0.350	4.1	9	12	1.09	----	1.50		"	110-120
16.83	10.20	13.79	0.390	3.8	10	14	1.09	----	1.53		"	"
16.91	9.60	12.96	0.430	4.5	10	13	1.10	----	1.43		"	"
17.00	8.20	11.05	0.450	5.5	8	11	1.10	----	1.44		"	"
17.08	8.50	11.44	0.430	5.1	9	11	1.10	----	1.50		"	"
17.17	8.50	11.42	0.390	4.6	9	11	1.11	----	1.50		"	"
17.25	7.80	10.46	0.350	4.5	8	10	1.11	----	1.36		"	"
17.34	7.70	10.31	0.340	4.4	8	10	1.12	----	1.34		"	"
17.42	8.40	11.22	0.330	3.9	8	11	1.12	----	1.47		"	"
17.50	8.70	11.60	0.350	4.0	9	12	1.13	----	1.53		"	"
17.58	9.10	12.12	0.360	4.0	9	12	1.13	----	1.34		"	"
17.67	9.20	12.23	0.360	3.9	9	12	1.14	----	1.36		"	"
17.75	8.00	10.62	0.350	4.4	8	11	1.14	----	1.39		"	"
17.84	6.90	9.14	0.340	4.9	7	9	1.14	----	1.17		"	"
17.92	6.20	8.20	0.350	5.6	6	8	1.15	----	1.03		"	100-110
18.01	7.10	9.38	0.340	4.8	7	9	1.15	----	1.21		"	110-120
18.09	7.50	9.89	0.330	4.4	8	10	1.16	----	1.29		"	"
18.18	7.50	9.87	0.360	4.8	8	10	1.16	----	1.29		"	"
18.26	7.30	9.59	0.420	5.8	7	10	1.17	----	1.24		"	"
18.34	7.20	9.44	0.440	6.1	7	9	1.17	----	1.22		"	"
18.43	7.40	9.69	0.400	5.4	7	10	1.17	----	1.26		"	"

18.61	6.50	8.48	0.320	4.9	7	8	1.18	----	1.08	"	100-110
18.70	5.60	7.30	0.300	5.4	6	7	1.19	----	0.90	"	"
18.78	4.40	5.73	0.310	7.0	4	6	1.19	----	0.66	"	"
18.86	4.80	6.24	0.320	6.7	5	6	1.19	----	0.74	"	"
18.95	4.00	5.19	0.310	7.8	4	5	1.20	----	0.58	Organic Material	"
19.03	4.00	5.18	0.310	7.8	4	5	1.20	----	0.58	"	"
19.11	5.60	7.25	0.310	5.5	6	7	1.20	----	0.90	CLAY	"
19.20	5.80	7.49	0.330	5.7	6	7	1.21	----	0.93	"	"
19.28	7.50	9.67	0.360	4.8	8	10	1.21	----	1.27	"	110-120
19.37	9.90	12.75	0.400	4.0	10	13	1.22	----	1.46	"	"
19.45	11.70	15.04	0.400	3.4	8	10	1.22	----	1.76	Silty CLAY to CLAY	"
19.53	9.70	12.44	0.410	4.2	10	12	1.23	----	1.43	CLAY	"
19.62	5.50	7.04	0.410	7.5	6	7	1.23	----	0.87	"	"
19.70	4.00	5.11	0.380	9.5	4	5	1.23	----	0.57	Organic Material	100-110
19.78	2.10	2.68	0.340	12.0	2	3	1.24	----	0.19	"	90-100
19.87	2.40	3.06	0.280	11.7	2	3	1.24	----	0.25	"	"
19.95	3.00	3.82	0.240	8.0	3	4	1.24	----	0.37	"	"
20.04	4.10	5.22	0.220	5.4	4	5	1.24	----	0.59	CLAY	"
20.12	5.20	6.61	0.250	4.8	5	7	1.25	----	0.81	"	100-110
20.21	6.40	8.12	0.310	4.8	6	8	1.25	----	1.04	"	"
20.29	10.20	12.93	0.350	3.4	7	9	1.26	----	1.50	Silty CLAY to CLAY	110-120
20.37	14.60	18.46	0.480	3.3	10	12	1.26	----	1.79	"	120-130
20.46	14.00	17.67	0.630	4.5	14	18	1.27	----	1.71	CLAY	"
20.54	21.50	27.08	0.690	3.2	11	14	1.27	----	2.71	Clayey SILT to Silty CLAY	"
20.62	28.80	36.21	0.690	2.4	12	14	1.28	----	3.68	Sandy SILT to Clayey SILT	"
20.71	31.80	39.88	0.720	2.3	13	16	1.28	----	4.08	"	130-140
20.79	29.00	36.30	0.690	2.4	12	15	1.29	----	3.70	"	120-130
20.87	20.20	25.24	0.590	2.9	10	13	1.29	----	2.53	Clayey SILT to Silty CLAY	"
20.96	15.60	19.45	0.510	3.3	10	13	1.30	----	1.92	Silty CLAY to CLAY	"
21.04	11.10	13.82	0.430	3.9	11	14	1.30	----	1.64	CLAY	110-120
21.12	9.10	11.31	0.360	4.0	9	11	1.31	----	1.31	"	"
21.21	9.20	11.41	0.320	3.5	9	11	1.31	----	1.33	"	"
21.29	10.60	13.13	0.320	3.0	7	9	1.32	----	1.56	Silty CLAY to CLAY	"
21.38	10.50	12.98	0.360	3.4	7	9	1.32	----	1.54	"	"
21.46	9.90	12.21	0.500	5.1	10	12	1.33	----	1.44	CLAY	120-130
21.54	9.40	11.57	0.610	6.5	9	12	1.33	----	1.36	"	"
21.63	9.70	11.92	0.580	6.0	10	12	1.34	----	1.41	"	"
21.71	10.20	12.51	0.570	5.6	10	13	1.34	----	1.49	"	"
21.79	12.70	15.54	0.560	4.4	13	16	1.35	----	1.52	"	"
21.88	13.30	16.24	0.550	4.1	13	16	1.35	----	1.60	"	"
21.96	13.60	16.57	0.520	3.8	9	11	1.36	----	1.64	Silty CLAY to CLAY	"
22.04	13.40	16.30	0.480	3.6	9	11	1.36	----	1.61	"	"
22.13	13.80	16.75	0.450	3.3	9	11	1.37	----	1.67	"	"
22.21	13.40	16.23	0.450	3.4	9	11	1.37	----	1.61	"	"
22.29	12.10	14.62	0.470	3.9	12	15	1.38	----	1.44	CLAY	"
22.38	11.30	13.63	0.510	4.5	11	14	1.38	----	1.66	"	"
22.46	11.70	14.08	0.540	4.6	12	14	1.39	----	1.73	"	"
22.54	12.70	15.25	0.550	4.3	13	15	1.39	----	1.52	"	"
22.63	12.50	14.98	0.530	4.2	13	15	1.40	----	1.49	"	"
22.71	11.90	14.23	0.490	4.1	12	14	1.40	----	1.76	"	"
22.79	11.80	14.08	0.460	3.9	12	14	1.41	----	1.74	"	"
22.88	12.50	14.89	0.410	3.3	8	10	1.41	----	1.49	Silty CLAY to CLAY	"
22.96	12.60	14.98	0.390	3.1	8	10	1.42	----	1.50	"	110-120
23.05	12.70	15.07	0.390	3.1	8	10	1.42	----	1.51	"	"
23.13	13.20	15.63	0.390	3.0	9	10	1.43	----	1.58	"	120-130

23.21	12.90	15.25	0.390	3.0	9	10	1.43	----	1.54	"	110-120
23.30	13.40	15.81	0.410	3.1	9	11	1.44	----	1.60	"	120-130
23.38	14.20	16.71	0.440	3.1	9	11	1.44	----	1.71	"	"
23.46	13.50	15.86	0.440	3.3	9	11	1.45	----	1.62	"	"
23.55	13.00	15.24	0.440	3.4	9	10	1.45	----	1.55	"	"
23.63	12.30	14.39	0.450	3.7	8	10	1.46	----	1.45	"	"
23.71	12.00	14.01	0.480	4.0	12	14	1.46	----	1.41	CLAY	"
23.80	13.80	16.07	0.540	3.9	14	16	1.47	----	1.65	"	"
23.88	14.70	17.08	0.560	3.8	10	11	1.47	----	1.77	Silty CLAY to CLAY	"
23.96	14.40	16.70	0.560	3.9	10	11	1.48	----	1.73	"	"
24.05	14.50	16.78	0.570	3.9	10	11	1.49	----	1.74	"	"
24.13	15.00	17.32	0.580	3.9	10	12	1.49	----	1.81	"	"
24.21	15.00	17.28	0.590	3.9	10	12	1.50	----	1.81	"	"
24.29	15.30	17.59	0.600	3.9	10	12	1.50	----	1.85	"	"
24.38	14.40	16.53	0.600	4.2	14	17	1.51	----	1.73	CLAY	"
24.46	14.20	16.27	0.590	4.2	14	16	1.51	----	1.70	"	"
24.54	13.70	15.67	0.580	4.2	14	16	1.52	----	1.63	"	"
24.63	12.20	13.94	0.580	4.8	12	14	1.52	----	1.43	"	"
24.71	12.90	14.71	0.570	4.4	13	15	1.53	----	1.53	"	"
24.79	14.20	16.17	0.570	4.0	14	16	1.53	----	1.70	"	"
24.88	15.70	17.84	0.580	3.7	10	12	1.54	----	1.90	Silty CLAY to CLAY	"
24.96	16.50	18.72	0.610	3.7	11	12	1.54	----	2.00	"	"
25.04	16.70	18.92	0.640	3.8	11	13	1.55	----	2.03	"	"
25.07	18.90	21.40	0.660	3.5	13	14	1.55	----	2.32	"	"
25.16	18.20	20.57	0.720	4.0	12	14	1.55	----	2.23	"	"
25.24	18.70	21.10	0.780	4.2	12	14	1.56	----	2.29	"	"
25.33	19.40	21.85	0.820	4.2	13	15	1.57	----	2.39	"	"
25.41	19.60	22.04	0.860	4.4	20	22	1.57	----	2.41	CLAY	"
25.49	20.40	22.90	0.920	4.5	20	23	1.58	----	2.52	"	130-140
25.58	20.70	23.19	0.970	4.7	21	23	1.58	----	2.56	"	"
25.66	20.50	22.92	0.990	4.8	21	23	1.59	----	2.53	"	"
25.74	21.10	23.55	1.010	4.8	21	24	1.59	----	2.61	"	"
25.82	22.50	25.06	1.030	4.6	23	25	1.60	----	2.80	"	"
25.91	22.10	24.57	1.010	4.6	22	25	1.61	----	2.74	"	"
25.99	21.00	23.30	0.970	4.6	21	23	1.61	----	2.59	"	"
26.07	20.00	22.14	0.920	4.6	20	22	1.62	----	2.46	"	"
26.16	20.00	22.10	0.900	4.5	20	22	1.62	----	2.46	"	"
26.24	19.80	21.84	0.900	4.5	20	22	1.63	----	2.43	"	"
26.32	19.30	21.25	0.910	4.7	19	21	1.64	----	2.37	"	"
26.41	18.00	19.78	0.880	4.9	18	20	1.64	----	2.19	"	120-130
26.49	18.20	19.97	0.820	4.5	18	20	1.65	----	2.22	"	"
26.57	17.60	19.27	0.730	4.1	12	13	1.65	----	2.14	Silty CLAY to CLAY	"
26.66	17.60	19.24	0.640	3.6	12	13	1.66	----	2.14	"	"
26.74	18.60	20.30	0.600	3.2	9	10	1.66	----	2.27	Clayey SILT to Silty CLAY	"
26.82	19.70	21.46	0.590	3.0	10	11	1.67	----	2.41	"	"
26.91	19.40	21.10	0.610	3.1	10	11	1.67	----	2.37	"	"
26.99	17.80	19.33	0.670	3.8	12	13	1.68	----	2.16	Silty CLAY to CLAY	"
27.07	17.00	18.43	0.700	4.1	11	12	1.68	----	2.05	"	"
27.15	15.80	17.10	0.670	4.2	16	17	1.69	----	1.89	CLAY	"
27.24	14.00	15.12	0.690	4.9	14	15	1.69	----	1.65	"	"
27.32	15.00	16.17	0.740	4.9	15	16	1.70	----	1.78	"	"
27.40	15.90	17.12	0.770	4.8	16	17	1.70	----	1.90	"	"
27.48	17.20	18.48	0.840	4.9	17	18	1.71	----	2.08	"	"
27.57	19.30	20.70	0.940	4.9	19	21	1.72	----	2.35	"	130-140
27.65	23.90	25.58	0.990	4.1	16	17	1.72	----	2.97	Silty CLAY to CLAY	"

27.73	25.80	27.56	0.990	3.8	17	18	1.73	----	3.22	"	"	
27.81	24.30	25.90	0.970	4.0	16	17	1.73	----	3.02	"	"	
27.90	21.50	22.87	0.920	4.3	14	15	1.74	----	2.65	"	"	
27.98	20.10	21.34	0.860	4.3	13	14	1.75	----	2.46	"	"	
28.06	20.30	21.51	0.920	4.5	20	22	1.75	----	2.48	CLAY		"
28.15	21.40	22.65	1.060	5.0	21	23	1.76	----	2.63	"	"	
28.23	21.10	22.30	1.210	5.7	21	22	1.76	----	2.59	"	"	
28.31	20.20	21.32	1.290	6.4	20	21	1.77	----	2.47	"	"	
28.54	35.50	37.32	1.820	5.1	36	37	1.79	----	4.51	"	"	
28.63	37.60	39.47	2.030	5.4	38	39	1.79	----	4.79	"	"	
28.71	37.70	39.53	2.150	5.7	38	40	1.80	----	4.80	"	"	
28.79	34.20	35.81	2.050	6.0	34	36	1.80	----	4.33	"	"	
28.87	27.50	28.75	1.760	6.4	28	29	1.81	----	3.44	"	"	
28.95	23.70	24.75	1.430	6.0	24	25	1.82	----	2.93	"	"	
29.03	21.50	22.42	1.200	5.6	22	22	1.82	----	2.63	"	"	
29.12	20.00	20.83	1.040	5.2	20	21	1.83	----	2.43	"	"	
29.20	17.90	18.61	1.150	6.4	18	19	1.83	----	2.15	"	"	
29.28	20.30	21.08	1.600	7.9	20	21	1.84	----	2.47	"	"	
29.36	29.60	30.70	2.080	7.0	30	31	1.85	----	3.71	"	"	
29.45	40.50	41.94	2.510	6.2	41	42	1.85	----	5.16	"	"	
29.52	45.00	46.54	2.790	6.2	45	47	1.86	----	5.76	"	"	
29.61	43.90	45.34	2.890	6.6	44	45	1.86	----	5.62	"	"	
29.68	39.50	40.74	2.850	7.2	40	41	1.87	----	5.03	"	"	
29.77	36.60	37.70	2.640	7.2	37	38	1.88	----	4.64	"	"	
29.85	34.10	35.07	2.320	6.8	34	35	1.88	----	4.31	"	"	
29.93	27.50	28.24	1.950	7.1	28	28	1.89	----	3.43	"	"	
30.01	20.20	20.72	1.630	8.1	20	21	1.89	----	2.45	"	"	

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-23
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 15:05:41
Terminated at 35.0 feet Groundwater measured at 3.0 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.53	36.80	58.88	1.530	4.2	25	39	0.06	----	4.90	Silty CLAY to CLAY	"
0.62	34.70	55.52	1.420	4.1	23	37	0.07	----	4.62	"	"
0.71	29.90	47.84	1.260	4.2	20	32	0.09	----	3.98	"	"
0.80	26.20	41.92	1.100	4.2	17	28	0.10	----	3.49	"	"
0.89	22.00	35.20	0.950	4.3	15	23	0.11	----	2.93	"	"
0.98	18.90	30.24	0.810	4.3	19	30	0.12	----	2.51	CLAY	120-130
1.07	15.80	25.28	0.730	4.6	16	25	0.13	----	2.10	"	"
1.16	12.70	20.32	0.680	5.4	13	20	0.14	----	1.68	"	"
1.25	11.10	17.76	0.660	5.9	11	18	0.15	----	1.84	"	"
1.33	10.70	17.12	0.630	5.9	11	17	0.17	----	1.77	"	"
1.43	10.20	16.32	0.610	6.0	10	16	0.18	----	1.69	"	"
1.52	10.40	16.64	0.610	5.9	10	17	0.19	----	1.72	"	"
1.61	10.70	17.12	0.590	5.5	11	17	0.20	----	1.77	"	"
1.70	11.10	17.76	0.590	5.3	11	18	0.21	----	1.83	"	"
1.79	11.50	18.40	0.600	5.2	12	18	0.22	----	1.90	"	"
1.88	11.90	19.04	0.620	5.2	12	19	0.23	----	1.96	"	"
1.97	12.60	20.16	0.640	5.1	13	20	0.24	----	1.66	"	"
2.06	14.10	22.56	0.750	5.3	14	23	0.26	----	1.86	"	"
2.15	14.70	23.52	0.810	5.5	15	24	0.27	----	1.94	"	"
2.22	11.70	18.72	0.850	7.3	12	19	0.28	----	1.93	"	"
2.33	16.30	26.08	0.880	5.4	16	26	0.29	----	2.15	"	"
2.41	16.30	26.08	0.880	5.4	16	26	0.30	----	2.15	"	"
2.50	16.20	25.92	0.860	5.3	16	26	0.31	----	2.14	"	"
2.58	15.90	25.44	0.850	5.3	16	25	0.32	----	2.10	"	"
2.66	15.40	24.64	0.860	5.6	15	25	0.33	----	2.03	"	"
2.75	15.80	25.28	0.870	5.5	16	25	0.34	----	2.08	"	"
2.84	16.40	26.24	0.860	5.2	16	26	0.35	----	2.16	"	"
2.92	14.80	23.68	0.820	5.5	15	24	0.36	----	1.95	"	"
3.01	13.20	21.12	0.750	5.7	13	21	0.37	----	1.74	"	"
3.09	12.20	19.52	0.690	5.7	12	20	0.37	----	1.60	"	"
3.18	11.10	17.76	0.620	5.6	11	18	0.38	----	1.82	"	"
3.26	10.50	16.80	0.570	5.4	11	17	0.39	----	1.72	"	"
3.35	10.10	16.16	0.530	5.2	10	16	0.39	----	1.65	"	"
3.43	9.10	14.56	0.490	5.4	9	15	0.39	----	1.48	"	110-120
3.52	9.10	14.56	0.480	5.3	9	15	0.40	----	1.48	"	"
3.60	8.70	13.92	0.480	5.5	9	14	0.40	----	1.70	"	"
3.69	8.00	12.80	0.450	5.6	8	13	0.41	----	1.55	"	"
3.77	7.50	12.00	0.400	5.3	8	12	0.41	----	1.45	"	"
3.86	6.80	10.88	0.370	5.4	7	11	0.42	----	1.31	"	"
3.94	6.40	10.24	0.360	5.6	6	10	0.42	----	1.23	"	"
4.03	5.40	8.64	0.360	6.7	5	9	0.43	----	1.03	"	100-110
4.11	4.80	7.68	0.360	7.5	5	8	0.43	----	0.91	"	"
4.20	5.50	8.80	0.370	6.7	6	9	0.43	----	1.05	"	"
4.28	6.40	10.24	0.350	5.5	6	10	0.44	----	1.23	"	110-120
4.37	6.90	11.04	0.320	4.6	7	11	0.44	----	1.33	"	"
4.45	7.60	12.16	0.300	3.9	8	12	0.45	----	1.47	"	"
4.54	7.80	12.48	0.280	3.6	8	12	0.45	----	1.50	"	100-110

4.62	8.10	12.96	0.270	3.3	8	13	0.45	----	1.56	"	"
4.71	7.90	12.64	0.260	3.3	8	13	0.46	----	1.52	"	"
4.79	7.40	11.84	0.260	3.5	7	12	0.46	----	1.42	"	"
4.88	6.70	10.72	0.250	3.7	7	11	0.46	----	1.28	"	"
4.96	6.50	10.40	0.240	3.7	7	10	0.47	----	1.24	"	"
5.05	6.50	10.40	0.240	3.7	7	10	0.47	----	1.24	"	"
5.13	7.40	11.84	0.250	3.4	7	12	0.48	----	1.42	"	"
5.22	7.80	12.48	0.230	2.9	5	8	0.48	----	1.50	Silty CLAY to CLAY	"
5.31	8.20	13.12	0.330	4.0	8	13	0.48	----	1.58	CLAY	110-120
5.39	10.10	16.16	0.400	4.0	10	16	0.49	----	1.63	"	"
5.48	9.90	15.84	0.380	3.8	10	16	0.49	----	1.60	"	"
5.54	6.80	10.88	0.350	5.1	7	11	0.50	----	1.29	"	"
5.57	10.80	17.28	0.340	3.1	7	12	0.50	----	1.74	Silty CLAY to CLAY	"
5.66	8.60	13.76	0.310	3.6	9	14	0.50	----	1.65	CLAY	"
5.74	7.10	11.36	0.270	3.8	7	11	0.51	----	1.35	"	100-110
5.83	7.30	11.68	0.230	3.2	7	12	0.51	----	1.39	"	"
5.91	7.80	12.48	0.220	2.8	5	8	0.51	----	1.49	Silty CLAY to CLAY	"
6.00	8.10	12.96	0.200	2.5	5	9	0.52	----	1.55	"	"
6.09	8.80	14.08	0.200	2.3	6	9	0.52	----	1.69	"	"
6.18	9.60	15.36	0.230	2.4	5	8	0.52	----	1.54	Clayey SILT to Silty CLAY	"
6.26	9.60	15.36	0.250	2.6	6	10	0.53	----	1.54	Silty CLAY to CLAY	"
6.35	10.20	16.32	0.270	2.6	7	11	0.53	----	1.64	"	110-120
6.43	10.10	16.16	0.290	2.9	7	11	0.54	----	1.62	"	"
6.52	10.20	16.32	0.300	2.9	7	11	0.54	----	1.64	"	"
6.60	9.60	15.36	0.300	3.1	6	10	0.55	----	1.54	"	"
6.69	10.00	16.00	0.310	3.1	7	11	0.55	----	1.60	"	"
6.77	10.30	16.48	0.310	3.0	7	11	0.55	----	1.65	"	"
6.86	10.90	17.44	0.330	3.0	7	12	0.56	----	1.75	"	"
6.95	12.50	20.00	0.360	2.9	8	13	0.56	----	1.61	"	"
7.03	13.70	21.92	0.400	2.9	7	11	0.57	----	1.77	Clayey SILT to Silty CLAY	120-130
7.12	14.10	22.56	0.450	3.2	9	15	0.57	----	1.82	Silty CLAY to CLAY	"
7.20	13.20	21.12	0.490	3.7	9	14	0.58	----	1.70	"	"
7.29	13.40	21.44	0.500	3.7	9	14	0.58	----	1.73	"	"
7.38	13.70	21.92	0.480	3.5	9	15	0.59	----	1.77	"	"
7.46	12.70	20.32	0.450	3.5	8	14	0.60	----	1.63	"	"
7.55	12.30	19.68	0.450	3.7	8	13	0.60	----	1.58	"	"
7.63	11.80	18.88	0.460	3.9	12	19	0.61	----	1.89	CLAY	"
7.72	11.90	19.04	0.460	3.9	12	19	0.61	----	1.91	"	"
7.80	12.40	19.84	0.460	3.7	8	13	0.62	----	1.59	Silty CLAY to CLAY	"
7.89	12.40	19.84	0.470	3.8	12	20	0.62	----	1.59	CLAY	"
7.97	12.80	20.48	0.500	3.9	13	20	0.63	----	1.64	"	"
8.06	14.30	22.88	0.520	3.6	10	15	0.63	----	1.84	Silty CLAY to CLAY	"
8.14	15.10	24.16	0.530	3.5	10	16	0.64	----	1.95	"	"
8.23	15.50	24.80	0.560	3.6	10	17	0.64	----	2.00	"	"
8.31	15.40	24.64	0.590	3.8	10	16	0.65	----	1.99	"	"
8.40	15.80	25.28	0.590	3.7	11	17	0.65	----	2.04	"	"
8.48	14.60	23.36	0.550	3.8	10	16	0.66	----	1.88	"	"
8.57	14.50	23.20	0.560	3.9	10	15	0.67	----	1.87	"	"
8.65	14.00	22.40	0.610	4.4	14	22	0.67	----	1.80	CLAY	"
8.74	12.90	20.64	0.570	4.4	13	21	0.68	----	1.65	"	"
8.81	10.60	16.96	0.550	5.2	11	17	0.68	----	1.68	"	"
8.91	13.50	21.60	0.540	4.0	14	22	0.69	----	1.73	"	"
8.99	12.40	19.84	0.520	4.2	12	20	0.69	----	1.58	"	"
9.08	11.50	18.40	0.510	4.4	12	18	0.70	----	1.83	"	"
9.16	11.00	17.60	0.480	4.4	11	18	0.70	----	1.74	"	"

9.25	11.40	18.24	0.440	3.9	11	18	0.71	----	1.81	"	110-120
9.33	10.70	17.12	0.410	3.8	11	17	0.71	----	1.69	"	"
9.42	11.50	18.40	0.360	3.1	8	12	0.72	----	1.82	Silty CLAY to CLAY	"
9.50	11.50	18.40	0.290	2.5	6	9	0.72	----	1.82	Clayey SILT to Silty CLAY	"
9.59	10.90	17.44	0.230	2.1	5	9	0.72	----	1.72	"	100-110
9.67	9.00	14.40	0.220	2.4	6	10	0.73	----	1.40	Silty CLAY to CLAY	"
9.76	9.00	14.40	0.220	2.4	6	10	0.73	----	1.40	"	"
9.84	8.30	13.28	0.230	2.8	6	9	0.73	----	1.54	"	"
9.93	7.40	11.84	0.260	3.5	7	12	0.74	----	1.36	CLAY	"
10.01	8.80	14.08	0.270	3.1	6	9	0.74	----	1.64	Silty CLAY to CLAY	"
10.10	10.60	16.96	0.250	2.4	5	8	0.75	----	1.67	Clayey SILT to Silty CLAY	110-120
10.18	10.10	16.16	0.240	2.4	5	8	0.75	----	1.58	"	100-110
10.27	8.30	13.28	0.210	2.5	6	9	0.75	----	1.54	Silty CLAY to CLAY	"
10.36	6.90	11.04	0.190	2.8	5	7	0.76	----	1.26	"	"
10.44	6.00	9.60	0.170	2.8	6	10	0.76	----	1.08	CLAY	90-100
10.53	5.30	8.48	0.140	2.6	5	8	0.76	----	0.94	"	"
10.61	5.30	8.48	0.130	2.5	5	8	0.77	----	0.94	"	"
10.69	5.50	8.80	0.120	2.2	4	6	0.77	----	0.97	Silty CLAY to CLAY	"
10.78	6.40	10.24	0.120	1.9	4	7	0.77	----	1.15	"	"
10.87	5.20	8.32	0.120	2.3	3	6	0.77	----	0.91	"	"
10.95	5.00	8.00	0.130	2.6	5	8	0.78	----	0.87	CLAY	"
11.04	5.30	8.48	0.130	2.5	5	8	0.78	----	0.93	"	"
11.12	5.80	9.28	0.130	2.2	4	6	0.78	----	1.03	Silty CLAY to CLAY	"
11.21	6.50	10.40	0.130	2.0	4	7	0.79	----	1.17	"	"
11.29	6.70	10.72	0.120	1.8	4	7	0.79	----	1.21	"	"
11.38	5.70	9.12	0.120	2.1	4	6	0.79	----	1.01	"	"
11.47	5.40	8.64	0.110	2.0	4	6	0.79	----	0.95	"	"
11.55	5.30	8.48	0.120	2.3	4	6	0.80	----	0.93	"	"
11.64	5.20	8.32	0.110	2.1	3	6	0.80	----	0.91	"	"
11.72	6.10	9.75	0.100	1.6	4	6	0.80	----	1.08	"	"
11.81	6.70	10.69	0.140	2.1	4	7	0.80	----	1.20	"	"
11.89	6.80	10.82	0.190	2.8	5	7	0.81	----	1.22	"	100-110
11.98	8.20	13.02	0.210	2.6	5	9	0.81	----	1.50	"	"
12.06	9.30	14.74	0.220	2.4	6	10	0.82	----	1.43	"	"
12.09	12.20	19.32	0.230	1.9	6	10	0.82	----	1.53	Clayey SILT to Silty CLAY	"
12.18	11.70	18.47	0.250	2.1	6	9	0.82	----	1.83	"	110-120
12.26	13.10	20.62	0.240	1.8	7	10	0.83	----	1.65	"	"
12.35	13.50	21.20	0.200	1.5	5	8	0.83	----	1.71	Sandy SILT to Clayey SILT	100-110
12.43	12.90	20.22	0.190	1.5	6	10	0.83	----	1.62	Clayey SILT to Silty CLAY	"
12.52	9.40	14.70	0.170	1.8	5	7	0.84	----	1.45	"	"
12.60	7.30	11.39	0.150	2.1	5	8	0.84	----	1.32	Silty CLAY to CLAY	90-100
12.69	6.80	10.59	0.120	1.8	5	7	0.84	----	1.21	"	"
12.77	6.40	9.95	0.110	1.7	4	7	0.84	----	1.13	"	"
12.86	6.30	9.78	0.110	1.7	4	7	0.85	----	1.11	"	"
12.94	6.60	10.23	0.130	2.0	4	7	0.85	----	1.17	"	"
13.03	5.80	8.97	0.140	2.4	4	6	0.85	----	1.01	"	"
13.11	5.50	8.49	0.160	2.9	6	8	0.86	----	0.95	CLAY	"
13.20	5.80	8.94	0.160	2.8	6	9	0.86	----	1.01	"	"
13.28	5.70	8.77	0.150	2.6	6	9	0.86	----	0.99	"	"
13.37	6.40	9.82	0.180	2.8	6	10	0.87	----	1.13	"	100-110
13.45	10.30	15.77	0.230	2.2	5	8	0.87	----	1.59	Clayey SILT to Silty CLAY	"
13.54	12.30	18.78	0.260	2.1	6	9	0.87	----	1.54	"	110-120
13.63	11.40	17.35	0.260	2.3	6	9	0.88	----	1.77	"	"
13.71	8.60	13.06	0.240	2.8	6	9	0.88	----	1.56	Silty CLAY to CLAY	100-110
13.80	6.60	10.00	0.200	3.0	7	10	0.89	----	1.16	CLAY	"

13.88	6.00	9.07	0.160	2.7	6	9	0.89	----	1.04	"	90-100
13.97	6.50	9.81	0.160	2.5	4	7	0.89	----	1.14	Silty CLAY to CLAY	"
14.05	7.70	11.59	0.170	2.2	5	8	0.89	----	1.38	"	100-110
14.14	8.80	13.22	0.180	2.0	4	7	0.90	----	1.60	Clayey SILT to Silty CLAY	"
14.22	8.90	13.34	0.190	2.1	4	7	0.90	----	1.62	"	"
14.30	8.80	13.15	0.200	2.3	6	9	0.91	----	1.60	Silty CLAY to CLAY	"
14.39	8.90	13.27	0.200	2.2	4	7	0.91	----	1.62	Clayey SILT to Silty CLAY	"
14.47	8.60	12.79	0.190	2.2	6	9	0.91	----	1.56	Silty CLAY to CLAY	"
14.56	8.80	13.06	0.180	2.0	4	7	0.92	----	1.60	Clayey SILT to Silty CLAY	"
14.64	9.70	14.36	0.170	1.8	5	7	0.92	----	1.48	"	"
14.73	9.40	13.88	0.180	1.9	5	7	0.92	----	1.43	"	"
14.81	9.80	14.44	0.180	1.8	5	7	0.93	----	1.49	"	"
14.90	9.50	13.96	0.190	2.0	5	7	0.93	----	1.44	"	"
14.98	9.50	13.93	0.200	2.1	5	7	0.93	----	1.44	"	"
15.07	9.70	14.18	0.210	2.2	5	7	0.94	----	1.48	"	"
15.15	9.40	13.71	0.210	2.2	5	7	0.94	----	1.42	"	"
15.24	8.90	12.95	0.200	2.2	4	6	0.94	----	1.61	"	"
15.32	9.20	13.36	0.210	2.3	5	7	0.95	----	1.39	"	"
15.41	10.40	15.06	0.220	2.1	5	8	0.95	----	1.59	"	"
15.49	10.10	14.59	0.240	2.4	5	7	0.96	----	1.54	"	"
15.58	10.50	15.12	0.260	2.5	5	8	0.96	----	1.60	"	110-120
15.66	10.00	14.35	0.260	2.6	7	10	0.96	----	1.52	Silty CLAY to CLAY	"
15.75	9.10	13.03	0.250	2.7	6	9	0.97	----	1.37	"	100-110
15.83	8.50	12.14	0.230	2.7	6	8	0.97	----	1.52	"	"
15.92	7.60	10.83	0.170	2.2	5	7	0.98	----	1.34	"	"
16.00	8.00	11.37	0.150	1.9	4	6	0.98	----	1.42	Clayey SILT to Silty CLAY	"
16.09	8.40	11.91	0.130	1.5	4	6	0.98	----	1.50	"	90-100
16.17	9.50	13.45	0.120	1.3	5	7	0.98	----	1.43	"	"
16.26	10.80	15.25	0.110	1.0	4	6	0.99	----	1.32	Sandy SILT to Clayey SILT	"
16.34	10.00	14.10	0.110	1.1	5	7	0.99	----	1.51	Clayey SILT to Silty CLAY	"
16.43	9.50	13.37	0.120	1.3	5	7	0.99	----	1.43	"	"
16.51	9.10	12.78	0.140	1.5	5	6	1.00	----	1.36	"	"
16.60	9.30	13.02	0.160	1.7	5	7	1.00	----	1.40	"	100-110
16.68	9.80	13.70	0.180	1.8	5	7	1.00	----	1.48	"	"
16.77	10.40	14.52	0.210	2.0	5	7	1.01	----	1.58	"	"
16.85	10.80	15.06	0.280	2.6	5	8	1.01	----	1.64	"	110-120
16.94	13.40	18.65	0.360	2.7	7	9	1.02	----	1.66	"	"
17.02	15.10	20.98	0.410	2.7	8	10	1.02	----	1.89	"	120-130
17.11	15.30	21.21	0.440	2.9	8	11	1.03	----	1.91	"	"
17.19	14.30	19.79	0.460	3.2	10	13	1.03	----	1.78	Silty CLAY to CLAY	"
17.28	13.30	18.36	0.450	3.4	9	12	1.04	----	1.64	"	"
17.36	12.50	17.23	0.430	3.4	8	11	1.04	----	1.54	"	"
17.45	14.00	19.25	0.440	3.1	9	13	1.05	----	1.74	"	"
17.53	13.30	18.26	0.560	4.2	13	18	1.05	----	1.64	CLAY	"
17.62	16.80	23.01	0.600	3.6	11	15	1.06	----	2.11	Silty CLAY to CLAY	"
17.70	17.50	23.93	0.500	2.9	9	12	1.06	----	2.20	Clayey SILT to Silty CLAY	"
17.78	14.50	19.78	0.450	3.1	10	13	1.07	----	1.80	Silty CLAY to CLAY	"
17.87	8.10	11.03	0.390	4.8	8	11	1.07	----	1.42	CLAY	110-120
17.95	9.60	13.05	0.290	3.0	6	9	1.08	----	1.43	Silty CLAY to CLAY	"
18.04	7.20	9.78	0.230	3.2	7	10	1.08	----	1.24	CLAY	100-110
18.12	5.70	7.73	0.210	3.7	6	8	1.08	----	0.94	"	"
18.21	7.60	10.29	0.210	2.8	5	7	1.09	----	1.32	Silty CLAY to CLAY	"
18.29	9.80	13.25	0.290	3.0	7	9	1.09	----	1.46	"	110-120
18.38	8.40	11.34	0.370	4.4	8	11	1.10	----	1.47	CLAY	"
18.46	6.40	8.62	0.370	5.8	6	9	1.10	----	1.07	"	"

18.54	5.60	7.53	0.350	6.3	6	8	1.11	----	0.91	"	100-110
18.63	5.80	7.79	0.270	4.7	6	8	1.11	----	0.95	"	"
18.71	4.10	5.50	0.210	5.1	4	6	1.11	----	0.61	"	90-100
18.80	4.50	6.03	0.180	4.0	5	6	1.11	----	0.69	"	"
18.88	4.10	5.49	0.160	3.9	4	5	1.12	----	0.61	"	"
18.97	4.90	6.56	0.160	3.3	5	7	1.12	----	0.77	"	"
19.05	6.20	8.28	0.170	2.7	6	8	1.12	----	1.03	"	"
19.13	6.20	8.27	0.190	3.1	6	8	1.13	----	1.03	"	100-110
19.22	6.20	8.26	0.220	3.5	6	8	1.13	----	1.03	"	"
19.30	6.30	8.38	0.240	3.8	6	8	1.13	----	1.04	"	"
19.39	6.70	8.90	0.250	3.7	7	9	1.14	----	1.12	"	"
19.47	8.50	11.28	0.250	2.9	6	8	1.14	----	1.48	Silty CLAY to CLAY	"
19.56	8.80	11.66	0.270	3.1	6	8	1.14	----	1.54	"	"
19.64	9.70	12.83	0.270	2.8	6	9	1.15	----	1.43	"	110-120
19.73	10.20	13.47	0.290	2.8	7	9	1.15	----	1.52	"	"
19.81	9.20	12.13	0.360	3.9	9	12	1.16	----	1.35	CLAY	"
19.90	6.80	8.95	0.420	6.2	7	9	1.16	----	1.14	"	"
19.98	11.30	14.84	0.430	3.8	11	15	1.17	----	1.70	"	"
20.07	27.50	36.04	0.500	1.8	11	14	1.17	----	3.52	Sandy SILT to Clayey SILT	120-130
20.15	41.80	54.67	0.620	1.5	14	18	1.18	35	----	Silty SAND to Sandy SILT	"
20.24	54.80	71.50	0.880	1.6	18	24	1.18	36	----	"	130-140
20.32	60.50	78.75	1.060	1.8	20	26	1.19	37	----	"	"
20.40	50.60	65.70	1.100	2.2	20	26	1.20	----	6.59	Sandy SILT to Clayey SILT	"
20.49	33.70	43.65	1.030	3.1	17	22	1.20	----	4.34	Clayey SILT to Silty CLAY	"
20.57	21.60	27.91	0.840	3.9	14	19	1.21	----	2.73	Silty CLAY to CLAY	"
20.66	16.20	20.89	0.680	4.2	16	21	1.21	----	2.01	CLAY	120-130
20.74	13.10	16.85	0.580	4.4	13	17	1.22	----	1.59	"	"
20.82	11.90	15.28	0.510	4.3	12	15	1.22	----	1.79	"	"
20.91	10.80	13.84	0.460	4.3	11	14	1.23	----	1.60	"	110-120
20.99	10.40	13.30	0.410	3.9	10	13	1.23	----	1.54	"	"
21.08	9.50	12.13	0.340	3.6	10	12	1.24	----	1.39	"	"
21.16	9.80	12.49	0.320	3.3	7	8	1.24	----	1.44	Silty CLAY to CLAY	"
21.25	9.30	11.83	0.320	3.4	9	12	1.25	----	1.35	CLAY	"
21.33	9.90	12.57	0.320	3.2	7	8	1.25	----	1.45	Silty CLAY to CLAY	"
21.41	10.00	12.68	0.320	3.2	7	8	1.25	----	1.47	"	"
21.49	10.10	12.79	0.320	3.2	7	9	1.26	----	1.48	"	"
21.58	9.50	12.01	0.400	4.2	10	12	1.26	----	1.38	CLAY	"
21.66	9.70	12.24	0.440	4.5	10	12	1.27	----	1.41	"	"
21.75	9.70	12.22	0.420	4.3	10	12	1.27	----	1.41	"	"
21.83	9.10	11.44	0.430	4.7	9	11	1.28	----	1.31	"	"
21.90	11.30	14.19	0.440	3.9	11	14	1.28	----	1.68	"	"
21.98	10.50	13.16	0.490	4.7	11	13	1.28	----	1.54	"	120-130
22.07	11.60	14.51	0.570	4.9	12	15	1.29	----	1.73	"	"
22.15	14.40	17.97	0.620	4.3	14	18	1.30	----	1.75	"	"
22.24	16.10	20.05	0.630	3.9	11	13	1.30	----	1.98	Silty CLAY to CLAY	"
22.32	14.00	17.40	0.620	4.4	14	17	1.31	----	1.70	CLAY	"
22.40	11.80	14.64	0.550	4.7	12	15	1.31	----	1.76	"	"
22.48	11.40	14.12	0.420	3.7	11	14	1.32	----	1.69	"	110-120
22.57	10.50	12.98	0.320	3.0	7	9	1.32	----	1.54	Silty CLAY to CLAY	"
22.65	10.60	13.08	0.290	2.7	7	9	1.32	----	1.55	"	"
22.74	10.30	12.69	0.270	2.6	7	8	1.33	----	1.50	"	"
22.82	9.90	12.18	0.280	2.8	7	8	1.33	----	1.44	"	"
22.91	8.90	10.93	0.290	3.3	6	7	1.34	----	1.52	"	"
22.99	9.40	11.52	0.310	3.3	6	8	1.34	----	1.35	"	"
23.08	10.80	13.21	0.340	3.1	7	9	1.35	----	1.58	"	"

23.16	12.30	15.02	0.360	2.9	8	10	1.35	----	1.47	"	"	
23.24	14.30	17.43	0.380	2.7	7	9	1.36	----	1.73	Clayey SILT to Silty CLAY		120-130
23.33	15.30	18.61	0.410	2.7	8	9	1.36	----	1.86	"	"	
23.41	15.30	18.57	0.430	2.8	8	9	1.37	----	1.86	"	"	
23.50	14.80	17.93	0.420	2.8	7	9	1.37	----	1.80	"	"	
23.58	13.80	16.68	0.390	2.8	7	8	1.38	----	1.66	"	"	
23.66	12.60	15.20	0.370	2.9	8	10	1.38	----	1.50	Silty CLAY to CLAY		110-120
23.75	12.60	15.18	0.350	2.8	6	8	1.39	----	1.50	Clayey SILT to Silty CLAY		"
23.83	12.50	15.03	0.340	2.7	6	8	1.39	----	1.49	"	"	
23.92	12.30	14.76	0.330	2.7	6	7	1.40	----	1.46	"	"	
24.00	12.20	14.62	0.340	2.8	6	7	1.40	----	1.45	"	"	
24.08	11.00	13.16	0.350	3.2	7	9	1.40	----	1.61	Silty CLAY to CLAY		"
24.17	9.90	11.82	0.340	3.4	7	8	1.41	----	1.42	"	"	
24.25	9.80	11.68	0.320	3.3	7	8	1.41	----	1.40	"	"	
24.33	9.10	10.83	0.310	3.4	9	11	1.42	----	1.29	CLAY	"	
24.42	9.40	11.16	0.340	3.6	9	11	1.42	----	1.34	"	"	
24.50	11.10	13.16	0.390	3.5	7	9	1.43	----	1.62	Silty CLAY to CLAY		"
24.59	13.10	15.50	0.430	3.3	9	10	1.43	----	1.56	"	120-130	
24.67	13.20	15.58	0.480	3.6	9	10	1.44	----	1.57	"	"	
24.75	12.40	14.61	0.520	4.2	12	15	1.44	----	1.47	CLAY	"	
24.84	12.20	14.34	0.520	4.3	12	14	1.45	----	1.44	"	"	
24.93	12.80	15.01	0.520	4.1	13	15	1.45	----	1.52	"	"	
25.01	13.90	16.27	0.520	3.7	9	11	1.46	----	1.66	Silty CLAY to CLAY		"
25.09	13.90	16.23	0.520	3.7	9	11	1.46	----	1.66	"	"	
25.17	13.90	16.20	0.520	3.7	9	11	1.47	----	1.66	"	"	
25.23	14.80	17.22	0.520	3.5	10	11	1.47	----	1.78	"	"	
25.32	13.80	16.02	0.520	3.8	9	11	1.48	----	1.65	"	"	
25.40	11.70	13.55	0.520	4.4	12	14	1.48	----	1.71	CLAY	"	
25.48	10.80	12.49	0.500	4.6	11	12	1.49	----	1.56	"	"	
25.57	10.60	12.23	0.470	4.4	11	12	1.49	----	1.52	"	110-120	
25.65	11.60	13.36	0.430	3.7	12	13	1.50	----	1.69	"	"	
25.74	12.90	14.83	0.420	3.3	9	10	1.50	----	1.52	Silty CLAY to CLAY		120-130
25.82	15.60	17.90	0.450	2.9	8	9	1.51	----	1.88	Clayey SILT to Silty CLAY		"
25.91	16.60	19.02	0.520	3.1	8	10	1.51	----	2.02	"	"	
25.99	16.70	19.10	0.600	3.6	11	13	1.52	----	2.03	Silty CLAY to CLAY		"
26.08	16.00	18.27	0.670	4.2	16	18	1.52	----	1.94	CLAY	"	
26.16	15.80	18.01	0.700	4.4	16	18	1.53	----	1.91	"	"	
26.25	16.00	18.21	0.720	4.5	16	18	1.53	----	1.93	"	"	
26.33	16.70	18.97	0.730	4.4	17	19	1.54	----	2.03	"	"	
26.41	18.50	20.98	0.770	4.2	12	14	1.54	----	2.27	Silty CLAY to CLAY		"
26.50	18.50	20.95	0.790	4.3	19	21	1.55	----	2.27	CLAY	"	
26.58	18.80	21.25	0.780	4.1	13	14	1.55	----	2.30	Silty CLAY to CLAY		"
26.67	18.10	20.43	0.770	4.3	18	20	1.56	----	2.21	CLAY	"	
26.75	18.20	20.50	0.750	4.1	12	14	1.57	----	2.22	Silty CLAY to CLAY		"
26.83	19.10	21.48	0.740	3.9	13	14	1.57	----	2.34	"	"	
26.92	19.30	21.67	0.760	3.9	13	14	1.58	----	2.37	"	"	
27.00	18.60	20.85	0.760	4.1	12	14	1.58	----	2.27	"	"	
27.09	18.30	20.48	0.730	4.0	12	14	1.59	----	2.23	"	"	
27.17	16.60	18.54	0.710	4.3	17	19	1.59	----	2.01	CLAY	"	
27.25	16.20	18.07	0.700	4.3	16	18	1.60	----	1.95	"	"	
27.34	17.80	19.82	0.710	4.0	12	13	1.60	----	2.16	Silty CLAY to CLAY		"
27.42	19.50	21.67	0.730	3.7	13	14	1.61	----	2.39	"	"	
27.50	19.90	22.08	0.750	3.8	13	15	1.61	----	2.44	"	"	
27.59	19.80	21.93	0.770	3.9	13	15	1.62	----	2.43	"	"	
27.67	20.00	22.12	0.790	4.0	13	15	1.62	----	2.46	"	"	

27.76	21.60	23.84	0.860	4.0	14	16	1.63	----	2.67	"	130-140
27.84	24.60	27.10	0.940	3.8	16	18	1.63	----	3.07	"	"
27.93	26.50	29.13	1.090	4.1	18	19	1.64	----	3.32	"	"
28.01	28.60	31.38	1.280	4.5	19	21	1.65	----	3.60	"	"
28.09	29.80	32.63	0.770	2.6	12	13	1.65	----	3.76	Sandy SILT to Clayey SILT	"
28.18	32.10	35.07	2.280	7.1	32	35	1.66	----	4.06	CLAY	"
28.26	34.90	38.06	2.190	6.3	35	38	1.67	----	4.44	"	"
28.34	32.30	35.15	2.060	6.4	32	35	1.67	----	4.09	"	"
28.39	31.90	34.68	1.990	6.2	32	35	1.67	----	4.04	"	"
28.47	30.10	32.66	1.830	6.1	30	33	1.68	----	3.80	"	"
28.55	28.70	31.08	1.730	6.0	29	31	1.69	----	3.61	"	"
28.64	31.80	34.36	1.790	5.6	32	34	1.69	----	4.02	"	"
28.72	40.70	43.89	1.850	4.5	27	29	1.70	----	5.21	Silty CLAY to CLAY	"
28.80	37.50	40.36	1.930	5.1	38	40	1.70	----	4.78	CLAY	"
28.88	26.10	28.04	1.930	7.4	26	28	1.71	----	3.26	"	"
28.97	23.80	25.51	1.710	7.2	24	26	1.72	----	2.95	"	"
29.05	26.50	28.35	1.490	5.6	27	28	1.72	----	3.31	"	"
29.13	27.20	29.04	1.410	5.2	27	29	1.73	----	3.40	"	"
29.21	27.30	29.09	1.400	5.1	27	29	1.73	----	3.41	"	"
29.30	24.20	25.73	1.410	5.8	24	26	1.74	----	3.00	"	"
29.38	20.00	21.22	1.420	7.1	20	21	1.75	----	2.44	"	"
29.46	18.00	19.07	1.470	8.2	18	19	1.75	----	2.17	"	"
29.55	19.40	20.52	1.580	8.1	19	21	1.76	----	2.36	"	"
29.63	22.80	24.09	1.660	7.3	23	24	1.76	----	2.81	"	"
29.71	24.80	26.16	1.650	6.7	25	26	1.77	----	3.08	"	"
29.80	22.80	24.02	1.580	6.9	23	24	1.78	----	2.81	"	"
29.88	18.60	19.57	1.510	8.1	19	20	1.78	----	2.25	"	"
29.97	17.60	18.49	1.470	8.4	18	18	1.79	----	2.11	"	"
30.05	17.70	18.57	1.450	8.2	18	19	1.80	----	2.13	"	"
30.13	20.20	21.16	1.470	7.3	20	21	1.80	----	2.46	"	"
30.21	21.40	22.39	1.560	7.3	21	22	1.81	----	2.62	"	"
30.29	21.90	22.88	1.660	7.6	22	23	1.81	----	2.69	"	"
30.37	22.10	23.06	1.670	7.6	22	23	1.82	----	2.71	"	"
30.46	21.40	22.30	1.570	7.3	21	22	1.82	----	2.62	"	"
30.54	19.20	19.98	1.400	7.3	19	20	1.83	----	2.32	"	"
30.62	16.60	17.25	1.190	7.2	17	17	1.84	----	1.98	"	"
30.70	15.70	16.30	1.000	6.4	16	16	1.84	----	1.85	"	120-130
30.78	15.90	16.48	0.850	5.3	16	16	1.85	----	1.88	"	"
30.86	16.00	16.57	0.770	4.8	16	17	1.85	----	1.89	"	"
30.95	17.20	17.79	0.740	4.3	17	18	1.86	----	2.05	"	"
31.03	16.40	16.94	0.730	4.5	16	17	1.86	----	1.95	"	"
31.11	15.30	15.79	0.720	4.7	15	16	1.87	----	1.80	"	"
31.19	16.10	16.59	0.700	4.3	16	17	1.87	----	1.90	"	"
31.28	14.90	15.34	0.680	4.6	15	15	1.88	----	1.74	"	"
31.36	14.70	15.11	0.680	4.6	15	15	1.88	----	1.72	"	"
31.45	14.30	14.68	0.790	5.5	14	15	1.89	----	1.66	"	"
31.53	13.80	14.15	0.970	7.0	14	14	1.89	----	1.59	"	"
31.61	14.90	15.26	1.330	8.9	15	15	1.90	----	1.74	"	130-140
31.69	19.00	19.43	1.610	8.5	19	19	1.91	----	2.29	"	"
31.73	30.10	30.76	1.940	6.4	30	31	1.91	----	3.77	"	"
31.81	36.90	37.66	2.240	6.1	37	38	1.91	----	4.67	"	"
31.90	43.10	43.92	1.990	4.6	29	29	1.92	----	5.50	Silty CLAY to CLAY	"
31.97	57.40	58.42	1.710	3.0	23	23	1.93	----	7.40	Sandy SILT to Clayey SILT	"
32.06	78.50	79.78	1.420	1.8	26	27	1.93	37	----	Silty SAND to Sandy SILT	"
32.14	95.50	96.94	1.100	1.2	24	24	1.94	38	----	SAND to Silty SAND	120-130

32.22	100.80	102.20	1.100	1.1	25	26	1.94	38	----	"	"
32.30	97.40	98.62	1.430	1.5	24	25	1.95	38	----	"	130-140
32.38	94.40	95.44	1.870	2.0	31	32	1.95	38	----	Silty SAND to Sandy SILT	"
32.47	84.30	85.11	2.130	2.5	34	34	1.96	----	10.99	Sandy SILT to Clayey SILT	"
32.55	73.50	74.09	2.180	3.0	29	30	1.97	----	9.55	"	"
32.63	72.70	73.19	2.220	3.1	29	29	1.97	----	9.44	"	"
32.72	79.90	80.32	2.090	2.6	32	32	1.98	----	10.40	"	"
32.80	86.80	87.13	1.740	2.0	29	29	1.98	37	----	Silty SAND to Sandy SILT	"
32.88	84.70	84.90	1.490	1.8	28	28	1.99	37	----	"	"
32.96	76.30	76.37	1.670	2.2	25	25	2.00	36	----	"	"
33.05	68.20	68.20	2.000	2.9	27	27	2.00	----	8.83	Sandy SILT to Clayey SILT	"
33.13	58.70	58.69	2.260	3.9	29	29	2.01	----	7.57	Clayey SILT to Silty CLAY	"
33.21	46.60	46.59	2.440	5.2	47	47	2.01	----	5.95	CLAY	"
33.29	43.50	43.48	2.350	5.4	44	43	2.02	----	5.54	"	"
33.38	48.40	48.37	2.080	4.3	24	24	2.03	----	6.19	Clayey SILT to Silty CLAY	"
33.46	48.90	48.87	1.960	4.0	24	24	2.03	----	6.26	"	"
33.54	48.30	48.26	1.910	4.0	24	24	2.04	----	6.18	"	"
33.62	45.80	45.76	2.000	4.4	31	31	2.04	----	5.84	Silty CLAY to CLAY	"
33.70	39.80	39.76	2.310	5.8	40	40	2.05	----	5.04	CLAY	"
33.78	39.00	38.96	2.330	6.0	39	39	2.06	----	4.93	"	"
33.86	49.10	49.04	2.010	4.1	25	25	2.06	----	6.28	Clayey SILT to Silty CLAY	"
33.94	71.90	71.80	1.410	2.0	24	24	2.07	36	----	Silty SAND to Sandy SILT	"
34.02	85.80	85.68	0.800	0.9	21	21	2.07	37	----	SAND to Silty SAND	120-130
34.10	80.30	80.18	0.540	0.7	20	20	2.08	37	----	"	110-120
34.18	67.70	67.59	0.530	0.8	17	17	2.08	36	----	"	"
34.26	53.70	53.61	0.660	1.2	18	18	2.09	34	----	Silty SAND to Sandy SILT	120-130
34.34	38.80	38.73	0.400	1.0	13	13	2.09	33	----	"	110-120
34.43	28.00	27.95	0.650	2.3	11	11	2.10	----	3.46	Sandy SILT to Clayey SILT	120-130
34.51	21.10	21.06	0.630	3.0	11	11	2.10	----	2.54	Clayey SILT to Silty CLAY	"
34.59	16.00	15.97	0.610	3.8	11	11	2.11	----	1.86	Silty CLAY to CLAY	"
34.66	15.50	15.47	0.590	3.8	10	10	2.11	----	1.79	"	"
34.69	12.30	12.27	0.580	4.7	12	12	2.11	----	1.37	CLAY	"
34.78	11.80	11.77	0.540	4.6	12	12	2.12	----	1.62	"	"
34.86	12.90	12.87	0.520	4.0	13	13	2.12	----	1.45	"	"
34.94	14.00	13.96	0.580	4.1	14	14	2.13	----	1.59	"	"
35.02	16.10	16.06	0.640	4.0	11	11	2.13	----	1.87	Silty CLAY to CLAY	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-24
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 16:01:11
Terminated at 49.0 feet Groundwater measured at 2.9 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.52	30.20	48.32	0.910	3.0	15	24	0.06	----	4.02	Clayey SILT to Silty CLAY	130-140
0.62	25.40	40.64	0.840	3.3	13	20	0.07	----	3.38	"	"
0.73	22.50	36.00	0.750	3.3	11	18	0.09	----	2.99	"	120-130
0.83	21.30	34.08	0.640	3.0	11	17	0.10	----	2.83	"	"
0.93	20.00	32.00	0.570	2.8	10	16	0.11	----	2.66	"	"
1.04	17.70	28.32	0.540	3.1	9	14	0.13	----	2.35	"	"
1.14	15.70	25.12	0.500	3.2	10	17	0.14	----	2.08	Silty CLAY to CLAY	"
1.25	14.00	22.40	0.490	3.5	9	15	0.15	----	1.86	"	"
1.35	13.00	20.80	0.450	3.5	9	14	0.16	----	1.72	"	"
1.45	12.60	20.16	0.430	3.4	8	13	0.18	----	1.67	"	"
1.55	12.40	19.84	0.450	3.6	8	13	0.19	----	1.64	"	"
1.65	11.90	19.04	0.450	3.8	12	19	0.20	----	1.97	CLAY	"
1.76	10.90	17.44	0.440	4.0	11	17	0.21	----	1.80	"	110-120
1.86	10.30	16.48	0.430	4.2	10	16	0.23	----	1.70	"	"
1.96	10.70	17.12	0.450	4.2	11	17	0.24	----	1.76	"	"
2.07	11.60	18.56	0.590	5.1	12	19	0.25	----	1.91	"	120-130
2.17	12.80	20.48	0.770	6.0	13	20	0.26	----	1.69	"	"
2.27	14.10	22.56	0.890	6.3	14	23	0.28	----	1.86	"	"
2.52	13.20	21.12	0.950	7.2	13	21	0.31	----	1.74	"	"
2.63	14.10	22.56	0.890	6.3	14	23	0.32	----	1.86	"	"
2.74	11.30	18.08	0.770	6.8	11	18	0.34	----	1.86	"	"
2.89	10.90	17.44	0.670	6.1	11	17	0.35	----	1.79	"	"
3.00	10.10	16.16	0.580	5.7	10	16	0.36	----	1.65	"	"
3.10	9.80	15.68	0.530	5.4	10	16	0.37	----	1.60	"	"
3.20	9.20	14.72	0.500	5.4	9	15	0.37	----	1.50	"	110-120
3.31	8.60	13.76	0.460	5.3	9	14	0.38	----	1.68	"	"
3.41	7.80	12.48	0.430	5.5	8	12	0.38	----	1.52	"	"
3.52	7.10	11.36	0.410	5.8	7	11	0.39	----	1.38	"	"
3.66	7.00	11.20	0.370	5.3	7	11	0.40	----	1.36	"	"
3.76	6.90	11.04	0.360	5.2	7	11	0.40	----	1.33	"	"
3.87	6.80	10.88	0.340	5.0	7	11	0.41	----	1.31	"	"
3.97	6.20	9.92	0.330	5.3	6	10	0.41	----	1.19	"	100-110
4.07	6.10	9.76	0.320	5.2	6	10	0.42	----	1.17	"	"
4.18	6.10	9.76	0.310	5.1	6	10	0.42	----	1.17	"	"
4.28	6.70	10.72	0.320	4.8	7	11	0.43	----	1.29	"	"
4.38	8.00	12.80	0.350	4.4	8	13	0.43	----	1.55	"	110-120
4.48	9.10	14.56	0.350	3.8	9	15	0.44	----	1.47	"	"
4.59	9.50	15.20	0.350	3.7	10	15	0.44	----	1.54	"	"
4.69	8.60	13.76	0.330	3.8	9	14	0.45	----	1.66	"	"
4.80	8.30	13.28	0.300	3.6	8	13	0.45	----	1.60	"	"
4.90	8.50	13.60	0.270	3.2	6	9	0.46	----	1.64	Silty CLAY to CLAY	100-110
5.00	7.40	11.84	0.270	3.6	7	12	0.46	----	1.42	CLAY	"
5.11	7.60	12.16	0.280	3.7	8	12	0.47	----	1.46	"	"
5.21	8.30	13.28	0.330	4.0	8	13	0.47	----	1.60	"	110-120
5.32	8.30	13.28	0.350	4.2	8	13	0.48	----	1.60	"	"
5.42	7.80	12.48	0.340	4.4	8	12	0.48	----	1.50	"	"
5.53	8.40	13.44	0.320	3.8	8	13	0.49	----	1.61	"	"

5.63	7.90	12.64	0.290	3.7	8	13	0.49	----	1.51	"	"
5.74	7.60	12.16	0.270	3.6	8	12	0.50	----	1.45	"	100-110
5.84	7.10	11.36	0.260	3.7	7	11	0.50	----	1.35	"	"
5.94	6.30	10.08	0.240	3.8	6	10	0.51	----	1.19	"	"
6.05	5.70	9.12	0.210	3.7	6	9	0.51	----	1.07	"	"
6.15	6.30	10.08	0.200	3.2	6	10	0.52	----	1.19	"	"
6.26	6.30	10.08	0.200	3.2	6	10	0.52	----	1.19	"	"
6.36	6.50	10.40	0.200	3.1	7	10	0.52	----	1.23	"	"
6.47	7.40	11.84	0.220	3.0	5	8	0.53	----	1.40	Silty CLAY to CLAY	"
6.57	8.70	13.92	0.240	2.8	6	9	0.53	----	1.66	"	"
6.68	8.90	14.24	0.270	3.0	6	9	0.54	----	1.70	"	"
6.78	9.60	15.36	0.320	3.3	6	10	0.54	----	1.53	"	110-120
6.88	11.50	18.40	0.380	3.3	8	12	0.55	----	1.85	"	"
6.99	12.40	19.84	0.440	3.5	8	13	0.56	----	1.60	"	120-130
7.09	13.20	21.12	0.500	3.8	9	14	0.56	----	1.71	"	"
7.19	13.40	21.44	0.550	4.1	13	21	0.57	----	1.73	CLAY	"
7.29	14.30	22.88	0.590	4.1	14	23	0.57	----	1.85	"	"
7.40	15.50	24.80	0.620	4.0	10	17	0.58	----	2.01	Silty CLAY to CLAY	"
7.50	16.00	25.60	0.650	4.1	11	17	0.59	----	2.07	"	"
7.61	16.00	25.60	0.640	4.0	11	17	0.59	----	2.07	"	"
7.71	16.60	26.56	0.650	3.9	11	18	0.60	----	2.15	"	"
7.81	17.00	27.20	0.720	4.2	17	27	0.61	----	2.21	CLAY	"
7.91	18.20	29.12	0.810	4.5	18	29	0.61	----	2.36	"	"
8.02	17.70	28.32	0.820	4.6	18	28	0.62	----	2.30	"	"
8.12	18.50	29.60	0.780	4.2	12	20	0.63	----	2.40	Silty CLAY to CLAY	"
8.22	17.40	27.84	0.750	4.3	17	28	0.63	----	2.26	CLAY	"
8.33	15.50	24.80	0.690	4.5	16	25	0.64	----	2.00	"	"
8.43	14.30	22.88	0.700	4.9	14	23	0.65	----	1.84	"	"
8.54	13.30	21.28	0.690	5.2	13	21	0.65	----	1.71	"	"
8.64	12.90	20.64	0.660	5.1	13	21	0.66	----	1.65	"	"
8.75	15.00	24.00	0.580	3.9	10	16	0.67	----	1.93	Silty CLAY to CLAY	"
8.86	12.60	20.16	0.520	4.1	13	20	0.67	----	1.61	CLAY	"
8.96	10.90	17.44	0.450	4.1	11	17	0.68	----	1.73	"	110-120
9.07	8.60	13.76	0.360	4.2	9	14	0.68	----	1.61	"	"
9.17	7.90	12.64	0.290	3.7	8	13	0.69	----	1.47	"	"
9.27	7.90	12.64	0.250	3.2	8	13	0.69	----	1.47	"	100-110
9.38	8.50	13.60	0.220	2.6	6	9	0.70	----	1.59	Silty CLAY to CLAY	"
9.48	9.50	15.20	0.250	2.6	6	10	0.70	----	1.49	"	"
9.59	11.10	17.76	0.350	3.2	7	12	0.71	----	1.76	"	110-120
9.69	14.60	23.36	0.500	3.4	10	16	0.71	----	1.87	"	120-130
9.79	19.50	31.20	0.630	3.2	10	16	0.72	----	2.52	Clayey SILT to Silty CLAY	"
9.90	24.60	39.36	0.650	2.6	12	20	0.73	----	3.20	"	"
10.00	22.80	36.48	0.550	2.4	11	18	0.73	----	2.96	"	"
10.10	17.80	28.48	0.460	2.6	9	14	0.74	----	2.29	"	"
10.21	13.50	21.60	0.480	3.6	9	14	0.75	----	1.72	Silty CLAY to CLAY	"
10.31	14.90	23.84	0.640	4.3	15	24	0.75	----	1.91	CLAY	"
10.41	23.60	37.76	0.830	3.5	12	19	0.76	----	3.06	Clayey SILT to Silty CLAY	130-140
10.51	33.50	53.60	1.110	3.3	17	27	0.77	----	4.38	"	"
10.62	43.80	70.08	1.240	2.8	18	28	0.78	----	5.76	Sandy SILT to Clayey SILT	"
10.70	56.10	89.76	1.210	2.2	22	36	0.78	----	7.40	"	"
10.80	68.40	109.44	1.460	2.1	23	36	0.79	39	----	Silty SAND to Sandy SILT	"
10.90	77.60	124.16	1.860	2.4	26	41	0.80	39	----	"	"
11.00	87.50	139.71	2.020	2.3	29	47	0.80	40	----	"	"
11.10	99.00	157.36	1.610	1.6	33	52	0.81	41	----	"	"
11.20	114.40	181.02	2.000	1.7	38	60	0.82	41	----	"	"

11.28	120.70	190.29	2.050	1.7	30	48	0.82	42	----	SAND to Silty SAND	"
11.38	124.60	195.53	1.730	1.4	31	49	0.83	42	----	"	"
11.48	112.50	175.72	1.720	1.5	28	44	0.84	41	----	"	"
11.58	96.80	150.48	1.710	1.8	32	50	0.85	40	----	Silty SAND to Sandy SILT	"
11.68	94.00	145.44	1.840	2.0	31	48	0.85	40	----	"	"
11.79	94.30	145.20	1.990	2.1	31	48	0.86	40	----	"	"
11.89	98.80	151.41	2.110	2.1	33	50	0.87	40	----	"	"
12.13	118.70	179.85	1.550	1.3	30	45	0.88	41	----	SAND to Silty SAND	"
12.23	133.50	201.44	1.300	1.0	27	40	0.89	42	----	SAND	120-130
12.32	130.60	196.39	1.040	0.8	26	39	0.90	42	----	"	110-120
12.42	118.00	176.83	0.790	0.7	24	35	0.90	41	----	"	"
12.52	103.20	153.90	1.920	1.9	34	51	0.91	40	----	Silty SAND to Sandy SILT	130-140
12.62	95.80	142.17	2.200	2.3	32	47	0.92	40	----	"	"
12.72	83.60	123.47	2.100	2.5	33	49	0.92	----	11.04	Sandy SILT to Clayey SILT	"
12.82	34.50	50.70	1.850	5.4	35	51	0.93	----	4.50	CLAY	"
12.92	20.10	29.39	1.350	6.7	20	29	0.94	----	2.58	"	"
13.02	11.40	16.60	0.590	5.2	11	17	0.94	----	1.77	"	120-130
13.12	8.70	12.62	0.290	3.3	9	13	0.95	----	1.58	"	110-120
13.22	7.00	10.13	0.220	3.1	7	10	0.95	----	1.24	"	100-110
13.32	5.60	8.08	0.180	3.2	6	8	0.96	----	0.96	"	90-100
13.42	5.70	8.21	0.160	2.8	6	8	0.96	----	0.98	"	"
13.52	5.20	7.47	0.140	2.7	5	7	0.96	----	0.88	"	"
13.62	5.20	7.45	0.140	2.7	5	7	0.97	----	0.88	"	"
13.72	6.20	8.87	0.160	2.6	4	6	0.97	----	1.08	Silty CLAY to CLAY	"
13.82	8.30	11.84	0.170	2.0	4	6	0.97	----	1.49	Clayey SILT to Silty CLAY	100-110
13.92	9.00	12.79	0.180	2.0	5	6	0.98	----	1.36	"	"
14.03	8.70	12.33	0.190	2.2	4	6	0.98	----	1.57	"	"
14.13	8.00	11.30	0.210	2.6	5	8	0.99	----	1.43	Silty CLAY to CLAY	"
14.23	8.80	12.40	0.220	2.5	6	8	0.99	----	1.59	"	"
14.33	8.30	11.66	0.200	2.4	6	8	1.00	----	1.49	"	"
14.43	7.80	10.92	0.170	2.2	5	7	1.00	----	1.39	"	"
14.53	7.70	10.76	0.180	2.3	5	7	1.00	----	1.37	"	"
14.64	9.10	12.70	0.200	2.2	5	6	1.01	----	1.37	Clayey SILT to Silty CLAY	"
14.74	8.40	11.70	0.190	2.3	6	8	1.01	----	1.50	Silty CLAY to CLAY	"
14.84	8.70	12.10	0.210	2.4	6	8	1.02	----	1.56	"	"
14.95	8.10	11.25	0.210	2.6	5	7	1.02	----	1.44	"	"
15.05	8.70	12.06	0.210	2.4	6	8	1.03	----	1.56	"	"
15.16	9.00	12.46	0.200	2.2	5	6	1.03	----	1.35	Clayey SILT to Silty CLAY	"
15.43	11.70	16.10	0.270	2.3	6	8	1.05	----	1.80	"	110-120
15.53	13.40	18.41	0.300	2.2	7	9	1.05	----	1.66	"	"
15.63	13.40	18.37	0.330	2.5	7	9	1.06	----	1.66	"	"
15.74	12.20	16.69	0.320	2.6	6	8	1.06	----	1.50	"	"
15.84	10.90	14.88	0.300	2.8	7	10	1.07	----	1.66	Silty CLAY to CLAY	"
15.94	9.80	13.35	0.290	3.0	7	9	1.07	----	1.48	"	"
16.05	9.20	12.51	0.260	2.8	6	8	1.08	----	1.38	"	100-110
16.15	9.10	12.36	0.210	2.3	6	8	1.08	----	1.36	"	"
16.26	8.50	11.52	0.200	2.4	6	8	1.09	----	1.51	"	"
16.36	7.60	10.28	0.210	2.8	5	7	1.09	----	1.33	"	"
16.46	8.50	11.48	0.230	2.7	6	8	1.09	----	1.51	"	"
16.57	10.20	13.75	0.280	2.7	7	9	1.10	----	1.54	"	110-120
16.67	11.00	14.80	0.380	3.5	7	10	1.11	----	1.67	"	"
16.78	12.70	17.04	0.450	3.5	8	11	1.11	----	1.56	"	120-130
16.88	12.80	17.13	0.620	4.8	13	17	1.12	----	1.57	CLAY	"
16.98	14.60	19.49	1.090	7.5	15	19	1.12	----	1.81	"	"
17.08	19.90	26.49	1.400	7.0	20	26	1.13	----	2.52	"	130-140

17.19	30.20	40.09	1.610	5.3	30	40	1.14	----	3.89	"	"
17.29	33.50	44.34	1.470	4.4	22	30	1.15	----	4.33	Silty CLAY to CLAY	"
17.39	27.40	36.16	1.190	4.3	18	24	1.15	----	3.52	"	"
17.49	30.20	39.74	1.120	3.7	15	20	1.16	----	3.89	Clayey SILT to Silty CLAY	"
17.59	32.40	42.51	0.890	2.7	13	17	1.17	----	4.18	Sandy SILT to Clayey SILT	"
17.69	26.70	34.94	0.660	2.5	11	14	1.18	----	3.42	"	120-130
17.80	25.90	33.79	0.820	3.2	13	17	1.18	----	3.31	Clayey SILT to Silty CLAY	130-140
17.90	25.80	33.56	0.820	3.2	13	17	1.19	----	3.30	"	"
18.00	27.60	35.82	0.660	2.4	11	14	1.20	----	3.54	Sandy SILT to Clayey SILT	120-130
18.10	15.80	20.45	0.560	3.5	11	14	1.20	----	1.96	Silty CLAY to CLAY	"
18.21	10.80	13.94	0.520	4.8	11	14	1.21	----	1.62	CLAY	"
18.31	11.20	14.42	0.460	4.1	11	14	1.22	----	1.69	"	"
18.41	12.10	15.54	0.470	3.9	12	16	1.22	----	1.47	"	"
18.51	13.80	17.68	0.440	3.2	9	12	1.23	----	1.69	Silty CLAY to CLAY	"
18.61	13.80	17.63	0.380	2.8	7	9	1.23	----	1.69	Clayey SILT to Silty CLAY	"
18.71	12.60	16.07	0.380	3.0	8	11	1.24	----	1.53	Silty CLAY to CLAY	110-120
18.81	12.10	15.39	0.470	3.9	12	15	1.25	----	1.46	CLAY	120-130
18.91	12.20	15.48	0.430	3.5	8	10	1.25	----	1.48	Silty CLAY to CLAY	"
19.02	12.40	15.70	0.410	3.3	8	10	1.26	----	1.50	"	110-120
19.12	10.60	13.39	0.420	4.0	11	13	1.26	----	1.58	CLAY	"
19.22	11.10	14.00	0.380	3.4	7	9	1.27	----	1.66	Silty CLAY to CLAY	"
19.32	10.30	12.96	0.340	3.3	7	9	1.27	----	1.53	"	"
19.43	9.90	12.43	0.340	3.4	7	8	1.28	----	1.46	"	"
19.53	9.40	11.78	0.320	3.4	9	12	1.29	----	1.37	CLAY	"
19.63	9.20	11.50	0.330	3.6	9	12	1.29	----	1.34	"	"
19.73	10.00	12.48	0.410	4.1	10	12	1.30	----	1.47	"	"
19.84	16.70	20.79	0.460	2.8	8	10	1.30	----	2.07	Clayey SILT to Silty CLAY	120-130
19.94	40.10	49.79	0.680	1.7	13	17	1.31	34	----	Silty SAND to Sandy SILT	"
20.04	48.90	60.57	0.750	1.5	16	20	1.32	35	----	"	"
20.14	34.70	42.86	0.790	2.3	14	17	1.32	----	4.47	Sandy SILT to Clayey SILT	130-140
20.24	24.80	30.54	0.960	3.9	17	20	1.33	----	3.15	Silty CLAY to CLAY	"
20.35	32.60	40.03	0.870	2.7	13	16	1.34	----	4.18	Sandy SILT to Clayey SILT	"
20.45	49.80	60.98	0.940	1.9	17	20	1.34	35	----	Silty SAND to Sandy SILT	"
20.55	45.80	55.92	0.850	1.9	15	19	1.35	35	----	"	"
20.65	35.60	43.35	0.650	1.8	14	17	1.36	----	4.58	Sandy SILT to Clayey SILT	120-130
20.75	22.60	27.45	0.560	2.5	11	14	1.37	----	2.85	Clayey SILT to Silty CLAY	"
20.86	11.80	14.30	0.400	3.4	8	10	1.37	----	1.76	Silty CLAY to CLAY	110-120
20.96	9.50	11.49	0.290	3.1	6	8	1.38	----	1.37	"	"
21.06	8.30	10.02	0.230	2.8	6	7	1.38	----	1.41	"	100-110
21.16	7.60	9.16	0.190	2.5	5	6	1.38	----	1.27	"	"
21.26	8.50	10.23	0.270	3.2	6	7	1.39	----	1.45	"	"
21.37	10.20	12.25	0.380	3.7	10	12	1.39	----	1.49	CLAY	110-120
21.47	10.90	13.06	0.490	4.5	11	13	1.40	----	1.60	"	120-130
21.75	12.20	14.53	0.410	3.4	8	10	1.42	----	1.45	Silty CLAY to CLAY	110-120
21.86	10.30	12.24	0.380	3.7	10	12	1.42	----	1.50	CLAY	"
21.96	9.70	11.50	0.370	3.8	10	11	1.43	----	1.40	"	"
22.06	9.70	11.47	0.340	3.5	10	11	1.43	----	1.40	"	"
22.16	9.60	11.33	0.330	3.4	10	11	1.44	----	1.38	"	"
22.27	9.30	10.95	0.320	3.4	9	11	1.44	----	1.33	"	"
22.37	8.50	9.99	0.310	3.6	9	10	1.45	----	1.43	"	"
22.47	8.80	10.32	0.290	3.3	9	10	1.45	----	1.49	"	"
22.58	8.80	10.29	0.280	3.2	6	7	1.46	----	1.49	Silty CLAY to CLAY	"
22.68	9.00	10.50	0.280	3.1	6	7	1.46	----	1.28	"	"
22.78	9.30	10.83	0.280	3.0	6	7	1.47	----	1.32	"	"
22.89	8.70	10.11	0.280	3.2	6	7	1.48	----	1.47	"	"

22.99	8.70	10.09	0.260	3.0	6	7	1.48	----	1.47	"	100-110
23.09	8.40	9.73	0.260	3.1	6	6	1.48	----	1.41	"	"
23.19	9.00	10.40	0.250	2.8	6	7	1.49	----	1.27	"	"
23.30	8.70	10.04	0.260	3.0	6	7	1.49	----	1.46	"	"
23.40	10.50	12.08	0.270	2.6	7	8	1.50	----	1.52	"	110-120
23.50	10.50	12.06	0.280	2.7	7	8	1.50	----	1.52	"	"
23.61	11.50	13.19	0.310	2.7	6	7	1.51	----	1.68	Clayey SILT to Silty CLAY	"
23.71	12.10	13.85	0.330	2.7	6	7	1.51	----	1.43	"	"
23.81	12.10	13.83	0.360	3.0	8	9	1.52	----	1.42	Silty CLAY to CLAY	"
23.91	11.40	13.01	0.360	3.2	8	9	1.53	----	1.66	"	"
24.02	9.90	11.28	0.320	3.2	7	8	1.53	----	1.41	"	"
24.12	7.40	8.42	0.260	3.5	7	8	1.53	----	1.19	CLAY	100-110
24.22	7.10	8.06	0.220	3.1	7	8	1.54	----	1.13	"	"
24.33	7.70	8.73	0.240	3.1	8	9	1.54	----	1.25	"	"
24.43	8.60	9.74	0.260	3.0	6	6	1.55	----	1.43	Silty CLAY to CLAY	"
24.53	10.00	11.31	0.280	2.8	7	8	1.55	----	1.42	"	110-120
24.63	11.90	13.43	0.250	2.1	6	7	1.56	----	1.74	Clayey SILT to Silty CLAY	"
24.74	12.80	14.42	0.450	3.5	9	10	1.57	----	1.51	Silty CLAY to CLAY	120-130
24.84	12.30	13.83	0.460	3.7	8	9	1.57	----	1.44	"	"
24.89	12.70	14.26	0.450	3.5	8	10	1.57	----	1.50	"	"
24.94	12.30	13.80	0.440	3.6	8	9	1.58	----	1.44	"	"
25.04	10.30	11.54	0.420	4.1	10	12	1.58	----	1.47	CLAY	110-120
25.15	10.20	11.40	0.420	4.1	10	11	1.59	----	1.45	"	"
25.25	9.60	10.71	0.410	4.3	10	11	1.59	----	1.35	"	"
25.35	11.80	13.14	0.440	3.7	12	13	1.60	----	1.72	"	120-130
25.45	14.60	16.23	0.520	3.6	10	11	1.61	----	1.75	Silty CLAY to CLAY	"
25.56	15.70	17.41	0.620	3.9	10	12	1.61	----	1.89	"	"
25.66	16.00	17.71	0.670	4.2	16	18	1.62	----	1.93	CLAY	"
25.76	16.10	17.78	0.680	4.2	16	18	1.63	----	1.94	"	"
25.86	17.40	19.18	0.700	4.0	12	13	1.63	----	2.12	Silty CLAY to CLAY	"
25.97	18.30	20.13	0.720	3.9	12	13	1.64	----	2.23	"	"
26.07	19.30	21.18	0.750	3.9	13	14	1.65	----	2.37	"	"
26.17	20.00	21.90	0.840	4.2	13	15	1.65	----	2.46	"	"
26.28	20.60	22.51	0.890	4.3	14	15	1.66	----	2.54	"	130-140
26.38	19.00	20.71	0.910	4.8	19	21	1.67	----	2.32	CLAY	"
26.48	18.40	20.01	0.910	4.9	18	20	1.67	----	2.24	"	120-130
26.58	19.30	20.95	0.830	4.3	19	21	1.68	----	2.36	"	"
26.69	18.50	20.03	0.790	4.3	19	20	1.69	----	2.26	"	"
26.79	18.20	19.67	0.820	4.5	18	20	1.69	----	2.21	"	"
26.89	19.80	21.35	0.850	4.3	13	14	1.70	----	2.43	Silty CLAY to CLAY	"
26.99	21.80	23.45	0.920	4.2	15	16	1.71	----	2.69	"	130-140
27.09	20.60	22.10	0.930	4.5	21	22	1.71	----	2.53	CLAY	"
27.20	19.10	20.45	0.880	4.6	19	20	1.72	----	2.33	"	120-130
27.30	17.50	18.70	0.820	4.7	18	19	1.73	----	2.12	"	"
27.40	15.20	16.20	0.730	4.8	15	16	1.73	----	1.81	"	"
27.50	14.20	15.11	0.680	4.8	14	15	1.74	----	1.67	"	"
27.61	16.00	16.98	0.650	4.1	11	11	1.75	----	1.91	Silty CLAY to CLAY	"
27.71	19.20	20.34	0.620	3.2	10	10	1.75	----	2.34	Clayey SILT to Silty CLAY	"
27.81	21.90	23.17	0.570	2.6	11	12	1.76	----	2.70	"	"
27.91	19.50	20.60	0.540	2.8	10	10	1.77	----	2.38	"	"
28.02	16.60	17.51	0.590	3.6	11	12	1.77	----	1.99	Silty CLAY to CLAY	"
28.12	15.90	16.75	0.660	4.2	16	17	1.78	----	1.90	CLAY	"
28.22	14.50	15.25	0.680	4.7	15	15	1.78	----	1.71	"	"
28.45	18.90	19.81	0.730	3.9	13	13	1.80	----	2.29	Silty CLAY to CLAY	"
28.55	22.50	23.55	1.060	4.7	23	24	1.81	----	2.77	CLAY	130-140

28.65	33.10	34.58	1.220	3.7	17	17	1.81	----	4.19	Clayey SILT to Silty CLAY	"
28.75	37.70	39.32	1.820	4.8	25	26	1.82	----	4.80	Silty CLAY to CLAY	"
28.86	42.30	44.04	2.420	5.7	42	44	1.83	----	5.41	CLAY	"
28.96	57.60	59.87	2.550	4.4	29	30	1.84	----	7.45	Clayey SILT to Silty CLAY	"
29.06	57.70	59.88	2.530	4.4	29	30	1.84	----	7.46	"	"
29.16	43.40	44.96	2.290	5.3	43	45	1.85	----	5.55	CLAY	"
29.26	32.20	33.30	1.800	5.6	32	33	1.86	----	4.06	"	"
29.37	25.30	26.12	1.250	4.9	25	26	1.87	----	3.14	"	"
29.47	21.80	22.47	0.920	4.2	15	15	1.87	----	2.67	Silty CLAY to CLAY	"
29.57	18.70	19.24	0.740	4.0	12	13	1.88	----	2.26	"	120-130
29.67	17.40	17.88	0.700	4.0	12	12	1.89	----	2.08	"	"
29.77	17.20	17.65	0.660	3.8	11	12	1.89	----	2.06	"	"
29.88	14.30	14.65	0.600	4.2	14	15	1.90	----	1.67	CLAY	"
29.98	12.30	12.58	0.560	4.6	12	13	1.90	----	1.40	"	"
30.08	12.20	12.46	0.520	4.3	12	12	1.91	----	1.39	"	"
30.18	12.10	12.34	0.560	4.6	12	12	1.92	----	1.37	"	"
30.28	13.00	13.24	0.660	5.1	13	13	1.92	----	1.49	"	"
30.38	14.10	14.34	0.870	6.2	14	14	1.93	----	1.64	"	"
30.48	16.70	16.96	0.960	5.7	17	17	1.94	----	1.98	"	"
30.58	18.90	19.16	0.960	5.1	19	19	1.94	----	2.28	"	130-140
30.68	18.70	18.92	0.970	5.2	19	19	1.95	----	2.25	"	"
30.78	16.70	16.87	0.940	5.6	17	17	1.96	----	1.98	"	120-130
30.88	16.80	16.95	0.860	5.1	17	17	1.96	----	1.99	"	"
30.98	15.20	15.31	0.800	5.3	15	15	1.97	----	1.78	"	"
31.08	14.70	14.79	0.840	5.7	15	15	1.98	----	1.71	"	"
31.18	15.50	15.57	0.890	5.7	16	16	1.98	----	1.82	"	"
31.29	17.40	17.44	0.990	5.7	17	17	1.99	----	2.07	"	130-140
31.39	17.10	17.11	1.090	6.4	17	17	2.00	----	2.03	"	"
31.49	18.20	18.20	1.150	6.3	18	18	2.00	----	2.17	"	"
31.76	16.40	16.39	0.770	4.7	16	16	2.02	----	1.93	"	120-130
31.86	16.50	16.49	0.700	4.2	17	16	2.03	----	1.94	"	"
31.96	16.70	16.69	0.690	4.1	11	11	2.03	----	1.97	Silty CLAY to CLAY	"
32.06	16.60	16.59	0.690	4.2	17	17	2.04	----	1.96	CLAY	"
32.16	17.70	17.68	0.800	4.5	18	18	2.05	----	2.10	"	"
32.26	21.70	21.68	1.130	5.2	22	22	2.05	----	2.63	"	130-140
32.36	28.60	28.57	1.940	6.8	29	29	2.06	----	3.55	"	"
32.46	41.30	41.24	2.920	7.1	41	41	2.07	----	5.25	"	"
32.56	64.40	64.30	3.640	5.7	64	64	2.08	----	8.32	Very Stiff Fine Grained *	"
32.66	79.50	79.37	4.150	5.2	80	79	2.08	----	10.34	"	"
32.76	84.80	84.65	4.370	5.2	85	85	2.09	----	11.04	"	"
32.81	95.20	95.02	4.490	4.7	95	95	2.09	----	12.43	"	"
32.88	129.80	129.54	4.170	3.2	52	52	2.10	----	17.04	Sandy SILT to Clayey SILT	"
33.01	172.50	172.13	2.850	1.7	43	43	2.11	41	----	SAND to Silty SAND	"
33.10	155.00	154.64	3.090	2.0	52	52	2.11	41	----	Silty SAND to Sandy SILT	"
33.20	141.10	140.76	2.960	2.1	47	47	2.12	40	----	"	"
33.30	136.10	135.75	3.150	2.3	45	45	2.13	40	----	"	"
33.40	129.60	129.25	3.170	2.4	43	43	2.14	39	----	"	"
33.49	138.00	137.61	2.990	2.2	46	46	2.14	40	----	"	"
33.57	148.60	148.16	2.800	1.9	50	49	2.15	40	----	"	"
33.67	155.30	154.82	1.850	1.2	31	31	2.15	41	----	SAND	120-130
33.76	152.50	152.01	1.340	0.9	31	30	2.16	40	----	"	"
33.86	145.10	144.62	1.030	0.7	29	29	2.17	40	----	"	110-120
33.96	131.50	131.05	0.900	0.7	26	26	2.17	40	----	"	"
34.05	122.60	122.17	1.070	0.9	25	24	2.18	39	----	"	120-130
34.15	117.60	117.17	1.040	0.9	29	29	2.18	39	----	SAND to Silty SAND	"

34.25	113.30	112.87	0.970	0.9	28	28	2.19	39	----	"	"
34.34	109.30	108.88	0.880	0.8	27	27	2.19	38	----	"	110-120
34.43	109.70	109.26	0.760	0.7	22	22	2.20	39	----	SAND	"
34.60	99.20	98.79	0.690	0.7	25	25	2.21	38	----	SAND to Silty SAND	"
34.70	97.90	97.48	0.950	1.0	24	24	2.21	38	----	"	120-130
34.80	96.10	95.68	0.980	1.0	24	24	2.22	38	----	"	"
34.89	98.60	98.15	0.900	0.9	25	25	2.23	38	----	"	"
34.99	92.50	92.07	0.930	1.0	23	23	2.23	38	----	"	"
35.08	86.20	85.79	0.890	1.0	22	21	2.24	37	----	"	"
35.18	78.30	77.92	0.720	0.9	20	19	2.24	37	----	"	"
35.27	61.90	61.59	0.870	1.4	21	21	2.25	35	----	Silty SAND to Sandy SILT	"
35.37	38.00	37.80	0.910	2.4	15	15	2.26	----	4.78	Sandy SILT to Clayey SILT	130-140
35.47	28.80	28.65	0.870	3.0	14	14	2.26	----	3.55	Clayey SILT to Silty CLAY	"
35.56	22.80	22.68	0.770	3.4	11	11	2.27	----	2.75	"	120-130
35.64	19.00	18.90	0.740	3.9	13	13	2.27	----	2.25	Silty CLAY to CLAY	"
35.74	14.50	14.42	0.640	4.4	15	14	2.28	----	1.64	CLAY	"
35.84	12.60	12.53	0.560	4.4	13	13	2.29	----	1.39	"	"
35.93	12.10	12.03	0.500	4.1	12	12	2.29	----	1.32	"	"
36.04	11.90	11.83	0.480	4.0	12	12	2.30	----	1.62	"	"
36.13	12.30	12.22	0.490	4.0	12	12	2.31	----	1.35	"	"
36.23	13.50	13.42	0.490	3.6	9	9	2.31	----	1.51	Silty CLAY to CLAY	"
36.33	13.30	13.22	0.510	3.8	9	9	2.32	----	1.48	"	"
36.43	13.40	13.31	0.530	4.0	13	13	2.32	----	1.49	CLAY	"
36.53	13.40	13.31	0.520	3.9	13	13	2.33	----	1.49	"	"
36.63	13.70	13.61	0.500	3.6	9	9	2.34	----	1.53	Silty CLAY to CLAY	"
36.73	12.90	12.81	0.490	3.8	9	9	2.34	----	1.42	"	"
36.83	13.20	13.11	0.490	3.7	9	9	2.35	----	1.46	"	"
36.93	12.70	12.61	0.490	3.9	13	13	2.36	----	1.39	CLAY	"
37.03	12.10	12.01	0.480	4.0	12	12	2.36	----	1.31	"	"
37.13	11.20	11.12	0.470	4.2	11	11	2.37	----	1.49	"	"
37.23	11.00	10.92	0.450	4.1	11	11	2.37	----	1.46	"	110-120
37.33	10.40	10.32	0.440	4.2	10	10	2.38	----	1.36	"	"
37.43	10.80	10.72	0.470	4.4	11	11	2.38	----	1.42	"	120-130
37.53	12.10	12.01	0.530	4.4	12	12	2.39	----	1.31	"	"
37.65	16.50	16.37	0.590	3.6	11	11	2.40	----	1.90	Silty CLAY to CLAY	"
37.75	16.90	16.76	0.630	3.7	11	11	2.40	----	1.95	"	"
37.85	17.40	17.26	0.660	3.8	12	12	2.41	----	2.01	"	"
37.96	16.70	16.56	0.660	4.0	11	11	2.42	----	1.92	"	"
38.06	17.20	17.05	1.370	8.0	17	17	2.43	----	1.99	CLAY	130-140
38.16	28.80	28.55	2.460	8.5	29	29	2.43	----	3.53	"	"
38.24	82.50	81.78	4.310	5.2	83	82	2.44	----	10.69	Very Stiff Fine Grained *	"
38.34	110.40	109.42	4.850	4.4	110	109	2.45	----	14.41	"	"
38.44	110.60	109.60	5.420	4.9	111	110	2.45	----	14.44	"	>140
38.54	96.50	95.61	5.060	5.2	97	96	2.46	----	12.55	"	"
38.64	121.50	120.36	4.760	3.9	122	120	2.47	----	15.89	"	130-140
38.74	143.40	142.03	5.430	3.8	72	71	2.48	40	----	SAND to Clayey SAND *	>140
38.84	142.90	141.52	5.150	3.6	71	71	2.48	40	----	"	130-140
38.94	137.50	136.15	4.060	3.0	46	45	2.49	40	----	Silty SAND to Sandy SILT	"
39.04	126.80	125.54	4.830	3.8	63	63	2.50	39	----	SAND to Clayey SAND *	"
39.13	136.40	134.81	5.060	3.7	68	67	2.51	40	----	"	>140
39.23	157.50	155.29	5.420	3.4	63	62	2.51	----	20.68	Sandy SILT to Clayey SILT	130-140
39.33	122.70	120.67	5.380	4.4	123	121	2.52	----	16.04	Very Stiff Fine Grained *	>140
39.43	126.90	124.49	5.490	4.3	127	124	2.53	----	16.60	"	"
39.52	134.80	131.94	4.550	3.4	54	53	2.53	----	17.65	Sandy SILT to Clayey SILT	130-140
39.61	153.40	149.80	4.270	2.8	51	50	2.54	40	----	Silty SAND to Sandy SILT	"

39.69	158.60	154.60	3.600	2.3	53	52	2.55	41	----	"	"
39.78	153.00	148.79	2.620	1.7	38	37	2.55	40	----	SAND to Silty SAND	"
39.88	145.50	141.17	2.200	1.5	36	35	2.56	40	----	"	"
39.97	138.10	133.68	2.240	1.6	35	33	2.57	40	----	"	"
40.06	124.90	120.63	2.290	1.8	42	40	2.57	39	----	Silty SAND to Sandy SILT	"
40.16	102.60	98.86	2.190	2.1	34	33	2.58	38	----	"	"
40.25	59.70	57.39	1.960	3.3	24	23	2.59	----	7.63	Sandy SILT to Clayey SILT	"
40.34	35.20	33.76	1.680	4.8	23	23	2.59	----	4.36	Silty CLAY to CLAY	"
40.44	26.30	25.16	1.240	4.7	26	25	2.60	----	3.18	CLAY	"
40.53	19.00	18.14	0.880	4.6	19	18	2.61	----	2.20	"	120-130
40.62	16.50	15.72	0.750	4.5	17	16	2.61	----	1.87	"	"
40.72	15.50	14.74	0.620	4.0	10	10	2.62	----	1.73	Silty CLAY to CLAY	"
40.81	13.50	12.81	0.550	4.1	14	13	2.62	----	1.47	CLAY	"
41.06	18.20	17.18	0.560	3.1	9	9	2.64	----	2.09	Clayey SILT to Silty CLAY	"
41.16	19.60	18.46	0.580	3.0	10	9	2.65	----	2.28	"	"
41.25	19.70	18.52	0.600	3.0	10	9	2.65	----	2.29	"	"
41.34	20.50	19.23	0.680	3.3	10	10	2.66	----	2.40	"	"
41.44	22.70	21.24	0.790	3.5	11	11	2.66	----	2.69	"	130-140
41.54	24.10	22.50	0.930	3.9	16	15	2.67	----	2.87	Silty CLAY to CLAY	"
41.63	24.50	22.82	1.030	4.2	16	15	2.68	----	2.93	"	"
41.72	24.60	22.85	1.060	4.3	16	15	2.68	----	2.94	"	"
41.82	22.70	21.03	0.990	4.4	15	14	2.69	----	2.69	"	"
41.92	22.00	20.33	0.920	4.2	15	14	2.70	----	2.59	"	"
42.02	20.20	18.62	0.850	4.2	13	12	2.71	----	2.35	"	"
42.11	17.50	16.10	0.740	4.2	18	16	2.71	----	1.99	CLAY	120-130
42.21	16.20	14.87	0.670	4.1	16	15	2.72	----	1.82	"	"
42.31	15.40	14.10	0.620	4.0	10	9	2.72	----	1.71	Silty CLAY to CLAY	"
42.41	14.00	12.79	0.580	4.1	14	13	2.73	----	1.52	CLAY	"
42.51	14.20	12.95	0.570	4.0	14	13	2.74	----	1.55	"	"
42.61	14.40	13.10	0.590	4.1	14	13	2.74	----	1.57	"	"
42.71	15.10	13.71	0.710	4.7	15	14	2.75	----	1.66	"	"
42.80	18.20	16.48	0.880	4.8	18	16	2.76	----	2.08	"	"
42.90	22.00	19.87	1.080	4.9	22	20	2.76	----	2.58	"	130-140
43.00	25.60	23.06	1.360	5.3	26	23	2.77	----	3.06	"	"
43.10	28.40	25.52	1.600	5.6	28	26	2.78	----	3.43	"	"
43.20	33.40	29.93	1.640	4.9	33	30	2.78	----	4.10	"	"
43.30	38.10	34.06	1.600	4.2	25	23	2.79	----	4.73	Silty CLAY to CLAY	"
43.40	33.60	29.95	1.560	4.6	22	20	2.80	----	4.12	"	"
43.50	28.90	25.69	1.470	5.1	29	26	2.81	----	3.50	CLAY	"
43.60	22.20	19.68	1.430	6.4	22	20	2.81	----	2.60	"	"
43.70	19.20	16.98	1.410	7.3	19	17	2.82	----	2.20	"	"
43.80	18.00	15.87	1.380	7.7	18	16	2.83	----	2.04	"	"
44.09	21.10	18.46	1.510	7.2	21	18	2.85	----	2.45	"	"
44.18	23.40	20.42	1.610	6.9	23	20	2.86	----	2.76	"	"
44.27	25.50	22.20	1.590	6.2	26	22	2.86	----	3.04	"	"
44.35	24.90	21.63	1.580	6.3	25	22	2.87	----	2.96	"	"
44.41	24.50	21.25	1.580	6.4	25	21	2.87	----	2.90	"	"
44.49	23.90	20.68	1.700	7.1	24	21	2.88	----	2.82	"	"
44.57	24.70	21.32	1.920	7.8	25	21	2.88	----	2.93	"	"
44.64	29.10	25.07	2.060	7.1	29	25	2.89	----	3.51	"	"
44.74	45.30	38.93	1.890	4.2	23	19	2.90	----	5.67	Clayey SILT to Silty CLAY	"
44.83	74.70	64.02	2.470	3.3	30	26	2.90	----	9.59	Sandy SILT to Clayey SILT	"
44.92	82.70	70.70	2.680	3.2	33	28	2.91	----	10.66	"	"
45.02	69.50	59.26	2.880	4.1	35	30	2.92	----	8.90	Clayey SILT to Silty CLAY	"
45.12	49.40	42.00	2.830	5.7	49	42	2.92	----	6.22	CLAY	"

45.21	43.80	37.14	2.940	6.7	44	37	2.93	----	5.47	"	"
45.31	27.20	23.00	2.850	10.5	27	23	2.94	----	3.25	"	"
45.41	30.20	25.46	2.640	8.7	30	25	2.94	----	3.65	"	"
45.51	30.60	25.73	2.540	8.3	31	26	2.95	----	3.71	"	"
45.61	40.10	33.62	2.270	5.7	40	34	2.96	----	4.97	"	"
45.70	50.40	42.14	2.340	4.6	34	28	2.97	----	6.34	Silty CLAY to CLAY	"
45.80	69.30	57.80	2.430	3.5	28	23	2.97	----	8.86	Sandy SILT to Clayey SILT	"
45.89	77.80	64.71	2.360	3.0	31	26	2.98	----	10.00	"	"
45.98	70.20	58.23	1.900	2.7	28	23	2.99	----	8.98	"	"
46.08	60.80	50.29	2.900	4.8	41	34	2.99	----	7.73	Silty CLAY to CLAY	"
46.17	52.50	43.31	3.390	6.5	53	43	3.00	----	6.62	CLAY	"
46.22	54.10	44.61	3.860	7.1	54	45	3.00	----	6.83	"	"
46.32	56.40	46.46	3.580	6.3	56	46	3.01	----	7.14	"	"
46.42	73.40	60.41	2.830	3.9	37	30	3.02	----	9.40	Clayey SILT to Silty CLAY	"
46.51	79.00	64.95	2.230	2.8	32	26	3.02	----	10.15	Sandy SILT to Clayey SILT	"
46.61	71.70	58.89	2.120	3.0	29	24	3.03	----	9.18	"	"
46.70	64.70	53.09	2.350	3.6	32	27	3.04	----	8.24	Clayey SILT to Silty CLAY	"
46.80	51.80	42.46	2.250	4.3	26	21	3.05	----	6.52	"	"
46.89	44.30	36.28	2.670	6.0	44	36	3.05	----	5.52	CLAY	"
46.99	46.30	37.88	2.820	6.1	46	38	3.06	----	5.79	"	"
47.08	65.20	53.30	2.230	3.4	26	21	3.07	----	8.31	Sandy SILT to Clayey SILT	"
47.17	89.00	72.68	1.730	1.9	30	24	3.07	36	----	Silty SAND to Sandy SILT	"
47.26	100.50	82.00	1.380	1.4	25	20	3.08	37	----	SAND to Silty SAND	"
47.36	95.70	78.00	1.720	1.8	32	26	3.09	37	----	Silty SAND to Sandy SILT	"
47.45	81.20	66.12	2.130	2.6	32	26	3.09	----	10.44	Sandy SILT to Clayey SILT	"
47.55	73.90	60.12	2.550	3.5	30	24	3.10	----	9.46	"	"
47.65	52.90	42.99	2.890	5.5	53	43	3.11	----	6.66	CLAY	"
47.90	64.80	52.52	2.780	4.3	32	26	3.13	----	8.24	Clayey SILT to Silty CLAY	"
48.00	73.30	59.36	2.400	3.3	29	24	3.13	----	9.38	Sandy SILT to Clayey SILT	"
48.09	76.80	62.13	3.490	4.5	77	62	3.14	----	9.84	Very Stiff Fine Grained *	"
48.18	145.70	117.76	4.130	2.8	49	39	3.15	39	----	Silty SAND to Sandy SILT	"
48.27	287.80	232.39	4.980	1.7	58	46	3.15	43	----	SAND	"
48.32	325.00	262.30	5.920	1.8	65	52	3.16	44	----	"	"
48.38	410.90	331.41	10.400	2.5	205	166	3.16	45	----	SAND to Clayey SAND *	"
48.45	462.40	372.67	18.470	4.0	231	186	3.17	46	----	"	>140
48.51	537.60	432.98	16.660	3.1	269	216	3.17	46	----	"	"
48.61	614.90	494.67	16.160	2.6	307	247	3.18	47	----	"	"
48.65	659.10	530.01	13.990	2.1	330	265	3.18	48	----	"	130-140
48.71	604.00	485.43	13.520	2.2	302	243	3.19	47	----	"	"
48.75	598.80	481.04	13.220	2.2	299	241	3.19	47	----	"	"
48.79	620.60	498.37	12.770	2.1	310	249	3.19	47	----	"	"
48.82	591.50	474.83	12.850	2.2	296	237	3.19	47	----	"	"
48.87	691.80	555.04	10.930	1.6	138	111	3.20	48	----	SAND	"
48.90	718.70	576.44	10.130	1.4	144	115	3.20	>48	----	"	"
48.95	768.60	616.16	9.450	1.2	154	123	3.20	>48	----	"	"
48.99	774.10	620.29	9.240	1.2	155	124	3.21	>48	----	"	"
49.03	775.80	621.43	9.060	1.2	155	124	3.21	>48	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-25
LOCATION: Santa Rosa CA DATE : 05-31-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 14:43:58
Terminated at 35.0 feet Groundwater measured at 2.8 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.53	36.20	57.92	1.230	3.4	18	29	0.06	----	4.82	Clayey SILT to Silty CLAY	130-140
0.64	35.00	56.00	1.210	3.5	18	28	0.08	----	4.66	"	"
0.75	33.30	53.28	1.130	3.4	17	27	0.09	----	4.43	"	"
0.86	29.50	47.20	1.020	3.5	15	24	0.11	----	3.93	"	"
0.96	23.60	37.76	0.860	3.6	12	19	0.12	----	3.14	"	"
1.07	18.20	29.12	0.620	3.4	12	19	0.13	----	2.42	Silty CLAY to CLAY	120-130
1.18	13.00	20.80	0.440	3.4	9	14	0.15	----	1.72	"	"
1.29	9.70	15.52	0.390	4.0	10	16	0.16	----	1.60	CLAY	110-120
1.39	8.20	13.12	0.400	4.9	8	13	0.17	----	1.62	"	"
1.50	8.50	13.60	0.440	5.2	9	14	0.18	----	1.68	"	"
1.61	9.00	14.40	0.460	5.1	9	14	0.20	----	1.48	"	"
1.71	8.60	13.76	0.440	5.1	9	14	0.21	----	1.70	"	"
1.82	8.20	13.12	0.430	5.2	8	13	0.22	----	1.62	"	"
1.92	8.10	12.96	0.430	5.3	8	13	0.23	----	1.60	"	"
2.03	8.40	13.44	0.420	5.0	8	13	0.25	----	1.66	"	"
2.14	8.70	13.92	0.430	4.9	9	14	0.26	----	1.71	"	"
2.40	11.70	18.72	0.530	4.5	12	19	0.29	----	1.93	"	120-130
2.51	12.10	19.36	0.600	5.0	12	19	0.30	----	1.59	"	"
2.61	12.70	20.32	0.680	5.4	13	20	0.32	----	1.67	"	"
2.72	13.50	21.60	0.760	5.6	14	22	0.33	----	1.78	"	"
2.82	14.50	23.20	0.820	5.7	15	23	0.34	----	1.91	"	"
2.93	14.90	23.84	0.860	5.8	15	24	0.34	----	1.96	"	"
3.04	14.30	22.88	0.890	6.2	14	23	0.35	----	1.88	"	"
3.15	11.70	18.72	0.870	7.4	12	19	0.36	----	1.92	"	"
3.25	10.30	16.48	0.800	7.8	10	16	0.36	----	1.68	"	"
3.36	9.40	15.04	0.740	7.9	9	15	0.37	----	1.53	"	"
3.47	8.80	14.08	0.670	7.6	9	14	0.38	----	1.72	"	"
3.58	8.00	12.80	0.610	7.6	8	13	0.38	----	1.56	"	"
3.69	7.40	11.84	0.560	7.6	7	12	0.39	----	1.43	"	110-120
3.80	6.40	10.24	0.520	8.1	6	10	0.40	----	1.23	"	"
3.91	6.10	9.76	0.490	8.0	6	10	0.40	----	1.17	"	"
4.01	6.70	10.72	0.480	7.2	7	11	0.41	----	1.29	"	"
4.12	9.00	14.40	0.470	5.2	9	14	0.41	----	1.46	"	"
4.23	10.30	16.48	0.430	4.2	10	16	0.42	----	1.67	"	"
4.34	9.40	15.04	0.380	4.0	9	15	0.42	----	1.52	"	"
4.45	9.00	14.40	0.360	4.0	9	14	0.43	----	1.46	"	"
4.55	9.30	14.88	0.340	3.7	9	15	0.43	----	1.50	"	"
4.66	8.80	14.08	0.310	3.5	9	14	0.44	----	1.70	"	"
4.77	8.60	13.76	0.270	3.1	6	9	0.45	----	1.66	Silty CLAY to CLAY	100-110
4.87	8.40	13.44	0.220	2.6	6	9	0.45	----	1.62	"	"
4.98	8.10	12.96	0.210	2.6	5	9	0.45	----	1.56	"	"
5.09	8.30	13.28	0.260	3.1	6	9	0.46	----	1.60	"	"
5.20	8.10	12.96	0.310	3.8	8	13	0.46	----	1.56	CLAY	110-120
5.31	9.80	15.68	0.440	4.5	10	16	0.47	----	1.58	"	"
5.42	14.10	22.56	0.530	3.8	9	15	0.48	----	1.84	Silty CLAY to CLAY	120-130
5.52	13.60	21.76	0.520	3.8	9	15	0.48	----	1.77	"	"
5.65	16.30	26.08	0.480	2.9	8	13	0.49	----	2.13	Clayey SILT to Silty CLAY	"

5.75	27.00	43.20	0.500	1.9	11	17	0.50	----	3.55	Sandy SILT to Clayey SILT	"
5.86	20.90	33.44	0.490	2.3	10	17	0.50	----	2.74	Clayey SILT to Silty CLAY	"
5.97	12.10	19.36	0.340	2.8	8	13	0.51	----	1.57	Silty CLAY to CLAY	110-120
6.08	7.40	11.84	0.220	3.0	5	8	0.52	----	1.41	"	100-110
6.19	6.10	9.76	0.170	2.8	6	10	0.52	----	1.15	CLAY	90-100
6.30	5.80	9.28	0.190	3.3	6	9	0.52	----	1.09	"	100-110
6.40	6.80	10.88	0.220	3.2	7	11	0.53	----	1.28	"	"
6.51	7.70	12.32	0.230	3.0	5	8	0.53	----	1.46	Silty CLAY to CLAY	"
6.62	6.70	10.72	0.230	3.4	7	11	0.54	----	1.26	CLAY	"
6.73	6.50	10.40	0.220	3.4	7	10	0.54	----	1.22	"	"
6.84	7.30	11.68	0.200	2.7	5	8	0.55	----	1.38	Silty CLAY to CLAY	"
6.95	7.40	11.84	0.190	2.6	5	8	0.55	----	1.40	"	"
7.06	7.60	12.16	0.190	2.5	5	8	0.56	----	1.44	"	"
7.17	7.90	12.64	0.190	2.4	5	8	0.56	----	1.50	"	"
7.27	5.90	9.44	0.200	3.4	6	9	0.57	----	1.10	CLAY	"
7.38	5.60	8.96	0.220	3.9	6	9	0.57	----	1.03	"	"
7.49	5.50	8.80	0.220	4.0	6	9	0.57	----	1.01	"	"
7.60	5.20	8.32	0.210	4.0	5	8	0.58	----	0.95	"	"
7.71	5.60	8.96	0.190	3.4	6	9	0.58	----	1.03	"	"
7.81	6.10	9.76	0.160	2.6	4	7	0.59	----	1.13	Silty CLAY to CLAY	90-100
7.92	6.20	9.92	0.120	1.9	4	7	0.59	----	1.15	"	"
8.03	6.10	9.76	0.100	1.6	4	7	0.59	----	1.13	"	"
8.14	5.80	9.28	0.100	1.7	4	6	0.60	----	1.07	"	"
8.24	6.00	9.60	0.140	2.3	4	6	0.60	----	1.11	"	"
8.35	6.00	9.60	0.170	2.8	6	10	0.60	----	1.10	CLAY	"
8.46	5.60	8.96	0.170	3.0	6	9	0.61	----	1.02	"	"
8.57	5.10	8.16	0.180	3.5	5	8	0.61	----	0.92	"	"
8.68	5.30	8.48	0.170	3.2	5	8	0.62	----	0.96	"	"
8.78	5.00	8.00	0.150	3.0	5	8	0.62	----	0.90	"	"
8.90	3.50	5.60	0.130	3.7	4	6	0.62	----	0.60	"	"
9.01	3.60	5.76	0.140	3.9	4	6	0.63	----	0.62	"	"
9.12	3.90	6.24	0.140	3.6	4	6	0.63	----	0.68	"	"
9.23	3.50	5.60	0.150	4.3	4	6	0.63	----	0.60	"	"
9.34	3.80	6.08	0.200	5.3	4	6	0.64	----	0.66	"	"
9.45	7.30	11.68	0.260	3.6	7	12	0.64	----	1.35	"	100-110
9.56	7.10	11.36	0.280	3.9	7	11	0.65	----	1.31	"	"
9.66	6.20	9.92	0.260	4.2	6	10	0.65	----	1.13	"	"
9.77	5.00	8.00	0.220	4.4	5	8	0.66	----	0.89	"	"
9.88	4.60	7.36	0.200	4.3	5	7	0.66	----	0.81	"	90-100
9.99	4.90	7.84	0.180	3.7	5	8	0.66	----	0.87	"	"
10.10	5.00	8.00	0.180	3.6	5	8	0.67	----	0.89	"	"
10.21	5.50	8.80	0.180	3.3	6	9	0.67	----	0.99	"	"
10.32	4.20	6.72	0.180	4.3	4	7	0.67	----	0.73	"	"
10.43	3.10	4.96	0.170	5.5	3	5	0.68	----	0.50	"	"
10.53	2.70	4.32	0.170	6.3	3	4	0.68	----	0.42	Organic Material	"
10.64	3.10	4.96	0.160	5.2	3	5	0.68	----	0.50	CLAY	"
10.75	3.30	5.28	0.160	4.8	3	5	0.69	----	0.54	"	"
10.86	4.60	7.36	0.170	3.7	5	7	0.69	----	0.80	"	"
10.97	5.10	8.16	0.180	3.5	5	8	0.69	----	0.90	"	"
11.07	6.00	9.60	0.170	2.8	6	10	0.70	----	1.08	"	"
11.18	6.60	10.56	0.150	2.3	4	7	0.70	----	1.20	Silty CLAY to CLAY	"
11.29	7.80	12.48	0.150	1.9	4	6	0.71	----	1.44	Clayey SILT to Silty CLAY	100-110
11.39	7.90	12.64	0.150	1.9	4	6	0.71	----	1.45	"	"
11.50	7.40	11.84	0.170	2.3	5	8	0.71	----	1.35	Silty CLAY to CLAY	"
11.61	7.90	12.64	0.200	2.5	5	8	0.72	----	1.45	"	"

11.72	8.50	13.60	0.230	2.7	6	9	0.72	----	1.57	"	"
11.82	8.90	14.24	0.350	3.9	9	14	0.73	----	1.65	CLAY	110-120
11.93	9.50	15.20	0.400	4.2	10	15	0.74	----	1.47	"	"
12.04	10.50	16.80	0.380	3.6	11	17	0.74	----	1.64	"	"
12.07	15.10	24.16	0.380	2.5	8	12	0.74	----	1.92	Clayey SILT to Silty CLAY	120-130
12.18	13.90	22.24	0.320	2.3	7	11	0.75	----	1.76	"	110-120
12.29	11.40	18.24	0.250	2.2	6	9	0.75	----	1.79	"	"
12.40	8.30	13.28	0.210	2.5	6	9	0.76	----	1.52	Silty CLAY to CLAY	100-110
12.51	7.60	12.16	0.190	2.5	5	8	0.76	----	1.38	"	"
12.61	8.30	13.28	0.190	2.3	6	9	0.77	----	1.52	"	"
12.72	8.30	13.28	0.240	2.9	6	9	0.77	----	1.52	"	"
12.83	9.80	15.68	0.290	3.0	7	10	0.78	----	1.52	"	110-120
12.94	10.80	17.28	0.420	3.9	11	17	0.78	----	1.68	CLAY	"
13.05	12.90	20.64	0.510	4.0	13	21	0.79	----	1.62	"	120-130
13.16	30.10	48.16	0.490	1.6	12	19	0.80	----	3.92	Sandy SILT to Clayey SILT	"
13.26	36.30	57.92	0.450	1.2	12	19	0.80	35	----	Silty SAND to Sandy SILT	"
13.37	22.90	36.38	0.360	1.6	9	15	0.81	----	2.95	Sandy SILT to Clayey SILT	"
13.48	14.10	22.32	0.280	2.0	7	11	0.82	----	1.78	Clayey SILT to Silty CLAY	110-120
13.59	10.50	16.57	0.230	2.2	5	8	0.82	----	1.63	"	100-110
13.70	8.10	12.75	0.210	2.6	5	8	0.83	----	1.47	Silty CLAY to CLAY	"
13.80	7.80	12.24	0.220	2.8	5	8	0.83	----	1.41	"	"
13.91	8.60	13.46	0.240	2.8	6	9	0.84	----	1.57	"	"
14.02	8.50	13.26	0.230	2.7	6	9	0.84	----	1.55	"	"
14.13	10.10	15.71	0.230	2.3	5	8	0.84	----	1.55	Clayey SILT to Silty CLAY	"
14.23	10.50	16.27	0.250	2.4	5	8	0.85	----	1.62	"	110-120
14.34	10.90	16.83	0.280	2.6	5	8	0.86	----	1.68	"	"
14.45	10.10	15.54	0.280	2.8	7	10	0.86	----	1.55	Silty CLAY to CLAY	"
14.56	8.60	13.19	0.270	3.1	6	9	0.87	----	1.56	"	100-110
14.66	7.10	10.86	0.260	3.7	7	11	0.87	----	1.26	CLAY	"
14.77	7.60	11.59	0.240	3.2	8	12	0.88	----	1.36	"	"
14.88	7.10	10.79	0.210	3.0	7	11	0.88	----	1.26	"	"
14.98	7.20	10.91	0.210	2.9	5	7	0.88	----	1.28	Silty CLAY to CLAY	"
15.09	6.90	10.43	0.230	3.3	7	10	0.89	----	1.21	CLAY	"
15.20	7.20	10.85	0.250	3.5	7	11	0.89	----	1.27	"	"
15.46	7.90	11.81	0.230	2.9	5	8	0.90	----	1.41	Silty CLAY to CLAY	"
15.57	7.40	11.03	0.220	3.0	5	7	0.91	----	1.31	"	"
15.68	5.50	8.17	0.210	3.8	6	8	0.91	----	0.93	CLAY	"
15.79	7.50	11.11	0.210	2.8	5	7	0.92	----	1.33	Silty CLAY to CLAY	"
15.90	7.60	11.22	0.210	2.8	5	7	0.92	----	1.35	"	"
16.00	7.10	10.45	0.210	3.0	7	10	0.93	----	1.24	CLAY	"
16.11	6.90	10.13	0.230	3.3	7	10	0.93	----	1.20	"	"
16.22	5.90	8.63	0.230	3.9	6	9	0.94	----	1.00	"	"
16.33	6.30	9.19	0.230	3.7	6	9	0.94	----	1.08	"	"
16.44	9.50	13.81	0.220	2.3	5	7	0.95	----	1.43	Clayey SILT to Silty CLAY	"
16.55	11.30	16.37	0.230	2.0	6	8	0.95	----	1.73	"	"
16.66	11.60	16.74	0.300	2.6	6	8	0.96	----	1.78	"	110-120
16.77	11.30	16.25	0.350	3.1	8	11	0.96	----	1.73	Silty CLAY to CLAY	"
16.88	11.00	15.75	0.360	3.3	7	11	0.97	----	1.68	"	"
16.98	12.30	17.54	0.350	2.8	8	12	0.97	----	1.52	"	"
17.09	10.80	15.34	0.310	2.9	7	10	0.98	----	1.64	"	"
17.20	9.40	13.30	0.310	3.3	6	9	0.99	----	1.41	"	"
17.31	11.70	16.49	0.290	2.5	6	8	0.99	----	1.79	Clayey SILT to Silty CLAY	"
17.39	14.10	19.81	0.320	2.3	7	10	1.00	----	1.75	"	"
17.50	14.70	20.56	0.390	2.7	7	10	1.00	----	1.83	"	120-130
17.61	14.70	20.51	0.470	3.2	10	14	1.01	----	1.83	Silty CLAY to CLAY	"

17.71	13.60	18.93	0.530	3.9	14	19	1.02	----	1.68	CLAY	"
17.82	12.00	16.66	0.520	4.3	12	17	1.02	----	1.47	"	"
17.93	9.90	13.72	0.490	4.9	10	14	1.03	----	1.49	"	110-120
18.04	6.70	9.26	0.430	6.4	7	9	1.03	----	1.14	"	"
18.15	4.60	6.35	0.330	7.2	5	6	1.04	----	0.72	"	100-110
18.25	4.40	6.06	0.270	6.1	4	6	1.04	----	0.68	"	"
18.36	3.60	4.95	0.270	7.5	4	5	1.05	----	0.52	Organic Material	90-100
18.47	5.00	6.87	0.260	5.2	5	7	1.05	----	0.80	CLAY	100-110
18.52	3.30	4.53	0.250	7.6	3	5	1.05	----	0.46	Organic Material	90-100
18.56	6.10	8.37	0.250	4.1	6	8	1.05	----	1.02	CLAY	100-110
18.66	3.90	5.34	0.220	5.6	4	5	1.06	----	0.57	"	90-100
18.77	4.40	6.02	0.220	5.0	4	6	1.06	----	0.67	"	"
18.88	6.30	8.61	0.240	3.8	6	9	1.07	----	1.05	"	100-110
18.99	9.60	13.09	0.240	2.5	6	9	1.07	----	1.43	Silty CLAY to CLAY	"
19.09	8.20	11.16	0.240	2.9	5	7	1.07	----	1.43	"	"
19.20	8.50	11.55	0.250	2.9	6	8	1.08	----	1.49	"	"
19.31	8.40	11.39	0.260	3.1	6	8	1.08	----	1.47	"	"
19.42	9.60	12.99	0.280	2.9	6	9	1.09	----	1.42	"	110-120
19.53	9.20	12.42	0.300	3.3	6	8	1.10	----	1.35	"	"
19.63	9.10	12.26	0.300	3.3	6	8	1.10	----	1.34	"	"
19.74	9.40	12.64	0.290	3.1	6	8	1.11	----	1.39	"	"
19.85	12.00	16.10	0.370	3.1	8	11	1.11	----	1.45	"	"
19.96	12.60	16.86	0.530	4.2	13	17	1.12	----	1.53	CLAY	120-130
20.07	15.20	20.28	0.610	4.0	10	14	1.13	----	1.88	Silty CLAY to CLAY	"
20.17	23.60	31.41	0.700	3.0	12	16	1.13	----	3.00	Clayey SILT to Silty CLAY	"
20.28	41.80	55.49	0.730	1.7	14	18	1.14	35	----	Silty SAND to Sandy SILT	"
20.39	39.20	51.90	0.650	1.7	13	17	1.15	34	----	"	"
20.49	25.30	33.41	0.490	1.9	10	13	1.15	----	3.22	Sandy SILT to Clayey SILT	"
20.60	14.20	18.70	0.390	2.7	7	9	1.16	----	1.74	Clayey SILT to Silty CLAY	"
20.71	10.30	13.54	0.310	3.0	7	9	1.17	----	1.53	Silty CLAY to CLAY	110-120
20.82	8.10	10.63	0.250	3.1	5	7	1.17	----	1.39	"	100-110
20.92	7.10	9.30	0.240	3.4	7	9	1.17	----	1.19	CLAY	"
21.03	7.90	10.33	0.250	3.2	8	10	1.18	----	1.35	"	"
21.14	9.80	12.79	0.240	2.4	7	9	1.18	----	1.44	Silty CLAY to CLAY	"
21.25	8.50	11.07	0.260	3.1	6	7	1.19	----	1.47	"	"
21.35	7.60	9.88	0.270	3.6	8	10	1.19	----	1.28	CLAY	"
21.46	7.30	9.47	0.280	3.8	7	9	1.20	----	1.22	"	"
21.56	8.10	10.49	0.430	5.3	8	10	1.20	----	1.38	"	110-120
21.67	8.00	10.33	0.500	6.3	8	10	1.21	----	1.36	"	"
21.78	8.50	10.96	0.470	5.5	9	11	1.21	----	1.46	"	"
21.89	8.80	11.32	0.440	5.0	9	11	1.22	----	1.52	"	"
22.00	8.00	10.26	0.540	6.8	8	10	1.23	----	1.36	"	"
22.10	11.60	14.84	0.680	5.9	12	15	1.23	----	1.73	"	120-130
22.21	19.70	25.13	0.650	3.3	10	13	1.24	----	2.46	Clayey SILT to Silty CLAY	"
22.31	15.80	20.10	0.560	3.5	11	13	1.25	----	1.94	Silty CLAY to CLAY	"
22.42	13.30	16.88	0.470	3.5	9	11	1.25	----	1.61	"	"
22.53	13.30	16.84	0.420	3.2	9	11	1.26	----	1.61	"	"
22.63	14.00	17.68	0.530	3.8	9	12	1.27	----	1.70	"	"
22.74	15.70	19.77	0.950	6.1	16	20	1.27	----	1.93	CLAY	"
22.85	23.10	29.01	1.300	5.6	23	29	1.28	----	2.91	"	130-140
22.96	28.70	35.93	1.790	6.2	29	36	1.29	----	3.66	"	"
23.06	34.70	43.32	2.420	7.0	35	43	1.30	----	4.46	"	"
23.17	41.30	51.40	2.600	6.3	41	51	1.30	----	5.33	"	"
23.25	41.40	51.40	2.560	6.2	41	51	1.31	----	5.35	"	"
23.36	38.40	47.54	2.300	6.0	38	48	1.32	----	4.95	"	"

23.47	23.50	29.00	1.760	7.5	24	29	1.32	----	2.96	"	"
23.57	16.30	20.06	1.130	6.9	16	20	1.33	----	2.00	"	"
23.68	13.30	16.32	0.670	5.0	13	16	1.34	----	1.60	"	120-130
23.78	12.60	15.42	0.510	4.0	13	15	1.35	----	1.50	"	"
23.89	12.40	15.14	0.480	3.9	12	15	1.35	----	1.48	"	"
23.99	13.20	16.08	0.490	3.7	9	11	1.36	----	1.58	Silty CLAY to CLAY	"
24.10	14.50	17.61	0.520	3.6	10	12	1.37	----	1.75	"	"
24.20	12.80	15.51	0.550	4.3	13	16	1.37	----	1.53	CLAY	"
24.31	13.00	15.71	0.600	4.6	13	16	1.38	----	1.55	"	"
24.41	13.60	16.39	0.610	4.5	14	16	1.38	----	1.63	"	"
24.52	14.00	16.83	0.590	4.2	14	17	1.39	----	1.68	"	"
24.62	13.70	16.43	0.560	4.1	14	16	1.40	----	1.64	"	"
24.73	13.10	15.66	0.530	4.0	13	16	1.40	----	1.56	"	"
24.83	14.00	16.70	0.500	3.6	9	11	1.41	----	1.68	Silty CLAY to CLAY	"
24.94	16.00	19.03	0.560	3.5	11	13	1.42	----	1.95	"	"
25.04	18.90	22.42	0.650	3.4	13	15	1.42	----	2.33	"	"
25.09	22.40	26.54	0.710	3.2	11	13	1.43	----	2.80	Clayey SILT to Silty CLAY	"
25.20	24.90	29.41	0.840	3.4	12	15	1.43	----	3.13	"	130-140
25.30	25.60	30.15	0.910	3.6	13	15	1.44	----	3.22	"	"
25.41	25.60	30.05	0.910	3.6	13	15	1.45	----	3.22	"	"
25.51	25.50	29.84	0.880	3.5	13	15	1.46	----	3.21	"	"
25.62	26.20	30.56	0.880	3.4	13	15	1.47	----	3.30	"	"
25.72	27.90	32.44	0.940	3.4	14	16	1.47	----	3.53	"	"
25.83	28.90	33.50	1.040	3.6	14	17	1.48	----	3.66	"	"
25.94	29.60	34.20	1.130	3.8	15	17	1.49	----	3.75	"	"
26.04	29.60	34.09	1.180	4.0	20	23	1.50	----	3.75	Silty CLAY to CLAY	"
26.15	29.70	34.11	1.230	4.1	20	23	1.50	----	3.76	"	"
26.26	30.40	34.83	1.240	4.1	20	23	1.51	----	3.85	"	"
26.36	30.40	34.74	1.260	4.1	20	23	1.52	----	3.85	"	"
26.47	30.20	34.43	1.280	4.2	20	23	1.53	----	3.83	"	"
26.58	29.70	33.78	1.300	4.4	20	23	1.54	----	3.76	"	"
26.68	29.30	33.24	1.320	4.5	20	22	1.54	----	3.70	"	"
26.79	29.30	33.16	1.300	4.4	20	22	1.55	----	3.70	"	"
26.90	27.20	30.71	1.250	4.6	18	20	1.56	----	3.42	"	"
27.00	24.80	27.93	1.160	4.7	25	28	1.57	----	3.10	CLAY	"
27.11	21.80	24.49	1.050	4.8	22	24	1.57	----	2.70	"	"
27.21	21.70	24.32	0.940	4.3	14	16	1.58	----	2.69	Silty CLAY to CLAY	"
27.32	19.40	21.70	0.800	4.1	13	14	1.59	----	2.38	"	120-130
27.42	18.10	20.20	0.720	4.0	12	13	1.59	----	2.20	"	"
27.53	17.60	19.60	0.680	3.9	12	13	1.60	----	2.14	"	"
27.63	16.80	18.67	0.710	4.2	17	19	1.61	----	2.03	CLAY	"
27.74	18.90	20.96	0.740	3.9	13	14	1.61	----	2.31	Silty CLAY to CLAY	"
27.84	18.80	20.80	0.770	4.1	13	14	1.62	----	2.29	"	"
27.95	20.80	22.97	0.790	3.8	14	15	1.63	----	2.56	"	"
28.05	20.70	22.80	1.030	5.0	21	23	1.64	----	2.55	CLAY	130-140
28.16	21.20	23.29	1.220	5.8	21	23	1.64	----	2.61	"	"
28.27	21.20	23.23	1.130	5.3	21	23	1.65	----	2.61	"	"
28.35	15.10	16.52	1.030	6.8	15	17	1.66	----	1.80	"	120-130
28.45	16.00	17.47	0.920	5.8	16	17	1.66	----	1.92	"	"
28.56	13.70	14.92	0.790	5.8	14	15	1.67	----	1.61	"	"
28.66	10.90	11.85	0.680	6.2	11	12	1.68	----	1.54	"	"
28.77	11.80	12.80	0.630	5.3	12	13	1.68	----	1.69	"	"
28.88	11.20	12.12	0.620	5.5	11	12	1.69	----	1.59	"	"
28.98	11.10	11.98	0.600	5.4	11	12	1.70	----	1.57	"	"
29.09	12.10	13.03	0.610	5.0	12	13	1.70	----	1.39	"	"

29.20	10.90	11.72	0.610	5.6	11	12	1.71	----	1.54	"	"
29.30	7.80	8.37	0.580	7.4	8	8	1.71	----	1.22	"	110-120
29.41	6.70	7.17	0.490	7.3	7	7	1.72	----	1.00	"	"
29.52	6.40	6.84	0.450	7.0	6	7	1.73	----	0.94	"	"
29.63	9.60	10.24	0.440	4.6	10	10	1.73	----	1.32	"	"
29.73	14.50	15.43	0.450	3.1	10	10	1.74	----	1.71	Silty CLAY to CLAY	120-130
29.84	14.70	15.61	0.590	4.0	15	16	1.74	----	1.73	CLAY	"
29.95	13.60	14.41	0.690	5.1	14	14	1.75	----	1.58	"	"
30.06	14.60	15.45	0.680	4.7	15	15	1.76	----	1.72	"	"
30.16	15.90	16.80	0.660	4.2	16	17	1.76	----	1.89	"	"
30.27	14.70	15.51	0.640	4.4	15	16	1.77	----	1.73	"	"
30.37	16.10	16.96	0.560	3.5	11	11	1.78	----	1.91	Silty CLAY to CLAY	"
30.46	18.80	19.78	0.490	2.6	9	10	1.78	----	2.27	Clayey SILT to Silty CLAY	"
30.56	20.20	21.22	0.480	2.4	10	11	1.79	----	2.46	"	"
30.67	20.30	21.29	0.490	2.4	10	11	1.80	----	2.47	"	"
30.78	18.50	19.37	0.490	2.6	9	10	1.80	----	2.23	"	"
30.88	17.30	18.09	0.470	2.7	9	9	1.81	----	2.07	"	"
30.99	16.40	17.12	0.450	2.7	8	9	1.82	----	1.95	"	"
31.09	15.30	15.95	0.470	3.1	8	8	1.82	----	1.80	"	"
31.20	15.40	16.03	0.470	3.1	8	8	1.83	----	1.81	"	"
31.31	14.70	15.28	0.590	4.0	15	15	1.84	----	1.72	CLAY	"
31.41	15.20	15.77	0.570	3.8	10	11	1.84	----	1.78	Silty CLAY to CLAY	"
31.52	15.60	16.16	0.580	3.7	10	11	1.85	----	1.84	"	"
31.57	16.50	17.08	0.570	3.5	11	11	1.85	----	1.96	"	"
31.68	16.50	17.06	0.570	3.5	11	11	1.86	----	1.96	"	"
31.78	16.30	16.82	0.550	3.4	11	11	1.87	----	1.93	"	"
31.89	16.10	16.59	0.520	3.2	11	11	1.87	----	1.90	"	"
32.00	16.00	16.46	0.490	3.1	8	8	1.88	----	1.89	Clayey SILT to Silty CLAY	"
32.10	16.30	16.74	0.480	2.9	8	8	1.89	----	1.93	"	"
32.21	15.90	16.31	0.470	3.0	8	8	1.89	----	1.87	"	"
32.32	14.60	14.95	0.480	3.3	10	10	1.90	----	1.70	Silty CLAY to CLAY	"
32.42	14.80	15.13	0.490	3.3	10	10	1.91	----	1.72	"	"
32.53	14.80	15.11	0.470	3.2	10	10	1.91	----	1.72	"	"
32.64	13.60	13.86	0.480	3.5	9	9	1.92	----	1.56	"	"
32.74	13.30	13.53	0.540	4.1	13	14	1.93	----	1.52	CLAY	"
32.85	14.10	14.33	0.600	4.3	14	14	1.93	----	1.63	"	"
32.95	15.60	15.83	0.760	4.9	16	16	1.94	----	1.82	"	"
33.06	15.70	15.90	0.940	6.0	16	16	1.95	----	1.84	"	"
33.17	17.20	17.39	1.140	6.6	17	17	1.95	----	2.04	"	130-140
33.25	16.90	17.06	1.350	8.0	17	17	1.96	----	2.00	"	"
33.36	21.50	21.66	1.630	7.6	22	22	1.97	----	2.61	"	"
33.46	25.50	25.65	1.960	7.7	26	26	1.98	----	3.14	"	"
33.57	32.40	32.53	2.070	6.4	32	33	1.98	----	4.06	"	"
33.68	60.70	60.83	2.080	3.4	30	30	1.99	----	7.83	Clayey SILT to Silty CLAY	"
33.73	76.10	76.19	2.150	2.8	30	30	1.99	----	9.88	Sandy SILT to Clayey SILT	"
33.81	81.90	81.90	2.120	2.6	33	33	2.00	----	10.66	"	"
33.94	65.00	64.99	1.990	3.1	26	26	2.01	----	8.40	"	"
34.03	54.40	54.38	1.800	3.3	22	22	2.02	----	6.99	"	"
34.13	38.70	38.68	1.650	4.3	26	26	2.02	----	4.89	Silty CLAY to CLAY	"
34.24	23.40	23.39	1.460	6.2	23	23	2.03	----	2.85	CLAY	"
34.34	19.20	19.18	1.120	5.8	19	19	2.04	----	2.29	"	"
34.45	16.10	16.09	0.810	5.0	16	16	2.05	----	1.88	"	120-130
34.55	14.40	14.38	0.590	4.1	14	14	2.05	----	1.65	"	"
34.66	13.50	13.48	0.520	3.9	9	9	2.06	----	1.53	Silty CLAY to CLAY	"
34.76	12.60	12.58	0.480	3.8	13	13	2.07	----	1.41	CLAY	"

34.84	10.30	10.29	0.470	4.6	10	10	2.07	----	1.38	"	110-120
34.90	13.80	13.78	0.450	3.3	9	9	2.07	----	1.57	Silty CLAY to CLAY	120-130
35.00	12.70	12.68	0.450	3.5	8	8	2.08	----	1.42	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-26
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 15:22:11
Terminated at 34.3 feet Groundwater measured at 2.7 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.51	27.10	43.36	1.080	4.0	18	29	0.06	----	3.61	Silty CLAY to CLAY	"
0.61	24.30	38.88	1.070	4.4	16	26	0.07	----	3.24	"	"
0.70	22.70	36.32	1.010	4.4	23	36	0.08	----	3.02	CLAY	"
0.80	20.70	33.12	0.980	4.7	21	33	0.10	----	2.75	"	"
0.89	18.50	29.60	0.950	5.1	19	30	0.11	----	2.46	"	"
0.99	17.50	28.00	0.890	5.1	18	28	0.12	----	2.33	"	120-130
1.08	16.80	26.88	0.700	4.2	17	27	0.13	----	2.23	"	"
1.18	14.70	23.52	0.560	3.8	10	16	0.15	----	1.95	Silty CLAY to CLAY	"
1.27	12.90	20.64	0.490	3.8	9	14	0.16	----	1.71	"	"
1.36	11.70	18.72	0.440	3.8	12	19	0.17	----	1.94	CLAY	"
1.46	12.20	19.52	0.400	3.3	8	13	0.18	----	1.61	Silty CLAY to CLAY	110-120
1.55	11.10	17.76	0.380	3.4	7	12	0.19	----	1.83	"	"
1.65	10.70	17.12	0.390	3.6	11	17	0.20	----	1.77	CLAY	"
1.74	10.10	16.16	0.370	3.7	10	16	0.21	----	1.67	"	"
1.84	9.70	15.52	0.340	3.5	10	16	0.22	----	1.60	"	"
1.93	8.70	13.92	0.310	3.6	9	14	0.24	----	1.72	"	"
2.03	8.20	13.12	0.290	3.5	8	13	0.25	----	1.62	"	"
2.26	9.20	14.72	0.330	3.6	9	15	0.27	----	1.51	"	"
2.36	10.30	16.48	0.370	3.6	10	16	0.28	----	1.69	"	"
2.45	10.80	17.28	0.390	3.6	11	17	0.29	----	1.78	"	"
2.55	10.50	16.80	0.410	3.9	11	17	0.31	----	1.72	"	"
2.64	11.30	18.08	0.440	3.9	11	18	0.32	----	1.86	"	"
2.74	12.90	20.64	0.490	3.8	9	14	0.32	----	1.70	Silty CLAY to CLAY	120-130
2.83	13.80	22.08	0.560	4.1	14	22	0.33	----	1.82	CLAY	"
2.92	15.00	24.00	0.620	4.1	15	24	0.33	----	1.98	"	"
3.02	14.30	22.88	0.670	4.7	14	23	0.34	----	1.88	"	"
3.11	13.90	22.24	0.690	5.0	14	22	0.35	----	1.83	"	"
3.20	13.40	21.44	0.680	5.1	13	21	0.35	----	1.76	"	"
3.30	12.80	20.48	0.670	5.2	13	20	0.36	----	1.68	"	"
3.39	12.30	19.68	0.640	5.2	12	20	0.36	----	1.61	"	"
3.49	12.20	19.52	0.600	4.9	12	20	0.37	----	1.60	"	"
3.58	11.70	18.72	0.560	4.8	12	19	0.38	----	1.91	"	"
3.68	11.60	18.56	0.560	4.8	12	19	0.38	----	1.90	"	"
3.77	11.20	17.92	0.530	4.7	11	18	0.39	----	1.83	"	"
3.87	10.40	16.64	0.530	5.1	10	17	0.39	----	1.69	"	"
3.96	8.90	14.24	0.500	5.6	9	14	0.40	----	1.73	"	110-120
4.05	8.00	12.80	0.470	5.9	8	13	0.40	----	1.55	"	"
4.15	8.30	13.28	0.440	5.3	8	13	0.41	----	1.61	"	"
4.25	8.40	13.44	0.440	5.2	8	13	0.41	----	1.63	"	"
4.34	8.70	13.92	0.430	4.9	9	14	0.42	----	1.69	"	"
4.43	7.90	12.64	0.410	5.2	8	13	0.42	----	1.53	"	"
4.53	6.30	10.08	0.370	5.9	6	10	0.43	----	1.21	"	"
4.62	5.60	8.96	0.310	5.5	6	9	0.43	----	1.06	"	100-110
4.72	4.80	7.68	0.250	5.2	5	8	0.44	----	0.90	"	"
4.81	4.90	7.84	0.220	4.5	5	8	0.44	----	0.92	"	"
4.91	5.20	8.32	0.220	4.2	5	8	0.44	----	0.98	"	"
5.00	6.50	10.40	0.260	4.0	7	10	0.45	----	1.24	"	"

5.10	8.70	13.92	0.310	3.6	9	14	0.45	----	1.68	"	110-120
5.19	8.10	12.96	0.350	4.3	8	13	0.46	----	1.56	"	"
5.46	6.50	10.40	0.290	4.5	7	10	0.47	----	1.24	"	100-110
5.56	5.30	8.48	0.230	4.3	5	8	0.47	----	0.99	"	"
5.65	4.20	6.72	0.180	4.3	4	7	0.48	----	0.77	"	90-100
5.75	4.70	7.52	0.180	3.8	5	8	0.48	----	0.87	"	"
5.84	6.10	9.76	0.200	3.3	6	10	0.48	----	1.15	"	100-110
5.94	7.70	12.32	0.210	2.7	5	8	0.49	----	1.47	Silty CLAY to CLAY	"
6.03	9.00	14.40	0.240	2.7	6	10	0.49	----	1.44	"	"
6.13	9.70	15.52	0.270	2.8	6	10	0.50	----	1.56	"	110-120
6.23	10.40	16.64	0.280	2.7	7	11	0.50	----	1.67	"	"
6.32	10.00	16.00	0.290	2.9	7	11	0.51	----	1.61	"	"
6.42	9.70	15.52	0.290	3.0	6	10	0.51	----	1.55	"	"
6.51	9.90	15.84	0.290	2.9	7	11	0.52	----	1.59	"	"
6.61	9.60	15.36	0.280	2.9	6	10	0.52	----	1.54	"	"
6.70	9.00	14.40	0.280	3.1	6	10	0.53	----	1.43	"	"
6.80	8.40	13.44	0.260	3.1	6	9	0.53	----	1.60	"	100-110
6.89	7.90	12.64	0.260	3.3	8	13	0.54	----	1.50	CLAY	"
6.99	7.50	12.00	0.240	3.2	8	12	0.54	----	1.42	"	"
7.08	8.00	12.80	0.240	3.0	5	9	0.54	----	1.52	Silty CLAY to CLAY	"
7.18	8.10	12.96	0.250	3.1	5	9	0.55	----	1.54	"	"
7.27	8.80	14.08	0.260	3.0	6	9	0.55	----	1.68	"	"
7.37	8.50	13.60	0.260	3.1	6	9	0.56	----	1.61	"	"
7.46	9.00	14.40	0.280	3.1	6	10	0.56	----	1.43	"	110-120
7.56	9.20	14.72	0.320	3.5	9	15	0.57	----	1.46	CLAY	"
7.65	9.40	15.04	0.350	3.7	9	15	0.57	----	1.49	"	"
7.74	10.20	16.32	0.350	3.4	7	11	0.58	----	1.63	Silty CLAY to CLAY	"
7.84	9.70	15.52	0.370	3.8	10	16	0.58	----	1.54	CLAY	"
7.93	9.70	15.52	0.370	3.8	10	16	0.59	----	1.54	"	"
8.03	9.20	14.72	0.370	4.0	9	15	0.59	----	1.46	"	"
8.12	9.50	15.20	0.370	3.9	10	15	0.60	----	1.51	"	"
8.21	10.00	16.00	0.380	3.8	10	16	0.60	----	1.59	"	"
8.31	9.70	15.52	0.430	4.4	10	16	0.60	----	1.54	"	"
8.40	9.70	15.52	0.470	4.8	10	16	0.61	----	1.54	"	"
8.50	10.10	16.16	0.470	4.7	10	16	0.62	----	1.60	"	"
8.73	9.60	15.36	0.400	4.2	10	15	0.63	----	1.52	"	"
8.83	10.00	16.00	0.370	3.7	10	16	0.63	----	1.58	"	"
8.93	9.40	15.04	0.340	3.6	9	15	0.64	----	1.48	"	"
9.02	8.60	13.76	0.320	3.7	9	14	0.64	----	1.62	"	"
9.12	8.00	12.80	0.300	3.8	8	13	0.65	----	1.49	"	"
9.22	8.70	13.92	0.290	3.3	9	14	0.65	----	1.63	"	"
9.31	8.10	12.96	0.280	3.5	8	13	0.66	----	1.51	"	100-110
9.41	9.10	14.56	0.310	3.4	9	15	0.66	----	1.43	"	110-120
9.50	9.00	14.40	0.310	3.4	9	14	0.67	----	1.41	"	"
9.60	9.00	14.40	0.300	3.3	9	14	0.67	----	1.41	"	"
9.69	7.60	12.16	0.270	3.6	8	12	0.68	----	1.41	"	100-110
9.79	7.10	11.36	0.220	3.1	7	11	0.68	----	1.31	"	"
9.89	7.00	11.20	0.200	2.9	5	7	0.68	----	1.29	Silty CLAY to CLAY	"
9.98	6.70	10.72	0.210	3.1	7	11	0.69	----	1.23	CLAY	"
10.08	6.60	10.56	0.230	3.5	7	11	0.69	----	1.20	"	"
10.17	7.80	12.48	0.230	2.9	5	8	0.70	----	1.44	Silty CLAY to CLAY	"
10.27	7.50	12.00	0.230	3.1	8	12	0.70	----	1.38	CLAY	"
10.37	8.00	12.80	0.250	3.1	5	9	0.70	----	1.48	Silty CLAY to CLAY	"
10.46	8.60	13.76	0.240	2.8	6	9	0.71	----	1.60	"	"
10.55	8.80	14.08	0.220	2.5	6	9	0.71	----	1.64	"	"

10.65	8.70	13.92	0.220	2.5	6	9	0.72	----	1.62	"	"
10.75	7.90	12.64	0.210	2.7	5	8	0.72	----	1.46	"	"
10.84	7.30	11.68	0.210	2.9	5	8	0.72	----	1.34	"	"
10.93	7.10	11.36	0.220	3.1	7	11	0.73	----	1.30	CLAY	"
11.03	6.50	10.40	0.180	2.8	7	10	0.73	----	1.17	"	"
11.12	6.40	10.24	0.150	2.3	4	7	0.74	----	1.15	Silty CLAY to CLAY	90-100
11.22	6.20	9.92	0.120	1.9	4	7	0.74	----	1.11	"	"
11.32	6.40	10.24	0.100	1.6	3	5	0.74	----	1.15	Clayey SILT to Silty CLAY	"
11.41	7.10	11.36	0.140	2.0	5	8	0.75	----	1.29	Silty CLAY to CLAY	"
11.51	8.90	14.24	0.170	1.9	4	7	0.75	----	1.65	Clayey SILT to Silty CLAY	100-110
11.60	10.10	16.16	0.190	1.9	5	8	0.75	----	1.57	"	"
11.70	9.90	15.84	0.320	3.2	7	11	0.76	----	1.54	Silty CLAY to CLAY	110-120
11.80	8.00	12.80	0.300	3.8	8	13	0.76	----	1.47	CLAY	"
11.89	6.20	9.92	0.230	3.7	6	10	0.77	----	1.11	"	100-110
11.99	5.70	9.12	0.160	2.8	6	9	0.77	----	1.00	"	90-100
12.09	5.60	8.96	0.140	2.5	4	6	0.77	----	0.98	Silty CLAY to CLAY	"
12.18	5.60	8.96	0.120	2.1	4	6	0.78	----	0.98	"	"
12.28	5.70	9.12	0.120	2.1	4	6	0.78	----	1.00	"	"
12.38	6.10	9.76	0.130	2.1	4	7	0.78	----	1.08	"	"
12.47	6.60	10.56	0.140	2.1	4	7	0.79	----	1.18	"	"
12.57	7.10	11.36	0.150	2.1	5	8	0.79	----	1.28	"	"
12.73	7.70	12.32	0.170	2.2	5	8	0.80	----	1.40	"	100-110
12.81	7.60	12.16	0.180	2.4	5	8	0.80	----	1.38	"	"
12.91	7.30	11.65	0.290	4.0	7	12	0.80	----	1.32	CLAY	"
13.00	11.80	18.76	0.440	3.7	12	19	0.81	----	1.85	"	120-130
13.10	16.50	26.14	0.500	3.0	8	13	0.82	----	2.10	Clayey SILT to Silty CLAY	"
13.19	17.40	27.46	0.570	3.3	9	14	0.82	----	2.22	"	"
13.29	18.50	29.08	0.540	2.9	9	15	0.83	----	2.37	"	"
13.38	18.20	28.50	0.400	2.2	9	14	0.83	----	2.33	"	"
13.48	13.50	21.08	0.320	2.4	7	11	0.84	----	1.70	"	110-120
13.57	10.20	15.88	0.250	2.5	5	8	0.84	----	1.57	"	100-110
13.67	8.60	13.36	0.200	2.3	6	9	0.85	----	1.57	Silty CLAY to CLAY	"
13.76	8.90	13.79	0.190	2.1	4	7	0.85	----	1.63	Clayey SILT to Silty CLAY	"
13.86	9.10	14.06	0.210	2.3	6	9	0.86	----	1.39	Silty CLAY to CLAY	"
13.95	9.60	14.79	0.240	2.5	6	10	0.86	----	1.47	"	"
14.05	10.10	15.51	0.280	2.8	7	10	0.86	----	1.55	"	110-120
14.14	10.10	15.46	0.290	2.9	7	10	0.87	----	1.55	"	"
14.23	9.00	13.73	0.270	3.0	6	9	0.87	----	1.37	"	"
14.33	7.90	12.02	0.250	3.2	8	12	0.88	----	1.42	CLAY	100-110
14.42	7.90	11.99	0.220	2.8	5	8	0.88	----	1.42	Silty CLAY to CLAY	"
14.52	7.20	10.90	0.220	3.1	7	11	0.89	----	1.28	CLAY	"
14.62	7.80	11.78	0.240	3.1	5	8	0.89	----	1.40	Silty CLAY to CLAY	"
14.71	7.60	11.44	0.250	3.3	8	11	0.89	----	1.36	CLAY	"
14.80	6.90	10.36	0.270	3.9	7	10	0.90	----	1.21	"	"
14.90	7.30	10.93	0.260	3.6	7	11	0.90	----	1.29	"	"
14.99	7.50	11.20	0.250	3.3	8	11	0.91	----	1.33	"	"
15.09	4.60	6.85	0.250	5.4	5	7	0.91	----	0.75	"	"
15.19	3.40	5.05	0.240	7.1	3	5	0.91	----	0.51	Organic Material	90-100
15.39	5.00	7.40	0.190	3.8	5	7	0.92	----	0.83	CLAY	"
15.49	5.10	7.53	0.210	4.1	5	8	0.92	----	0.85	"	100-110
15.58	5.60	8.24	0.230	4.1	6	8	0.93	----	0.95	"	"
15.68	6.10	8.95	0.240	3.9	6	9	0.93	----	1.05	"	"
15.77	5.90	8.64	0.290	4.9	6	9	0.94	----	1.00	"	"
15.86	3.20	4.67	0.280	8.8	3	5	0.94	----	0.46	Organic Material	90-100
15.96	2.90	4.23	0.290	10.0	3	4	0.94	----	0.40	"	"

16.05	3.50	5.09	0.260	7.4	4	5	0.95	----	0.52	"	"
16.15	2.90	4.21	0.220	7.6	3	4	0.95	----	0.40	"	"
16.24	2.50	3.62	0.230	9.2	3	4	0.95	----	0.32	"	"
16.34	2.30	3.32	0.190	8.3	2	3	0.95	----	0.28	"	"
16.43	4.50	6.49	0.210	4.7	5	6	0.96	----	0.72	CLAY	"
16.53	7.00	10.06	0.220	3.1	7	10	0.96	----	1.22	"	100-110
16.63	8.00	11.47	0.220	2.8	5	8	0.97	----	1.42	Silty CLAY to CLAY	"
16.72	9.10	13.01	0.220	2.4	6	9	0.97	----	1.36	"	"
16.82	8.60	12.26	0.200	2.3	6	8	0.97	----	1.53	"	"
16.91	8.30	11.80	0.220	2.7	6	8	0.98	----	1.47	"	"
17.01	8.50	12.05	0.230	2.7	6	8	0.98	----	1.51	"	"
17.10	7.80	11.03	0.200	2.6	5	7	0.99	----	1.37	"	"
17.20	7.50	10.57	0.190	2.5	5	7	0.99	----	1.31	"	"
17.29	7.00	9.84	0.220	3.1	7	10	0.99	----	1.21	CLAY	"
17.39	7.70	10.79	0.260	3.4	8	11	1.00	----	1.35	"	"
17.48	9.40	13.14	0.300	3.2	6	9	1.00	----	1.41	Silty CLAY to CLAY	110-120
17.57	10.00	13.96	0.330	3.3	7	9	1.01	----	1.50	"	"
17.67	8.60	11.98	0.370	4.3	9	12	1.01	----	1.52	CLAY	"
17.76	7.60	10.57	0.350	4.6	8	11	1.02	----	1.32	"	"
17.86	7.70	10.69	0.330	4.3	8	11	1.02	----	1.34	"	"
17.95	8.20	11.36	0.320	3.9	8	11	1.03	----	1.44	"	"
18.04	8.40	11.61	0.330	3.9	8	12	1.03	----	1.48	"	"
18.14	9.00	12.42	0.290	3.2	6	8	1.04	----	1.33	Silty CLAY to CLAY	"
18.24	7.60	10.47	0.300	3.9	8	10	1.04	----	1.32	CLAY	"
18.33	7.50	10.31	0.300	4.0	8	10	1.05	----	1.30	"	"
18.42	8.10	11.12	0.290	3.6	8	11	1.05	----	1.42	"	"
18.66	7.50	10.25	0.220	2.9	5	7	1.06	----	1.29	Silty CLAY to CLAY	100-110
18.76	7.40	10.10	0.270	3.6	7	10	1.07	----	1.27	CLAY	"
18.85	8.80	11.99	0.310	3.5	9	12	1.07	----	1.55	"	110-120
18.94	12.10	16.45	0.320	2.6	6	8	1.08	----	1.47	Clayey SILT to Silty CLAY	"
19.04	12.80	17.37	0.330	2.6	6	9	1.08	----	1.57	"	"
19.13	11.30	15.31	0.330	2.9	8	10	1.09	----	1.71	Silty CLAY to CLAY	"
19.22	12.60	17.04	0.400	3.2	8	11	1.09	----	1.54	"	"
19.32	13.40	18.08	0.610	4.6	13	18	1.10	----	1.64	CLAY	120-130
19.41	22.50	30.28	1.010	4.5	23	30	1.10	----	2.86	"	130-140
19.50	79.40	106.57	1.220	1.5	26	36	1.11	38	----	Silty SAND to Sandy SILT	"
19.57	110.20	147.65	1.270	1.2	28	37	1.12	40	----	SAND to Silty SAND	120-130
19.67	120.30	160.82	1.120	0.9	30	40	1.12	41	----	"	"
19.76	102.90	137.26	1.270	1.2	26	34	1.13	40	----	"	"
19.85	84.60	112.55	1.370	1.6	28	38	1.13	39	----	Silty SAND to Sandy SILT	130-140
19.95	69.30	91.95	1.490	2.2	23	31	1.14	38	----	"	"
20.04	55.70	73.70	1.410	2.5	22	29	1.15	----	7.28	Sandy SILT to Clayey SILT	"
20.13	40.30	53.18	1.420	3.5	20	27	1.15	----	5.22	Clayey SILT to Silty CLAY	"
20.23	35.90	47.25	1.900	5.3	36	47	1.16	----	4.64	CLAY	"
20.32	41.30	54.21	1.840	4.5	28	36	1.17	----	5.36	Silty CLAY to CLAY	"
20.41	47.60	62.32	1.620	3.4	24	31	1.17	----	6.19	Clayey SILT to Silty CLAY	"
20.51	45.20	59.02	1.680	3.7	23	30	1.18	----	5.87	"	"
20.60	37.40	48.70	1.450	3.9	19	24	1.19	----	4.83	"	"
20.69	28.70	37.27	0.980	3.4	14	19	1.19	----	3.67	"	"
20.78	18.00	23.32	0.770	4.3	18	23	1.20	----	2.24	CLAY	120-130
20.88	12.40	16.03	0.630	5.1	12	16	1.21	----	1.50	"	"
20.97	10.00	12.90	0.420	4.2	10	13	1.21	----	1.47	"	110-120
21.06	9.00	11.59	0.320	3.6	9	12	1.22	----	1.30	"	"
21.15	9.50	12.21	0.300	3.2	6	8	1.22	----	1.39	Silty CLAY to CLAY	"
21.25	9.40	12.06	0.330	3.5	9	12	1.23	----	1.37	CLAY	"

21.34	9.10	11.65	0.380	4.2	9	12	1.23	----	1.32	"	"
21.43	8.70	11.11	0.420	4.8	9	11	1.24	----	1.50	"	"
21.52	8.80	11.22	0.470	5.3	9	11	1.24	----	1.52	"	"
21.62	7.80	9.92	0.460	5.9	8	10	1.25	----	1.32	"	"
21.87	11.50	14.56	0.370	3.2	8	10	1.26	----	1.71	Silty CLAY to CLAY	"
21.96	13.70	17.30	0.430	3.1	9	12	1.26	----	1.66	"	120-130
22.05	15.90	20.04	0.470	3.0	8	10	1.27	----	1.95	Clayey SILT to Silty CLAY	"
22.14	15.50	19.49	0.520	3.4	10	13	1.28	----	1.90	Silty CLAY to CLAY	"
22.24	14.80	18.57	0.530	3.6	10	12	1.28	----	1.81	"	"
22.33	14.40	18.03	0.500	3.5	10	12	1.29	----	1.75	"	"
22.42	14.10	17.61	0.470	3.3	9	12	1.29	----	1.71	"	"
22.52	12.90	16.08	0.470	3.6	9	11	1.30	----	1.55	"	"
22.61	12.90	16.04	0.470	3.6	9	11	1.31	----	1.55	"	"
22.70	12.70	15.76	0.490	3.9	13	16	1.31	----	1.52	CLAY	"
22.80	12.70	15.72	0.570	4.5	13	16	1.32	----	1.52	"	"
22.89	14.40	17.79	0.670	4.7	14	18	1.32	----	1.75	"	"
22.98	18.70	23.04	0.700	3.7	12	15	1.33	----	2.32	Silty CLAY to CLAY	"
23.08	15.30	18.81	0.650	4.2	15	19	1.33	----	1.87	CLAY	"
23.17	10.00	12.27	0.630	6.3	10	12	1.34	----	1.45	"	"
23.27	7.70	9.43	0.500	6.5	8	9	1.35	----	1.28	"	110-120
23.36	8.30	10.14	0.350	4.2	8	10	1.35	----	1.40	"	"
23.45	8.20	10.00	0.290	3.5	8	10	1.36	----	1.37	"	"
23.55	9.70	11.81	0.320	3.3	6	8	1.36	----	1.39	Silty CLAY to CLAY	"
23.64	12.40	15.06	0.380	3.1	8	10	1.36	----	1.47	"	"
23.74	14.00	16.97	0.420	3.0	7	8	1.37	----	1.69	Clayey SILT to Silty CLAY	120-130
23.83	14.00	16.93	0.470	3.4	9	11	1.38	----	1.69	Silty CLAY to CLAY	"
23.92	15.00	18.10	0.540	3.6	10	12	1.38	----	1.82	"	"
24.01	16.70	20.10	0.580	3.5	11	13	1.39	----	2.05	"	"
24.10	17.70	21.26	0.610	3.4	12	14	1.39	----	2.18	"	"
24.20	18.50	22.17	0.670	3.6	12	15	1.40	----	2.28	"	"
24.29	17.80	21.28	0.680	3.8	12	14	1.41	----	2.19	"	"
24.38	18.10	21.58	0.690	3.8	12	14	1.41	----	2.23	"	"
24.47	18.40	21.89	0.730	4.0	12	15	1.42	----	2.27	"	"
24.57	21.40	25.39	0.820	3.8	14	17	1.42	----	2.67	"	130-140
24.66	22.60	26.74	0.920	4.1	15	18	1.43	----	2.83	"	"
24.75	23.00	27.14	0.940	4.1	15	18	1.44	----	2.88	"	"
24.95	25.10	29.44	0.980	3.9	17	20	1.45	----	3.16	"	"
25.04	26.10	30.53	1.010	3.9	17	20	1.46	----	3.29	"	"
25.14	25.90	30.22	1.050	4.1	17	20	1.47	----	3.26	"	"
25.23	26.60	30.95	1.090	4.1	18	21	1.47	----	3.35	"	"
25.32	24.90	28.89	1.110	4.5	17	19	1.48	----	3.13	"	"
25.41	23.90	27.66	1.110	4.6	24	28	1.49	----	2.99	CLAY	"
25.50	22.20	25.62	1.060	4.8	22	26	1.49	----	2.77	"	"
25.59	20.50	23.59	1.020	5.0	21	24	1.50	----	2.54	"	"
25.68	19.00	21.82	0.960	5.1	19	22	1.50	----	2.34	"	"
25.78	17.50	20.06	0.890	5.1	18	20	1.51	----	2.14	"	120-130
25.87	16.50	18.88	0.830	5.0	17	19	1.52	----	2.00	"	"
25.96	13.90	15.87	0.730	5.3	14	16	1.52	----	1.65	"	"
26.05	12.70	14.48	0.640	5.0	13	14	1.53	----	1.49	"	"
26.14	10.80	12.29	0.590	5.5	11	12	1.53	----	1.55	"	"
26.23	10.00	11.36	0.570	5.7	10	11	1.54	----	1.42	"	"
26.33	10.80	12.24	0.560	5.2	11	12	1.55	----	1.55	"	"
26.42	11.60	13.13	0.550	4.7	12	13	1.55	----	1.68	"	"
26.51	11.50	12.99	0.500	4.3	12	13	1.56	----	1.66	"	"
26.60	10.10	11.39	0.440	4.4	10	11	1.56	----	1.43	"	110-120

26.69	9.00	10.14	0.400	4.4	9	10	1.57	----	1.24	"	"
26.78	8.00	9.00	0.340	4.3	8	9	1.57	----	1.29	"	"
26.87	7.00	7.86	0.300	4.3	7	8	1.57	----	1.09	"	100-110
26.96	7.20	8.08	0.260	3.6	7	8	1.58	----	1.13	"	"
27.05	7.70	8.63	0.220	2.9	5	6	1.58	----	1.23	Silty CLAY to CLAY	"
27.14	8.70	9.73	0.200	2.3	6	6	1.59	----	1.43	"	"
27.24	9.50	10.62	0.200	2.1	5	5	1.59	----	1.32	Clayey SILT to Silty CLAY	"
27.33	9.60	10.71	0.220	2.3	5	5	1.59	----	1.34	"	"
27.42	10.20	11.37	0.240	2.4	5	6	1.60	----	1.44	"	"
27.51	10.70	11.91	0.230	2.1	5	6	1.60	----	1.52	"	"
27.60	10.10	11.23	0.220	2.2	5	6	1.61	----	1.42	"	"
27.69	9.30	10.33	0.210	2.3	5	5	1.61	----	1.29	"	"
27.79	9.00	9.98	0.220	2.4	6	7	1.61	----	1.23	Silty CLAY to CLAY	"
27.88	8.40	9.30	0.230	2.7	6	6	1.62	----	1.36	"	"
27.98	8.90	9.84	0.230	2.6	6	7	1.62	----	1.46	"	"
28.07	9.70	10.72	0.240	2.5	6	7	1.63	----	1.35	"	"
28.10	11.30	12.48	0.250	2.2	6	6	1.63	----	1.62	Clayey SILT to Silty CLAY	110-120
28.20	10.40	11.46	0.270	2.6	7	8	1.63	----	1.46	Silty CLAY to CLAY	"
28.27	12.40	13.65	0.270	2.2	6	7	1.64	----	1.44	Clayey SILT to Silty CLAY	"
28.37	11.40	12.53	0.280	2.5	6	6	1.64	----	1.63	"	"
28.46	12.10	13.28	0.290	2.4	6	7	1.65	----	1.40	"	"
28.55	11.30	12.38	0.350	3.1	8	8	1.65	----	1.61	Silty CLAY to CLAY	"
28.65	11.70	12.79	0.470	4.0	12	13	1.66	----	1.68	CLAY	120-130
28.74	17.00	18.55	0.570	3.4	11	12	1.66	----	2.05	Silty CLAY to CLAY	"
28.84	21.10	22.98	0.640	3.0	11	11	1.67	----	2.59	Clayey SILT to Silty CLAY	"
28.93	20.90	22.72	0.740	3.5	14	15	1.67	----	2.57	Silty CLAY to CLAY	"
29.02	21.30	23.10	0.820	3.8	14	15	1.68	----	2.62	"	130-140
29.12	22.60	24.46	0.860	3.8	15	16	1.69	----	2.79	"	"
29.21	27.40	29.59	0.990	3.6	14	15	1.70	----	3.43	Clayey SILT to Silty CLAY	"
29.30	37.20	40.08	1.090	2.9	15	16	1.70	----	4.74	Sandy SILT to Clayey SILT	"
29.39	42.00	45.15	1.260	3.0	17	18	1.71	----	5.37	"	"
29.48	50.00	53.63	1.570	3.1	20	21	1.72	----	6.44	"	"
29.58	54.60	58.43	1.620	3.0	22	23	1.72	----	7.05	"	"
29.67	53.10	56.70	1.660	3.1	21	23	1.73	----	6.85	"	"
29.76	49.60	52.84	1.750	3.5	25	26	1.74	----	6.38	Clayey SILT to Silty CLAY	"
29.85	50.20	53.36	1.720	3.4	25	27	1.74	----	6.46	"	"
29.94	48.10	51.01	1.580	3.3	24	26	1.75	----	6.18	"	"
30.03	45.00	47.65	1.670	3.7	23	24	1.76	----	5.77	"	"
30.13	47.00	49.69	1.950	4.1	24	25	1.76	----	6.03	"	"
30.22	57.50	60.70	2.240	3.9	29	30	1.77	----	7.43	"	"
30.31	75.20	79.27	2.320	3.1	30	32	1.77	----	9.79	Sandy SILT to Clayey SILT	"
30.40	77.90	81.99	2.870	3.7	39	41	1.78	----	10.15	Clayey SILT to Silty CLAY	"
30.49	76.20	80.08	3.290	4.3	38	40	1.79	----	9.92	"	"
30.57	78.30	82.17	3.410	4.4	39	41	1.79	----	10.20	"	"
30.67	66.40	69.57	3.730	5.6	66	70	1.80	----	8.62	Very Stiff Fine Grained *	"
30.75	95.20	99.59	5.120	5.4	95	100	1.81	----	12.46	"	>140
30.84	129.30	135.06	6.510	5.0	129	135	1.81	----	17.00	"	"
30.89	135.40	141.32	6.600	4.9	135	141	1.82	----	17.81	"	"
31.00	153.10	159.47	5.610	3.7	77	80	1.83	41	----	SAND to Clayey SAND *	"
31.09	83.50	86.84	4.150	5.0	84	87	1.83	----	10.89	Very Stiff Fine Grained *	130-140
31.18	68.90	71.55	2.710	3.9	34	36	1.84	----	8.95	Clayey SILT to Silty CLAY	"
31.27	59.40	61.59	2.760	4.6	40	41	1.85	----	7.68	Silty CLAY to CLAY	"
31.36	61.20	63.36	2.240	3.7	31	32	1.85	----	7.92	Clayey SILT to Silty CLAY	"
31.45	66.10	68.33	1.800	2.7	26	27	1.86	----	8.57	Sandy SILT to Clayey SILT	"
31.49	35.20	36.36	1.730	4.9	35	36	1.86	----	4.45	CLAY	"

31.54	60.80	62.75	1.690	2.8	24	25	1.87	----	7.86	Sandy SILT to Clayey SILT	"
31.64	51.60	53.17	1.690	3.3	21	21	1.87	----	6.63	"	"
31.72	47.90	49.29	1.580	3.3	24	25	1.88	----	6.14	Clayey SILT to Silty CLAY	"
31.81	39.80	40.89	1.330	3.3	20	20	1.89	----	5.06	"	"
31.90	34.00	34.88	1.330	3.9	17	17	1.89	----	4.29	"	"
31.99	33.50	34.32	1.540	4.6	22	23	1.90	----	4.22	Silty CLAY to CLAY	"
32.07	39.40	40.30	1.870	4.7	26	27	1.90	----	5.00	"	"
32.16	49.90	50.97	2.190	4.4	33	34	1.91	----	6.40	"	"
32.25	51.90	52.93	2.570	5.0	35	35	1.92	----	6.67	"	"
32.33	54.30	55.29	2.940	5.4	54	55	1.92	----	6.99	CLAY	"
32.42	58.40	59.38	3.220	5.5	58	59	1.93	----	7.53	Very Stiff Fine Grained *	"
32.51	59.00	59.90	3.390	5.7	59	60	1.94	----	7.61	"	"
32.60	54.60	55.35	3.650	6.7	55	55	1.94	----	7.03	CLAY	"
32.68	56.60	57.29	4.260	7.5	57	57	1.95	----	7.29	"	"
32.77	71.50	72.27	4.700	6.6	72	72	1.96	----	9.28	Very Stiff Fine Grained *	"
32.85	83.60	84.37	4.770	5.7	84	84	1.96	----	10.89	"	"
32.94	71.20	71.75	4.550	6.4	71	72	1.97	----	9.24	"	"
33.03	65.60	66.01	4.080	6.2	66	66	1.97	----	8.49	"	"
33.11	53.00	53.25	3.640	6.9	53	53	1.98	----	6.81	CLAY	"
33.20	44.70	44.84	3.140	7.0	45	45	1.99	----	5.70	"	"
33.29	43.70	43.77	2.910	6.7	44	44	1.99	----	5.57	"	"
33.38	43.50	43.51	2.930	6.7	44	44	2.00	----	5.54	"	"
33.47	49.50	49.49	3.290	6.6	50	49	2.01	----	6.34	"	"
33.56	61.50	61.48	3.830	6.2	62	61	2.01	----	7.94	Very Stiff Fine Grained *	"
33.64	70.20	70.17	4.240	6.0	70	70	2.02	----	9.10	"	"
33.73	69.30	69.27	4.980	7.2	69	69	2.03	----	8.98	"	"
33.82	70.90	70.85	5.610	7.9	71	71	2.03	----	9.19	"	>140
33.90	86.50	86.43	5.940	6.9	87	86	2.04	----	11.27	"	"
33.99	99.60	99.51	6.050	6.1	100	100	2.05	----	13.01	"	"
34.08	91.70	91.60	6.000	6.5	92	92	2.05	----	11.96	"	"
34.16	105.00	104.88	6.330	6.0	105	105	2.06	----	13.73	"	"
34.25	140.00	139.82	6.550	4.7	140	140	2.06	----	18.40	"	"
34.33	161.20	160.97	6.420	4.0	81	80	2.07	41	----	SAND to Clayey SAND *	"

5.38	7.90	12.64	0.210	2.7	5	8	0.50	----	1.51	"	"
5.51	7.80	12.48	0.200	2.6	5	8	0.51	----	1.49	"	"
5.62	7.10	11.36	0.200	2.8	5	8	0.51	----	1.35	"	"
5.73	6.70	10.72	0.180	2.7	4	7	0.52	----	1.27	"	"
5.84	6.50	10.40	0.170	2.6	4	7	0.52	----	1.23	"	"
5.96	6.00	9.60	0.160	2.7	6	10	0.52	----	1.13	CLAY	90-100
6.07	6.50	10.40	0.150	2.3	4	7	0.53	----	1.23	Silty CLAY to CLAY	"
6.18	8.10	12.96	0.160	2.0	4	6	0.53	----	1.55	Clayey SILT to Silty CLAY	100-110
6.28	8.00	12.80	0.160	2.0	4	6	0.54	----	1.53	"	"
6.39	9.00	14.40	0.170	1.9	5	7	0.54	----	1.44	"	"
6.51	9.20	14.72	0.200	2.2	5	7	0.55	----	1.47	"	"
6.62	8.90	14.24	0.220	2.5	6	9	0.55	----	1.70	Silty CLAY to CLAY	"
6.72	9.70	15.52	0.220	2.3	5	8	0.56	----	1.55	Clayey SILT to Silty CLAY	"
6.83	10.70	17.12	0.230	2.1	5	9	0.56	----	1.72	"	"
6.94	10.60	16.96	0.230	2.2	5	8	0.57	----	1.70	"	"
7.05	10.80	17.28	0.260	2.4	5	9	0.57	----	1.73	"	110-120
7.16	12.30	19.68	0.290	2.4	6	10	0.58	----	1.58	"	"
7.27	14.10	22.56	0.350	2.5	7	11	0.58	----	1.82	"	"
7.38	14.30	22.88	0.400	2.8	7	11	0.59	----	1.85	"	120-130
7.49	14.90	23.84	0.450	3.0	7	12	0.60	----	1.93	"	"
7.59	15.00	24.00	0.470	3.1	10	16	0.60	----	1.94	Silty CLAY to CLAY	"
7.70	14.30	22.88	0.460	3.2	10	15	0.61	----	1.85	"	"
7.81	13.20	21.12	0.440	3.3	9	14	0.62	----	1.70	"	"
7.92	12.60	20.16	0.410	3.3	8	13	0.62	----	1.62	"	"
8.03	11.90	19.04	0.370	3.1	8	13	0.63	----	1.90	"	110-120
8.14	11.20	17.92	0.350	3.1	7	12	0.63	----	1.79	"	"
8.24	11.00	17.60	0.350	3.2	7	12	0.64	----	1.75	"	"
8.35	11.20	17.92	0.370	3.3	7	12	0.65	----	1.78	"	"
8.46	12.90	20.64	0.440	3.4	9	14	0.65	----	1.65	"	120-130
8.57	13.20	21.12	0.450	3.4	9	14	0.66	----	1.69	"	"
8.68	11.90	19.04	0.430	3.6	8	13	0.67	----	1.90	"	"
8.72	12.50	20.00	0.420	3.4	8	13	0.67	----	1.60	"	"
8.82	11.50	18.40	0.390	3.4	8	12	0.67	----	1.83	"	110-120
8.93	10.80	17.28	0.340	3.1	7	12	0.68	----	1.71	"	"
9.04	8.90	14.24	0.310	3.5	9	14	0.69	----	1.67	CLAY	"
9.15	9.80	15.68	0.310	3.2	7	10	0.69	----	1.54	Silty CLAY to CLAY	"
9.26	10.00	16.00	0.300	3.0	7	11	0.70	----	1.58	"	"
9.37	8.40	13.44	0.280	3.3	8	13	0.70	----	1.57	CLAY	100-110
9.48	6.60	10.56	0.240	3.6	7	11	0.71	----	1.21	"	"
9.59	5.50	8.80	0.220	4.0	6	9	0.71	----	0.99	"	"
9.70	6.30	10.08	0.230	3.7	6	10	0.72	----	1.15	"	"
9.81	8.60	13.76	0.260	3.0	6	9	0.72	----	1.61	Silty CLAY to CLAY	"
9.92	9.60	15.36	0.260	2.7	6	10	0.73	----	1.50	"	110-120
10.03	7.90	12.64	0.220	2.8	5	8	0.73	----	1.46	"	100-110
10.14	5.60	8.96	0.180	3.2	6	9	0.74	----	1.00	CLAY	90-100
10.25	5.10	8.16	0.150	2.9	5	8	0.74	----	0.90	"	"
10.35	5.20	8.32	0.140	2.7	5	8	0.74	----	0.92	"	"
10.46	7.30	11.68	0.130	1.8	4	6	0.75	----	1.34	Clayey SILT to Silty CLAY	"
10.57	6.50	10.40	0.120	1.8	4	7	0.75	----	1.18	Silty CLAY to CLAY	"
10.68	6.10	9.76	0.120	2.0	4	7	0.75	----	1.10	"	"
10.79	7.90	12.64	0.150	1.9	4	6	0.76	----	1.46	Clayey SILT to Silty CLAY	100-110
10.90	8.80	14.08	0.200	2.3	6	9	0.76	----	1.63	Silty CLAY to CLAY	"
11.01	12.70	20.32	0.240	1.9	6	10	0.77	----	1.61	Clayey SILT to Silty CLAY	110-120
11.11	13.50	21.60	0.220	1.6	7	11	0.77	----	1.71	"	100-110
11.22	11.00	17.60	0.160	1.5	6	9	0.78	----	1.73	"	"

11.33	8.50	13.60	0.120	1.4	4	7	0.78	----	1.57	"	90-100
11.44	6.20	9.92	0.090	1.5	3	5	0.78	----	1.11	Sensitive Fine Grained	"
11.55	6.10	9.76	0.080	1.3	3	5	0.79	----	1.09	"	"
11.66	6.40	10.24	0.070	1.1	3	5	0.79	----	1.15	"	"
11.77	7.50	12.00	0.110	1.5	4	6	0.79	----	1.37	Clayey SILT to Silty CLAY	"
11.88	7.40	11.84	0.120	1.6	4	6	0.80	----	1.34	"	"
11.95	4.70	7.52	0.120	2.6	5	8	0.80	----	0.80	CLAY	"
11.98	7.60	12.15	0.120	1.6	4	6	0.80	----	1.38	Clayey SILT to Silty CLAY	"
12.09	7.10	11.32	0.130	1.8	5	8	0.81	----	1.28	Silty CLAY to CLAY	"
12.20	7.30	11.62	0.140	1.9	5	8	0.81	----	1.32	"	"
12.31	8.80	13.96	0.270	3.1	6	9	0.81	----	1.62	"	100-110
12.42	10.60	16.76	0.300	2.8	7	11	0.82	----	1.65	"	110-120
12.53	14.70	23.15	0.270	1.8	7	12	0.83	----	1.87	Clayey SILT to Silty CLAY	"
12.64	8.60	13.50	0.250	2.9	6	9	0.83	----	1.58	Silty CLAY to CLAY	100-110
12.75	8.60	13.46	0.200	2.3	6	9	0.83	----	1.58	"	"
12.85	7.80	12.18	0.150	1.9	4	6	0.84	----	1.41	Clayey SILT to Silty CLAY	"
12.97	7.60	11.83	0.160	2.1	5	8	0.84	----	1.37	Silty CLAY to CLAY	"
13.08	11.70	18.15	0.170	1.5	6	9	0.85	----	1.83	Clayey SILT to Silty CLAY	"
13.19	13.50	20.88	0.170	1.3	5	8	0.85	----	1.70	Sandy SILT to Clayey SILT	"
13.30	9.70	14.96	0.180	1.9	5	7	0.86	----	1.49	Clayey SILT to Silty CLAY	"
13.40	9.20	14.15	0.200	2.2	5	7	0.86	----	1.41	"	"
13.51	13.60	20.85	0.200	1.5	5	8	0.87	----	1.71	Sandy SILT to Clayey SILT	"
13.62	14.60	22.31	0.180	1.2	6	9	0.87	----	1.84	"	"
13.73	13.00	19.81	0.230	1.8	7	10	0.88	----	1.63	Clayey SILT to Silty CLAY	"
13.84	14.40	21.86	0.300	2.1	7	11	0.88	----	1.82	"	110-120
13.95	19.90	30.10	0.300	1.5	8	12	0.89	----	2.55	Sandy SILT to Clayey SILT	"
14.06	19.90	29.98	0.270	1.4	8	12	0.89	----	2.55	"	"
14.17	14.90	22.36	0.290	1.9	7	11	0.90	----	1.88	Clayey SILT to Silty CLAY	"
14.27	13.60	20.33	0.290	2.1	7	10	0.90	----	1.71	"	"
14.38	14.00	20.85	0.290	2.1	7	10	0.91	----	1.76	"	"
14.49	12.30	18.25	0.300	2.4	6	9	0.92	----	1.53	"	"
14.60	9.90	14.63	0.290	2.9	7	10	0.92	----	1.51	Silty CLAY to CLAY	"
14.71	10.70	15.76	0.280	2.6	7	11	0.93	----	1.65	"	"
14.81	10.60	15.55	0.260	2.5	5	8	0.93	----	1.63	Clayey SILT to Silty CLAY	"
14.92	9.00	13.16	0.210	2.3	6	9	0.94	----	1.36	Silty CLAY to CLAY	100-110
15.03	9.20	13.41	0.260	2.8	6	9	0.94	----	1.39	"	"
15.14	8.00	11.62	0.260	3.3	8	12	0.95	----	1.43	CLAY	"
15.22	5.30	7.68	0.220	4.2	5	8	0.95	----	0.89	"	"
15.35	5.80	8.38	0.180	3.1	6	8	0.96	----	0.99	"	"
15.46	4.30	6.19	0.150	3.5	4	6	0.96	----	0.69	"	90-100
15.56	4.90	7.04	0.140	2.9	5	7	0.96	----	0.81	"	"
15.67	5.40	7.74	0.140	2.6	5	8	0.97	----	0.90	"	"
15.78	7.40	10.58	0.150	2.0	5	7	0.97	----	1.30	Silty CLAY to CLAY	"
15.89	8.20	11.69	0.150	1.8	4	6	0.97	----	1.46	Clayey SILT to Silty CLAY	100-110
16.00	8.40	11.93	0.150	1.8	4	6	0.98	----	1.50	"	"
16.11	8.10	11.47	0.150	1.9	4	6	0.98	----	1.44	"	"
16.21	7.80	11.02	0.140	1.8	4	6	0.99	----	1.38	"	90-100
16.33	7.30	10.29	0.130	1.8	4	5	0.99	----	1.28	"	"
16.44	6.70	9.42	0.120	1.8	4	6	0.99	----	1.16	Silty CLAY to CLAY	"
16.54	4.60	6.45	0.110	2.4	5	6	1.00	----	0.74	CLAY	"
16.65	2.30	3.22	0.100	4.3	2	3	1.00	----	0.27	"	85-90
16.76	1.60	2.24	0.090	5.6	2	2	1.00	----	0.13	Organic Material	"
16.87	2.10	2.93	0.120	5.7	2	3	1.01	----	0.23	"	"
16.98	3.90	5.44	0.190	4.9	4	5	1.01	----	0.59	CLAY	90-100
17.09	6.80	9.47	0.230	3.4	7	9	1.01	----	1.17	"	100-110

17.20	8.90	12.37	0.250	2.8	6	8	1.02	----	1.59	Silty CLAY to CLAY	"
17.30	7.60	10.55	0.260	3.4	8	11	1.02	----	1.33	CLAY	"
17.41	6.30	8.73	0.240	3.8	6	9	1.03	----	1.07	"	"
17.52	6.50	8.99	0.240	3.7	7	9	1.03	----	1.11	"	"
17.63	8.00	11.04	0.260	3.3	8	11	1.04	----	1.40	"	"
17.74	10.20	14.05	0.300	2.9	7	9	1.04	----	1.54	Silty CLAY to CLAY	110-120
17.85	9.10	12.51	0.330	3.6	9	13	1.05	----	1.35	CLAY	"
17.95	8.70	11.93	0.340	3.9	9	12	1.05	----	1.54	"	"
18.06	9.90	13.55	0.340	3.4	7	9	1.06	----	1.48	Silty CLAY to CLAY	"
18.17	11.10	15.16	0.340	3.1	7	10	1.07	----	1.68	"	"
18.28	13.30	18.12	0.430	3.2	9	12	1.07	----	1.64	"	120-130
18.39	14.60	19.84	0.480	3.3	10	13	1.08	----	1.81	"	"
18.49	13.00	17.62	0.510	3.9	13	18	1.09	----	1.60	CLAY	"
18.52	15.40	20.86	0.510	3.3	10	14	1.09	----	1.92	Silty CLAY to CLAY	"
18.63	12.40	16.75	0.490	4.0	12	17	1.09	----	1.52	CLAY	"
18.74	11.70	15.77	0.420	3.6	8	11	1.10	----	1.78	Silty CLAY to CLAY	110-120
18.84	10.10	13.58	0.350	3.5	7	9	1.11	----	1.51	"	"
18.95	9.20	12.35	0.280	3.0	6	8	1.11	----	1.36	"	"
19.06	9.20	12.32	0.250	2.7	6	8	1.12	----	1.36	"	100-110
19.17	10.00	13.37	0.270	2.7	7	9	1.12	----	1.49	"	110-120
19.28	12.60	16.80	0.320	2.5	6	8	1.13	----	1.54	Clayey SILT to Silty CLAY	"
19.38	15.50	20.63	0.330	2.1	8	10	1.13	----	1.92	"	"
19.49	16.40	21.77	0.300	1.8	7	9	1.14	----	2.04	Sandy SILT to Clayey SILT	"
19.60	15.40	20.40	0.290	1.9	8	10	1.14	----	1.91	Clayey SILT to Silty CLAY	"
19.71	14.10	18.64	0.290	2.1	7	9	1.15	----	1.73	"	"
19.82	13.90	18.33	0.290	2.1	7	9	1.16	----	1.71	"	"
19.93	13.50	17.76	0.300	2.2	7	9	1.16	----	1.65	"	"
20.04	14.20	18.64	0.260	1.8	7	9	1.17	----	1.74	"	"
20.15	12.70	16.63	0.330	2.6	6	8	1.17	----	1.54	"	"
20.23	13.40	17.52	0.310	2.3	7	9	1.18	----	1.64	"	"
20.34	15.90	20.74	0.300	1.9	8	10	1.18	----	1.97	"	"
20.44	14.30	18.61	0.370	2.6	7	9	1.19	----	1.75	"	120-130
20.55	15.40	19.98	0.440	2.9	8	10	1.20	----	1.90	"	"
20.66	19.10	24.72	0.410	2.1	10	12	1.20	----	2.39	"	"
20.77	13.50	17.42	0.390	2.9	7	9	1.21	----	1.65	"	"
20.88	10.90	14.04	0.330	3.0	7	9	1.22	----	1.62	Silty CLAY to CLAY	110-120
20.98	9.90	12.72	0.250	2.5	7	8	1.22	----	1.45	"	100-110
21.09	9.20	11.80	0.210	2.3	5	6	1.23	----	1.34	Clayey SILT to Silty CLAY	"
21.20	8.80	11.27	0.210	2.4	6	8	1.23	----	1.52	Silty CLAY to CLAY	"
21.31	8.30	10.61	0.220	2.7	6	7	1.23	----	1.42	"	"
21.42	8.30	10.59	0.250	3.0	6	7	1.24	----	1.42	"	"
21.52	9.90	12.60	0.320	3.2	7	8	1.24	----	1.45	"	110-120
21.63	9.60	12.19	0.370	3.9	10	12	1.25	----	1.40	CLAY	"
21.74	10.00	12.67	0.370	3.7	10	13	1.26	----	1.46	"	"
21.86	11.20	14.15	0.680	6.1	11	14	1.26	----	1.66	"	120-130
21.96	19.40	24.44	1.040	5.4	19	24	1.27	----	2.42	"	130-140
22.07	46.40	58.28	1.030	2.2	19	23	1.28	----	6.02	Sandy SILT to Clayey SILT	"
22.16	37.30	46.74	1.020	2.7	15	19	1.29	----	4.81	"	"
22.26	20.40	25.49	0.940	4.6	20	25	1.29	----	2.55	CLAY	"
22.37	13.40	16.70	0.640	4.8	13	17	1.30	----	1.62	"	120-130
22.48	12.30	15.29	0.400	3.3	8	10	1.31	----	1.47	Silty CLAY to CLAY	110-120
22.58	11.00	13.65	0.300	2.7	7	9	1.31	----	1.62	"	"
22.69	12.10	14.98	0.260	2.1	6	7	1.32	----	1.44	Clayey SILT to Silty CLAY	"
22.80	12.10	14.95	0.280	2.3	6	7	1.32	----	1.44	"	"
22.91	12.50	15.41	0.300	2.4	6	8	1.33	----	1.50	"	"

23.02	13.70	16.85	0.320	2.3	7	8	1.33	----	1.65	"	"
23.13	13.60	16.69	0.340	2.5	7	8	1.34	----	1.64	"	"
23.23	14.20	17.38	0.340	2.4	7	9	1.35	----	1.72	"	"
23.34	13.30	16.25	0.350	2.6	7	8	1.35	----	1.60	"	"
23.45	13.10	15.97	0.330	2.5	7	8	1.36	----	1.57	"	"
23.56	13.60	16.54	0.310	2.3	7	8	1.36	----	1.64	"	"
23.67	15.50	18.81	0.330	2.1	8	9	1.37	----	1.89	"	"
23.77	15.40	18.64	0.360	2.3	8	9	1.37	----	1.88	"	120-130
23.88	16.00	19.31	0.390	2.4	8	10	1.38	----	1.95	"	"
23.99	15.70	18.90	0.420	2.7	8	9	1.39	----	1.91	"	"
24.09	14.60	17.53	0.430	2.9	7	9	1.39	----	1.77	"	"
24.20	14.30	17.12	0.440	3.1	10	11	1.40	----	1.73	Silty CLAY to CLAY	"
24.31	15.60	18.63	0.430	2.8	8	9	1.41	----	1.90	Clayey SILT to Silty CLAY	"
24.41	16.10	19.17	0.430	2.7	8	10	1.41	----	1.96	"	"
24.52	15.60	18.53	0.440	2.8	8	9	1.42	----	1.90	"	"
24.63	16.20	19.19	0.460	2.8	8	10	1.43	----	1.97	"	"
24.73	16.40	19.37	0.390	2.4	8	10	1.43	----	2.00	"	"
24.84	16.50	19.44	0.470	2.8	8	10	1.44	----	2.01	"	"
24.95	17.10	20.09	0.520	3.0	9	10	1.45	----	2.09	"	"
25.04	14.90	17.46	0.590	4.0	10	12	1.45	----	1.80	Silty CLAY to CLAY	"
25.09	20.00	23.42	0.620	3.1	10	12	1.46	----	2.48	Clayey SILT to Silty CLAY	"
25.19	21.20	24.75	0.700	3.3	11	12	1.46	----	2.64	"	"
25.30	23.60	27.47	0.830	3.5	12	14	1.47	----	2.96	"	130-140
25.41	25.10	29.12	0.940	3.7	17	19	1.48	----	3.15	Silty CLAY to CLAY	"
25.51	26.30	30.41	0.970	3.7	13	15	1.49	----	3.31	Clayey SILT to Silty CLAY	"
25.62	27.70	31.93	0.980	3.5	14	16	1.49	----	3.50	"	"
25.73	26.10	29.99	0.930	3.6	13	15	1.50	----	3.29	"	"
25.84	25.50	29.23	0.900	3.5	13	15	1.51	----	3.20	"	"
25.94	24.90	28.47	0.920	3.7	12	14	1.52	----	3.12	"	"
26.05	24.90	28.40	0.930	3.7	17	19	1.53	----	3.12	Silty CLAY to CLAY	"
26.16	24.20	27.54	0.870	3.6	12	14	1.53	----	3.03	Clayey SILT to Silty CLAY	"
26.27	21.80	24.74	0.810	3.7	15	16	1.54	----	2.71	Silty CLAY to CLAY	"
26.38	20.10	22.77	0.760	3.8	13	15	1.55	----	2.48	"	120-130
26.48	19.20	21.70	0.710	3.7	13	14	1.56	----	2.36	"	"
26.59	18.40	20.75	0.660	3.6	12	14	1.56	----	2.25	"	"
26.70	17.50	19.69	0.640	3.7	12	13	1.57	----	2.13	"	"
26.81	19.60	22.01	0.600	3.1	10	11	1.58	----	2.41	Clayey SILT to Silty CLAY	"
26.91	17.10	19.16	0.540	3.2	9	10	1.58	----	2.08	"	"
27.02	14.80	16.55	0.490	3.3	10	11	1.59	----	1.77	Silty CLAY to CLAY	"
27.13	12.20	13.62	0.400	3.3	8	9	1.59	----	1.42	"	110-120
27.24	10.70	11.92	0.350	3.3	7	8	1.60	----	1.52	"	"
27.34	10.20	11.34	0.320	3.1	7	8	1.61	----	1.44	"	"
27.45	11.30	12.54	0.330	2.9	8	8	1.61	----	1.62	"	"
27.56	14.30	15.84	0.350	2.4	7	8	1.62	----	1.70	Clayey SILT to Silty CLAY	"
27.66	15.40	17.02	0.400	2.6	8	9	1.62	----	1.84	"	120-130
27.77	16.60	18.31	0.470	2.8	8	9	1.63	----	2.00	"	"
27.88	22.70	24.98	0.890	3.9	15	17	1.64	----	2.81	Silty CLAY to CLAY	130-140
27.99	32.80	36.00	1.110	3.4	16	18	1.65	----	4.16	Clayey SILT to Silty CLAY	"
28.07	39.70	43.48	1.420	3.6	20	22	1.65	----	5.08	"	"
28.18	33.70	36.82	1.540	4.6	22	25	1.66	----	4.28	Silty CLAY to CLAY	"
28.27	28.10	30.63	1.540	5.5	28	31	1.67	----	3.53	CLAY	"
28.31	34.40	37.46	1.510	4.4	23	25	1.67	----	4.37	Silty CLAY to CLAY	"
28.40	30.40	33.04	1.340	4.4	20	22	1.68	----	3.84	"	"
28.50	28.80	31.22	1.030	3.6	14	16	1.68	----	3.62	Clayey SILT to Silty CLAY	"
28.61	17.60	19.04	0.750	4.3	18	19	1.69	----	2.13	CLAY	120-130

28.71	13.00	14.03	0.480	3.7	9	9	1.70	----	1.51	Silty CLAY to CLAY	"
28.82	12.00	12.93	0.350	2.9	8	9	1.70	----	1.38	"	110-120
28.93	13.00	13.98	0.380	2.9	9	9	1.71	----	1.51	"	"
29.04	13.40	14.37	0.460	3.4	9	10	1.71	----	1.56	"	120-130
29.15	17.80	19.05	0.540	3.0	9	10	1.72	----	2.15	Clayey SILT to Silty CLAY	"
29.25	18.80	20.08	0.530	2.8	9	10	1.73	----	2.28	"	"
29.36	20.30	21.63	0.430	2.1	8	9	1.73	----	2.48	Sandy SILT to Clayey SILT	"
29.47	18.50	19.67	0.380	2.1	9	10	1.74	----	2.24	Clayey SILT to Silty CLAY	"
29.58	15.80	16.76	0.380	2.4	8	8	1.75	----	1.88	"	"
29.68	15.60	16.52	0.430	2.8	8	8	1.76	----	1.85	"	"
29.79	18.90	19.98	0.630	3.3	9	10	1.76	----	2.29	"	"
29.90	23.50	24.80	1.170	5.0	24	25	1.77	----	2.90	CLAY	130-140
30.00	43.90	46.25	1.390	3.2	22	23	1.78	----	5.62	Clayey SILT to Silty CLAY	"
30.11	52.10	54.79	1.340	2.6	21	22	1.78	----	6.71	Sandy SILT to Clayey SILT	"
30.21	39.00	40.94	1.350	3.5	20	20	1.79	----	4.97	Clayey SILT to Silty CLAY	"
30.32	33.90	35.53	1.100	3.2	17	18	1.80	----	4.29	"	"
30.42	29.20	30.55	1.050	3.6	15	15	1.81	----	3.66	"	"
30.53	27.20	28.41	1.070	3.9	18	19	1.82	----	3.39	Silty CLAY to CLAY	"
30.63	34.90	36.38	1.190	3.4	17	18	1.82	----	4.42	Clayey SILT to Silty CLAY	"
30.74	31.30	32.57	1.390	4.4	21	22	1.83	----	3.94	Silty CLAY to CLAY	"
30.84	42.70	44.36	1.920	4.5	28	30	1.84	----	5.45	"	"
30.94	88.20	91.47	2.150	2.4	29	30	1.85	37	----	Silty SAND to Sandy SILT	"
31.05	146.30	151.46	2.310	1.6	37	38	1.85	40	----	SAND to Silty SAND	"
31.10	153.10	158.37	2.240	1.5	38	40	1.86	41	----	"	"
31.22	158.50	163.60	1.970	1.2	32	33	1.87	41	----	SAND	"
31.33	152.30	156.97	1.620	1.1	30	31	1.87	41	----	"	120-130
31.43	136.40	140.37	1.560	1.1	34	35	1.88	40	----	SAND to Silty SAND	"
31.53	124.20	127.60	1.750	1.4	31	32	1.89	39	----	"	130-140
31.62	114.80	117.76	1.700	1.5	29	29	1.89	39	----	"	"
31.73	98.60	100.96	1.780	1.8	33	34	1.90	38	----	Silty SAND to Sandy SILT	"
31.83	81.90	83.72	1.930	2.4	27	28	1.91	37	----	"	"
31.93	65.90	67.25	1.800	2.7	26	27	1.91	----	8.54	Sandy SILT to Clayey SILT	"
32.03	64.90	66.11	1.720	2.7	26	26	1.92	----	8.40	"	"
32.13	63.50	64.57	1.470	2.3	25	26	1.93	----	8.22	"	"
32.23	61.70	62.63	1.360	2.2	21	21	1.94	35	----	Silty SAND to Sandy SILT	"
32.33	58.40	59.18	1.370	2.3	23	24	1.94	----	7.54	Sandy SILT to Clayey SILT	"
32.44	54.60	55.23	1.560	2.9	22	22	1.95	----	7.03	"	"
32.54	57.50	58.06	2.140	3.7	29	29	1.96	----	7.41	Clayey SILT to Silty CLAY	"
32.64	57.00	57.46	2.120	3.7	29	29	1.97	----	7.35	"	"
32.74	59.70	60.07	1.410	2.4	24	24	1.97	----	7.70	Sandy SILT to Clayey SILT	"
32.84	117.00	117.55	1.480	1.3	29	29	1.98	39	----	SAND to Silty SAND	120-130
32.94	172.40	172.97	1.790	1.0	34	35	1.99	41	----	SAND	"
33.04	180.60	180.87	2.320	1.3	36	36	1.99	41	----	"	130-140
33.17	163.20	163.19	3.600	2.2	54	54	2.00	41	----	Silty SAND to Sandy SILT	"
33.27	134.00	133.97	5.350	4.0	134	134	2.01	----	17.61	Very Stiff Fine Grained *	>140
33.36	276.70	276.60	9.510	3.4	138	138	2.02	44	----	SAND to Clayey SAND *	"
33.48	488.70	488.44	9.080	1.9	98	98	2.03	47	----	SAND	130-140
33.56	338.60	338.38	9.510	2.8	169	169	2.03	45	----	SAND to Clayey SAND *	>140
33.61	311.50	311.27	10.240	3.3	156	156	2.04	45	----	"	"
33.68	300.50	300.24	9.630	3.2	150	150	2.04	44	----	"	"
33.80	266.80	266.53	3.020	1.1	53	53	2.05	44	----	SAND	120-130
33.90	261.60	261.31	3.050	1.2	52	52	2.06	44	----	"	"
33.94	304.70	304.34	3.340	1.1	61	61	2.06	44	----	"	"
34.06	386.80	386.29	3.870	1.0	77	77	2.07	46	----	"	"
34.13	428.80	428.20	4.610	1.1	86	86	2.07	46	----	"	"

34.17	426.70	426.08	4.710	1.1	85	85	2.07	46	----	"	"
34.29	348.00	347.43	4.690	1.3	70	69	2.08	45	----	"	130-140
34.38	298.80	298.27	5.500	1.8	60	60	2.09	44	----	"	"
34.47	281.30	280.77	6.350	2.3	70	70	2.09	44	----	SAND to Silty SAND	"
34.56	252.00	251.49	3.470	1.4	50	50	2.10	43	----	SAND	"
34.65	271.30	270.72	3.470	1.3	54	54	2.11	44	----	"	"
34.74	270.60	269.98	3.260	1.2	54	54	2.11	44	----	"	"
34.82	282.50	281.82	3.940	1.4	57	56	2.12	44	----	"	"
34.88	268.20	267.53	4.350	1.6	54	54	2.12	44	----	"	"
34.95	243.50	242.87	4.690	1.9	49	49	2.13	43	----	"	"
35.04	280.20	279.44	4.610	1.6	56	56	2.14	44	----	"	"
35.13	226.90	226.25	4.510	2.0	57	57	2.14	43	----	SAND to Silty SAND	"
35.22	245.30	244.57	4.680	1.9	49	49	2.15	43	----	SAND	"
35.31	255.40	254.61	5.030	2.0	51	51	2.16	43	----	"	"
35.40	252.10	251.28	4.610	1.8	50	50	2.16	43	----	"	"
35.49	254.20	253.34	4.060	1.6	51	51	2.17	43	----	"	"
35.57	262.70	261.79	2.780	1.1	53	52	2.17	44	----	"	120-130
35.66	305.50	304.40	4.350	1.4	61	61	2.18	44	----	"	130-140
35.74	327.40	326.18	6.620	2.0	65	65	2.19	45	----	"	"
35.83	290.10	288.98	5.350	1.8	58	58	2.19	44	----	"	"
35.92	313.00	311.76	6.630	2.1	63	62	2.20	45	----	"	"
36.00	432.30	430.53	6.700	1.5	86	86	2.20	46	----	"	"
36.03	514.10	511.97	7.080	1.4	103	102	2.21	47	----	"	"
36.12	396.40	394.71	8.420	2.1	79	79	2.21	46	----	"	"
36.21	362.00	360.41	8.340	2.3	72	72	2.22	45	----	"	"
36.30	373.90	372.21	8.130	2.2	75	74	2.23	46	----	"	"
36.39	356.10	354.44	5.810	1.6	71	71	2.23	45	----	"	"
36.48	389.70	387.83	5.700	1.5	78	78	2.24	46	----	"	"
36.57	347.50	345.79	5.830	1.7	70	69	2.25	45	----	"	"
36.66	283.70	282.27	6.340	2.2	57	56	2.25	44	----	"	"
36.75	298.70	297.15	7.910	2.6	149	149	2.26	44	----	SAND to Clayey SAND *	"
36.84	253.50	252.15	8.980	3.5	127	126	2.27	43	----	"	>140
36.93	205.70	204.58	10.030	4.9	206	205	2.27	----	27.13	Very Stiff Fine Grained *	"
37.02	200.60	199.48	10.690	5.3	201	199	2.28	----	26.45	"	"
37.10	195.50	194.38	9.850	5.0	196	194	2.29	----	25.77	"	"
37.19	202.70	201.51	8.570	4.2	203	202	2.29	----	26.73	"	"
37.27	247.10	245.62	7.250	2.9	124	123	2.30	43	----	SAND to Clayey SAND *	130-140
37.35	267.20	265.57	7.890	3.0	134	133	2.31	44	----	"	>140
37.43	279.70	277.96	7.660	2.7	140	139	2.31	44	----	"	130-140
37.50	311.80	309.83	5.470	1.8	62	62	2.32	45	----	SAND	"
37.58	325.60	323.50	3.750	1.2	65	65	2.32	45	----	"	"
37.65	387.70	385.16	5.550	1.4	78	77	2.33	46	----	"	"
37.68	411.10	408.39	6.500	1.6	82	82	2.33	46	----	"	"
37.86	549.40	545.64	8.010	1.5	110	109	2.34	48	----	"	"
37.94	344.10	341.70	7.380	2.1	69	68	2.35	45	----	"	"
38.05	299.10	296.97	8.630	2.9	150	148	2.36	44	----	SAND to Clayey SAND *	>140
38.13	235.80	234.09	8.790	3.7	118	117	2.36	43	----	"	"
38.21	196.20	194.75	7.190	3.7	98	97	2.37	42	----	"	"
38.30	177.40	176.07	6.000	3.4	89	88	2.38	41	----	"	"
38.39	173.30	171.97	5.620	3.2	69	69	2.38	----	22.80	Sandy SILT to Clayey SILT	130-140
38.43	174.30	172.96	5.350	3.1	58	58	2.39	41	----	Silty SAND to Sandy SILT	"
38.54	196.00	194.46	4.630	2.4	65	65	2.39	42	----	"	"
38.63	194.50	192.94	3.860	2.0	49	48	2.40	42	----	SAND to Silty SAND	"
38.71	199.50	197.88	3.450	1.7	50	49	2.41	42	----	"	"
38.80	225.00	223.14	3.590	1.6	45	45	2.41	43	----	SAND	"

38.86	229.00	227.09	3.370	1.5	46	45	2.42	43	----	"	"
38.94	210.10	208.32	3.210	1.5	42	42	2.42	42	----	"	"
39.03	233.10	231.10	3.360	1.4	47	46	2.43	43	----	"	"
39.11	265.10	262.79	3.340	1.3	53	53	2.43	44	----	"	"
39.19	239.90	237.78	3.250	1.4	48	48	2.44	43	----	"	"
39.26	256.20	253.92	3.300	1.3	51	51	2.45	43	----	"	"
39.35	260.90	258.54	3.400	1.3	52	52	2.45	43	----	"	"
39.43	265.90	263.46	3.570	1.3	53	53	2.46	44	----	"	"
39.52	233.60	231.43	3.950	1.7	47	46	2.46	43	----	"	"
39.60	245.90	243.59	2.800	1.1	49	49	2.47	43	----	"	120-130
39.69	275.10	272.48	3.760	1.4	55	54	2.48	44	----	"	130-140
39.75	306.70	303.75	4.370	1.4	61	61	2.48	44	----	"	"
39.82	392.40	388.59	5.330	1.4	78	78	2.49	46	----	"	"
39.89	361.40	357.85	5.610	1.6	72	72	2.49	45	----	"	"
39.96	330.80	327.52	5.730	1.7	66	66	2.50	45	----	"	"
40.02	346.20	342.70	6.370	1.8	69	69	2.50	45	----	"	"
40.09	314.90	311.20	6.330	2.0	63	62	2.51	45	----	"	"
40.15	310.50	306.37	6.320	2.0	62	61	2.51	44	----	"	"
40.20	326.20	321.47	6.940	2.1	65	64	2.51	45	----	"	"
40.31	343.20	337.32	6.550	1.9	69	67	2.52	45	----	"	"
40.40	372.40	365.25	7.200	1.9	74	73	2.53	45	----	"	"
40.44	225.70	221.14	7.400	3.3	113	111	2.53	43	----	SAND to Clayey SAND *	>140
40.49	712.40	697.22	8.200	1.2	142	139	2.53	>48	----	SAND	130-140
40.54	549.70	537.29	7.000	1.3	110	107	2.54	48	----	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-27
LOCATION: Santa Rosa CA DATE : 06-27-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 12:49:11
Terminated at 40.5 feet Groundwater measured at 3.0 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.53	27.50	44.00	0.500	1.8	11	18	0.06	----	3.66	Sandy SILT to Clayey SILT	120-130
0.64	32.20	51.52	0.470	1.5	11	17	0.07	34	----	Silty SAND to Sandy SILT	"
0.72	36.60	58.56	0.430	1.2	12	20	0.09	35	----	"	"
0.83	37.40	59.84	0.440	1.2	12	20	0.10	35	----	"	"
0.94	38.80	62.08	0.430	1.1	13	21	0.11	35	----	"	110-120
1.05	40.50	64.80	0.440	1.1	14	22	0.12	35	----	"	"
1.15	40.80	65.28	0.470	1.2	14	22	0.14	36	----	"	120-130
1.26	40.10	64.16	0.550	1.4	13	21	0.15	35	----	"	"
1.37	39.00	62.40	0.680	1.7	16	25	0.16	----	5.19	Sandy SILT to Clayey SILT	"
1.48	36.50	58.40	0.790	2.2	15	23	0.18	----	4.85	"	130-140
1.58	33.00	52.80	0.850	2.6	13	21	0.19	----	4.39	"	"
1.69	30.00	48.00	0.890	3.0	15	24	0.21	----	3.99	Clayey SILT to Silty CLAY	"
1.80	27.50	44.00	0.940	3.4	14	22	0.22	----	3.65	"	"
1.90	25.40	40.64	0.850	3.3	13	20	0.24	----	3.37	"	"
2.01	22.70	36.32	0.880	3.9	15	24	0.25	----	3.01	Silty CLAY to CLAY	"
2.12	20.70	33.12	0.970	4.7	21	33	0.27	----	2.74	CLAY	"
2.18	13.30	21.28	0.970	7.3	13	21	0.27	----	1.76	"	120-130
2.24	18.50	29.60	0.980	5.3	19	30	0.28	----	2.45	"	130-140
2.33	13.80	22.08	0.980	7.1	14	22	0.29	----	1.82	"	120-130
2.36	17.60	28.16	0.980	5.6	18	28	0.30	----	2.33	"	130-140
2.47	17.20	27.52	0.970	5.6	17	28	0.31	----	2.27	"	"
2.57	15.80	25.28	0.960	6.1	16	25	0.32	----	2.09	"	120-130
2.68	15.20	24.32	0.920	6.1	15	24	0.34	----	2.00	"	"
2.79	14.50	23.20	0.880	6.1	15	23	0.35	----	1.91	"	"
2.90	14.80	23.68	0.870	5.9	15	24	0.36	----	1.95	"	"
3.00	14.60	23.36	0.880	6.0	15	23	0.38	----	1.92	"	"
3.11	14.20	22.72	0.880	6.2	14	23	0.38	----	1.87	"	"
3.22	13.90	22.24	0.880	6.3	14	22	0.39	----	1.83	"	"
3.33	13.30	21.28	0.820	6.2	13	21	0.40	----	1.75	"	"
3.43	13.00	20.80	0.760	5.8	13	21	0.40	----	1.70	"	"
3.54	12.10	19.36	0.710	5.9	12	19	0.41	----	1.58	"	"
3.65	11.70	18.72	0.630	5.4	12	19	0.42	----	1.91	"	"
3.76	11.30	18.08	0.580	5.1	11	18	0.42	----	1.84	"	"
3.87	10.80	17.28	0.520	4.8	11	17	0.43	----	1.76	"	"
3.97	10.20	16.32	0.470	4.6	10	16	0.44	----	1.66	"	110-120
4.08	9.70	15.52	0.460	4.7	10	16	0.44	----	1.57	"	"
4.19	8.90	14.24	0.440	4.9	9	14	0.45	----	1.73	"	"
4.30	9.50	15.20	0.350	3.7	10	15	0.45	----	1.54	"	"
4.41	8.50	13.60	0.280	3.3	9	14	0.46	----	1.65	"	"
4.51	7.50	12.00	0.230	3.1	8	12	0.46	----	1.44	"	100-110
4.62	7.00	11.20	0.210	3.0	7	11	0.47	----	1.34	"	"
4.73	7.70	12.32	0.210	2.7	5	8	0.47	----	1.48	Silty CLAY to CLAY	"
4.84	7.90	12.64	0.220	2.8	5	8	0.48	----	1.52	"	"
4.95	7.80	12.48	0.240	3.1	5	8	0.48	----	1.50	"	"
5.06	8.50	13.60	0.230	2.7	6	9	0.49	----	1.64	"	"
5.17	7.90	12.64	0.230	2.9	5	8	0.49	----	1.52	"	"
5.28	8.00	12.80	0.230	2.9	5	9	0.50	----	1.54	"	"

PROJECT: SUTTER MEDICAL CENTER CPT NO.: CPT02-28
LOCATION: Santa Rosa CA DATE : 06-01-2005
PROJ. NO.: 6486.2.003.01(KLF-103) TIME : 14:18:11
Terminated at 46.7 feet Groundwater measured at 2.8 feet

DEPTH (feet)	Qc (tsf)	Qc' (tsf)	Fs (tsf)	Rf (%)	SPT (N)	SPT' (N')	EffVtStr (ksf)	PHI (deg.)	SU (ksf)	SOIL BEHAVIOR TYPE	DENSITY RANGE (pcf)
0.55	29.90	47.84	0.990	3.3	15	24	0.06	----	3.98	Clayey SILT to Silty CLAY	130-140
0.66	27.80	44.48	0.870	3.1	14	22	0.08	----	3.70	"	"
0.76	23.20	37.12	0.740	3.2	12	19	0.09	----	3.09	"	120-130
0.87	16.40	26.24	0.620	3.8	11	17	0.11	----	2.18	Silty CLAY to CLAY	"
0.98	11.20	17.92	0.510	4.6	11	18	0.12	----	1.86	CLAY	"
1.08	9.80	15.68	0.390	4.0	10	16	0.13	----	1.62	"	110-120
1.19	9.00	14.40	0.320	3.6	9	14	0.14	----	1.49	"	"
1.29	9.10	14.56	0.300	3.3	6	10	0.15	----	1.50	Silty CLAY to CLAY	"
1.40	9.30	14.88	0.290	3.1	6	10	0.17	----	1.54	"	"
1.51	9.20	14.72	0.310	3.4	9	15	0.18	----	1.52	CLAY	"
1.61	9.80	15.68	0.340	3.5	10	16	0.19	----	1.62	"	"
1.72	10.20	16.32	0.400	3.9	10	16	0.20	----	1.68	"	"
1.82	11.10	17.76	0.460	4.1	11	18	0.22	----	1.83	"	120-130
1.93	12.20	19.52	0.520	4.3	12	20	0.23	----	1.61	"	"
2.11	13.40	21.44	0.610	4.6	13	21	0.25	----	1.77	"	"
2.22	14.80	23.68	0.650	4.4	15	24	0.27	----	1.96	"	"
2.32	14.70	23.52	0.650	4.4	15	24	0.28	----	1.94	"	"
2.43	14.00	22.40	0.660	4.7	14	22	0.29	----	1.85	"	"
2.53	12.70	20.32	0.650	5.1	13	20	0.31	----	1.67	"	"
2.64	12.60	20.16	0.610	4.8	13	20	0.32	----	1.66	"	"
2.74	12.40	19.84	0.570	4.6	12	20	0.33	----	1.63	"	"
2.85	11.60	18.56	0.550	4.7	12	19	0.34	----	1.90	"	"
2.96	11.00	17.60	0.520	4.7	11	18	0.35	----	1.80	"	"
3.06	10.60	16.96	0.500	4.7	11	17	0.35	----	1.74	"	"
3.17	11.20	17.92	0.490	4.4	11	18	0.36	----	1.83	"	"
3.28	11.80	18.88	0.490	4.2	12	19	0.37	----	1.93	"	"
3.38	11.10	17.76	0.460	4.1	11	18	0.37	----	1.82	"	"
3.49	10.30	16.48	0.420	4.1	10	16	0.38	----	1.68	"	110-120
3.60	10.00	16.00	0.370	3.7	10	16	0.38	----	1.63	"	"
3.71	8.90	14.24	0.340	3.8	9	14	0.39	----	1.74	"	"
3.81	9.50	15.20	0.350	3.7	10	15	0.39	----	1.54	"	"
3.92	10.20	16.32	0.340	3.3	7	11	0.40	----	1.66	Silty CLAY to CLAY	"
4.02	10.70	17.12	0.330	3.1	7	11	0.41	----	1.74	"	"
4.13	9.20	14.72	0.330	3.6	9	15	0.41	----	1.49	CLAY	"
4.24	9.30	14.88	0.330	3.5	9	15	0.42	----	1.51	"	"
4.34	10.30	16.48	0.300	2.9	7	11	0.42	----	1.67	Silty CLAY to CLAY	"
4.45	9.50	15.20	0.260	2.7	6	10	0.43	----	1.54	"	100-110
4.55	8.30	13.28	0.240	2.9	6	9	0.43	----	1.61	"	"
4.66	7.80	12.48	0.220	2.8	5	8	0.44	----	1.50	"	"
4.77	7.50	12.00	0.210	2.8	5	8	0.44	----	1.44	"	"
4.87	8.10	12.96	0.220	2.7	5	9	0.45	----	1.56	"	"
4.98	9.00	14.40	0.260	2.9	6	10	0.45	----	1.45	"	"
5.09	10.30	16.48	0.300	2.9	7	11	0.46	----	1.67	"	110-120
5.20	9.10	14.56	0.280	3.1	6	10	0.46	----	1.47	"	"
5.24	6.20	9.92	0.260	4.2	6	10	0.46	----	1.18	CLAY	100-110
5.29	8.20	13.12	0.240	2.9	5	9	0.47	----	1.58	Silty CLAY to CLAY	"
5.40	7.90	12.64	0.240	3.0	5	8	0.47	----	1.52	"	"

5.51	9.20	14.72	0.250	2.7	6	10	0.47	----	1.48	"	"
5.61	9.80	15.68	0.280	2.9	7	10	0.48	----	1.58	"	110-120
5.72	9.90	15.84	0.280	2.8	7	11	0.49	----	1.59	"	"
5.82	9.60	15.36	0.260	2.7	6	10	0.49	----	1.54	"	"
5.93	9.80	15.68	0.270	2.8	7	10	0.50	----	1.58	"	"
6.04	10.10	16.16	0.270	2.7	7	11	0.50	----	1.62	"	"
6.15	10.80	17.28	0.260	2.4	5	9	0.51	----	1.74	Clayey SILT to Silty CLAY	"
6.25	10.60	16.96	0.270	2.5	5	8	0.51	----	1.71	"	"
6.36	10.40	16.64	0.280	2.7	7	11	0.52	----	1.67	Silty CLAY to CLAY	"
6.47	11.40	18.24	0.330	2.9	8	12	0.52	----	1.84	"	"
6.57	12.20	19.52	0.380	3.1	8	13	0.53	----	1.58	"	"
6.68	13.10	20.96	0.390	3.0	9	14	0.54	----	1.69	"	"
6.79	12.80	20.48	0.390	3.0	9	14	0.54	----	1.65	"	"
6.90	12.20	19.52	0.400	3.3	8	13	0.55	----	1.57	"	"
7.00	12.40	19.84	0.430	3.5	8	13	0.55	----	1.60	"	120-130
7.11	13.60	21.76	0.470	3.5	9	15	0.56	----	1.76	"	"
7.22	14.90	23.84	0.530	3.6	10	16	0.57	----	1.93	"	"
7.32	13.90	22.24	0.580	4.2	14	22	0.57	----	1.80	CLAY	"
7.43	14.00	22.40	0.600	4.3	14	22	0.58	----	1.81	"	"
7.53	13.80	22.08	0.590	4.3	14	22	0.59	----	1.78	"	"
7.64	14.00	22.40	0.580	4.1	14	22	0.59	----	1.81	"	"
7.74	14.60	23.36	0.560	3.8	10	16	0.60	----	1.89	Silty CLAY to CLAY	"
7.85	15.30	24.48	0.550	3.6	10	16	0.61	----	1.98	"	"
7.96	15.30	24.48	0.540	3.5	10	16	0.61	----	1.98	"	"
8.06	15.10	24.16	0.540	3.6	10	16	0.62	----	1.95	"	"
8.17	15.70	25.12	0.520	3.3	10	17	0.63	----	2.03	"	"
8.28	14.80	23.68	0.540	3.6	10	16	0.63	----	1.91	"	"
8.38	14.10	22.56	0.500	3.5	9	15	0.64	----	1.81	"	"
8.48	13.20	21.12	0.470	3.6	9	14	0.65	----	1.69	"	"
8.55	13.50	21.60	0.460	3.4	9	14	0.65	----	1.73	"	"
8.66	11.90	19.04	0.410	3.4	8	13	0.66	----	1.90	"	110-120
8.76	11.20	17.92	0.350	3.1	7	12	0.66	----	1.78	"	"
8.87	10.10	16.16	0.330	3.3	7	11	0.67	----	1.60	"	"
8.97	10.00	16.00	0.310	3.1	7	11	0.67	----	1.58	"	"
9.08	10.50	16.80	0.290	2.8	7	11	0.68	----	1.66	"	"
9.18	9.80	15.68	0.270	2.8	7	10	0.68	----	1.54	"	"
9.29	9.50	15.20	0.250	2.6	6	10	0.69	----	1.49	"	100-110
9.40	8.90	14.24	0.230	2.6	6	9	0.69	----	1.67	"	"
9.50	8.80	14.08	0.230	2.6	6	9	0.70	----	1.65	"	"
9.61	9.70	15.52	0.230	2.4	5	8	0.70	----	1.52	Clayey SILT to Silty CLAY	"
9.72	10.00	16.00	0.240	2.4	5	8	0.71	----	1.57	"	"
9.82	9.50	15.20	0.260	2.7	6	10	0.71	----	1.49	Silty CLAY to CLAY	"
9.93	10.30	16.48	0.310	3.0	7	11	0.72	----	1.62	"	110-120
10.04	11.40	18.24	0.350	3.1	8	12	0.72	----	1.80	"	"
10.14	11.10	17.76	0.290	2.6	6	9	0.73	----	1.75	Clayey SILT to Silty CLAY	"
10.25	9.80	15.68	0.200	2.0	5	8	0.73	----	1.53	"	100-110
10.35	15.30	24.48	0.140	0.9	6	10	0.74	----	1.96	Sandy SILT to Clayey SILT	90-100
10.46	10.20	16.32	0.110	1.1	5	8	0.74	----	1.60	Clayey SILT to Silty CLAY	"
10.57	8.90	14.24	0.100	1.1	4	7	0.74	----	1.66	"	"
10.67	6.30	10.08	0.110	1.7	4	7	0.75	----	1.14	Silty CLAY to CLAY	"
10.78	6.80	10.88	0.110	1.6	3	5	0.75	----	1.23	Clayey SILT to Silty CLAY	"
10.88	6.90	11.04	0.100	1.4	3	6	0.75	----	1.25	"	"
10.99	6.90	11.04	0.110	1.6	3	6	0.76	----	1.25	"	"
11.10	8.00	12.80	0.140	1.8	4	6	0.76	----	1.47	"	"
11.20	8.80	14.08	0.200	2.3	6	9	0.76	----	1.63	Silty CLAY to CLAY	100-110

11.31	9.80	15.68	0.250	2.6	7	10	0.77	----	1.52	"	"
11.41	10.00	16.00	0.280	2.8	7	11	0.78	----	1.56	"	110-120
11.52	9.60	15.36	0.340	3.5	10	15	0.78	----	1.49	CLAY	"
11.63	8.60	13.76	0.320	3.7	9	14	0.79	----	1.59	"	"
11.73	8.10	12.96	0.330	4.1	8	13	0.79	----	1.48	"	"
11.79	9.30	14.88	0.340	3.7	9	15	0.80	----	1.44	"	"
11.90	10.60	16.95	0.440	4.2	11	17	0.80	----	1.65	"	"
12.01	12.90	20.54	0.510	4.0	13	21	0.81	----	1.63	"	120-130
12.11	15.90	25.22	0.470	3.0	8	13	0.81	----	2.03	Clayey SILT to Silty CLAY	"
12.22	14.70	23.22	0.390	2.7	7	12	0.82	----	1.87	"	"
12.32	13.60	21.41	0.300	2.2	7	11	0.83	----	1.72	"	110-120
12.43	11.90	18.66	0.250	2.1	6	9	0.83	----	1.86	"	"
12.53	9.20	14.39	0.240	2.6	6	10	0.84	----	1.41	Silty CLAY to CLAY	100-110
12.64	8.90	13.88	0.240	2.7	6	9	0.84	----	1.63	"	"
12.75	7.70	11.97	0.250	3.2	8	12	0.85	----	1.39	CLAY	"
12.85	8.60	13.33	0.250	2.9	6	9	0.85	----	1.57	Silty CLAY to CLAY	"
12.96	8.80	13.60	0.250	2.8	6	9	0.85	----	1.61	"	"
13.07	7.40	11.41	0.240	3.2	7	11	0.86	----	1.33	CLAY	"
13.17	7.20	11.06	0.220	3.1	7	11	0.86	----	1.29	"	"
13.28	8.20	12.56	0.210	2.6	5	8	0.87	----	1.49	Silty CLAY to CLAY	"
13.39	8.50	12.99	0.210	2.5	6	9	0.87	----	1.55	"	"
13.49	10.40	15.83	0.260	2.5	5	8	0.88	----	1.60	Clayey SILT to Silty CLAY	110-120
13.60	12.20	18.50	0.280	2.3	6	9	0.88	----	1.52	"	"
13.70	11.80	17.83	0.290	2.5	6	9	0.89	----	1.84	"	"
13.81	12.20	18.37	0.290	2.4	6	9	0.89	----	1.52	"	"
13.91	11.80	17.70	0.270	2.3	6	9	0.90	----	1.83	"	"
14.02	12.40	18.53	0.250	2.0	6	9	0.91	----	1.55	"	"
14.12	12.40	18.48	0.240	1.9	6	9	0.91	----	1.55	"	100-110
14.23	11.70	17.38	0.220	1.9	6	9	0.91	----	1.81	"	"
14.33	11.00	16.29	0.200	1.8	6	8	0.92	----	1.70	"	"
14.44	10.60	15.65	0.200	1.9	5	8	0.92	----	1.63	"	"
14.54	10.80	15.90	0.210	1.9	5	8	0.93	----	1.66	"	"
14.65	12.00	17.61	0.240	2.0	6	9	0.93	----	1.49	"	"
14.76	12.90	18.86	0.300	2.3	6	9	0.94	----	1.61	"	110-120
14.86	13.50	19.66	0.350	2.6	7	10	0.94	----	1.69	"	"
14.97	13.80	20.01	0.390	2.8	7	10	0.95	----	1.73	"	120-130
15.23	15.10	21.64	0.380	2.5	8	11	0.97	----	1.90	"	"
15.34	17.00	24.25	0.370	2.2	9	12	0.97	----	2.15	"	"
15.44	16.00	22.74	0.350	2.2	8	11	0.98	----	2.02	"	110-120
15.55	13.40	18.97	0.340	2.5	7	9	0.98	----	1.67	"	"
15.66	11.50	16.21	0.290	2.5	6	8	0.99	----	1.77	"	"
15.76	9.30	13.07	0.230	2.5	6	9	0.99	----	1.40	Silty CLAY to CLAY	100-110
15.87	7.30	10.23	0.170	2.3	5	7	1.00	----	1.28	"	"
15.98	5.40	7.55	0.150	2.8	5	8	1.00	----	0.90	CLAY	90-100
16.08	5.30	7.40	0.180	3.4	5	7	1.01	----	0.88	"	"
16.19	7.10	9.90	0.210	3.0	7	10	1.01	----	1.24	"	100-110
16.29	9.10	12.67	0.220	2.4	6	8	1.02	----	1.36	Silty CLAY to CLAY	"
16.40	8.30	11.53	0.240	2.9	6	8	1.02	----	1.47	"	"
16.51	6.70	9.30	0.290	4.3	7	9	1.02	----	1.15	CLAY	"
16.61	7.80	10.80	0.320	4.1	8	11	1.03	----	1.37	"	110-120
16.72	9.40	12.99	0.350	3.7	9	13	1.04	----	1.41	"	"
16.82	10.50	14.48	0.370	3.5	7	10	1.04	----	1.59	Silty CLAY to CLAY	"
16.93	9.40	12.93	0.370	3.9	9	13	1.05	----	1.41	CLAY	"
17.03	8.10	11.12	0.360	4.4	8	11	1.05	----	1.43	"	"
17.14	7.20	9.86	0.330	4.6	7	10	1.06	----	1.24	"	"

17.24	8.00	10.94	0.300	3.8	8	11	1.06	----	1.40	"	"
17.35	8.40	11.47	0.270	3.2	8	11	1.07	----	1.48	"	100-110
17.45	8.90	12.13	0.270	3.0	6	8	1.07	----	1.58	Silty CLAY to CLAY	"
17.56	9.50	12.92	0.280	2.9	6	9	1.08	----	1.42	"	110-120
17.66	10.00	13.57	0.290	2.9	7	9	1.08	----	1.50	"	"
17.77	8.40	11.37	0.300	3.6	8	11	1.09	----	1.48	CLAY	"
17.87	7.90	10.67	0.290	3.7	8	11	1.09	----	1.38	"	"
17.98	7.10	9.58	0.270	3.8	7	10	1.10	----	1.22	"	100-110
18.09	6.00	8.08	0.250	4.2	6	8	1.10	----	0.99	"	"
18.37	6.00	8.05	0.170	2.8	6	8	1.11	----	0.99	"	90-100
18.48	6.30	8.44	0.200	3.2	6	8	1.12	----	1.05	"	100-110
18.58	6.60	8.82	0.190	2.9	7	9	1.12	----	1.11	"	"
18.69	6.80	9.07	0.190	2.8	5	6	1.13	----	1.15	Silty CLAY to CLAY	"
18.79	6.70	8.93	0.220	3.3	7	9	1.13	----	1.13	CLAY	"
18.90	8.20	10.90	0.290	3.5	8	11	1.14	----	1.43	"	110-120
19.00	10.40	13.79	0.530	5.1	10	14	1.14	----	1.55	"	120-130
19.11	21.80	28.83	0.710	3.3	11	14	1.15	----	2.76	Clayey SILT to Silty CLAY	"
19.22	34.90	46.01	0.770	2.2	14	18	1.16	----	4.51	Sandy SILT to Clayey SILT	130-140
19.32	28.10	36.95	0.630	2.2	11	15	1.16	----	3.60	"	120-130
19.43	20.00	26.23	0.490	2.5	10	13	1.17	----	2.52	Clayey SILT to Silty CLAY	"
19.53	10.50	13.74	0.410	3.9	11	14	1.18	----	1.56	CLAY	110-120
19.64	10.50	13.71	0.330	3.1	7	9	1.18	----	1.56	Silty CLAY to CLAY	"
19.74	11.30	14.72	0.250	2.2	6	7	1.19	----	1.70	Clayey SILT to Silty CLAY	"
19.85	9.70	12.62	0.210	2.2	5	6	1.19	----	1.43	"	100-110
19.95	7.00	9.09	0.200	2.9	5	6	1.20	----	1.17	Silty CLAY to CLAY	"
20.06	7.10	9.20	0.330	4.6	7	9	1.20	----	1.19	CLAY	110-120
20.16	9.80	12.66	0.610	6.2	10	13	1.21	----	1.44	"	120-130
20.27	20.80	26.80	0.800	3.8	14	18	1.21	----	2.62	Silty CLAY to CLAY	"
20.37	26.60	34.17	0.760	2.9	13	17	1.22	----	3.39	Clayey SILT to Silty CLAY	130-140
20.47	20.20	25.88	0.620	3.1	10	13	1.23	----	2.54	"	120-130
20.58	11.10	14.19	0.450	4.1	11	14	1.23	----	1.65	CLAY	110-120
20.68	7.90	10.08	0.320	4.1	8	10	1.24	----	1.34	"	"
20.79	7.10	9.04	0.250	3.5	7	9	1.24	----	1.18	"	100-110
20.89	7.60	9.66	0.220	2.9	5	6	1.25	----	1.28	Silty CLAY to CLAY	"
21.00	8.40	10.66	0.220	2.6	6	7	1.25	----	1.44	"	"
21.10	9.00	11.40	0.230	2.6	6	8	1.26	----	1.30	"	"
21.21	9.80	12.39	0.240	2.4	7	8	1.26	----	1.43	"	"
21.31	9.70	12.24	0.480	4.9	10	12	1.27	----	1.41	CLAY	110-120
21.42	9.10	11.46	0.510	5.6	9	11	1.27	----	1.31	"	"
21.52	9.10	11.44	0.430	4.7	9	11	1.28	----	1.31	"	"
21.63	10.30	12.91	0.350	3.4	7	9	1.28	----	1.51	Silty CLAY to CLAY	"
21.73	9.60	12.01	0.270	2.8	6	8	1.29	----	1.39	"	"
21.83	8.20	10.24	0.230	2.8	5	7	1.29	----	1.39	"	100-110
21.93	8.20	10.23	0.210	2.6	5	7	1.30	----	1.39	"	"
22.04	7.90	9.84	0.200	2.5	5	7	1.30	----	1.33	"	"
22.14	8.10	10.07	0.190	2.3	5	7	1.31	----	1.37	"	"
22.24	9.00	11.17	0.190	2.1	5	6	1.31	----	1.29	Clayey SILT to Silty CLAY	"
22.34	8.70	10.78	0.200	2.3	6	7	1.32	----	1.49	Silty CLAY to CLAY	"
22.44	8.60	10.64	0.230	2.7	6	7	1.32	----	1.47	"	"
22.54	9.40	11.61	0.230	2.4	6	8	1.32	----	1.35	"	"
22.65	9.60	11.83	0.240	2.5	6	8	1.33	----	1.39	"	"
22.75	9.60	11.81	0.250	2.6	6	8	1.33	----	1.38	"	"
22.85	9.90	12.16	0.240	2.4	5	6	1.34	----	1.43	Clayey SILT to Silty CLAY	"
22.95	9.10	11.16	0.260	2.9	6	7	1.34	----	1.30	Silty CLAY to CLAY	"
23.06	10.20	12.48	0.260	2.5	7	8	1.35	----	1.48	"	110-120

23.16	11.50	14.04	0.260	2.3	6	7	1.35	----	1.70	Clayey SILT to Silty CLAY	"
23.26	10.00	12.18	0.260	2.6	7	8	1.36	----	1.45	Silty CLAY to CLAY	"
23.36	10.00	12.16	0.260	2.6	7	8	1.36	----	1.45	"	"
23.47	10.00	12.13	0.260	2.6	7	8	1.37	----	1.44	"	"
23.57	10.00	12.11	0.270	2.7	7	8	1.37	----	1.44	"	"
23.67	10.80	13.05	0.290	2.7	7	9	1.38	----	1.58	"	"
23.77	11.90	14.35	0.300	2.5	6	7	1.38	----	1.76	Clayey SILT to Silty CLAY	"
23.87	11.40	13.71	0.310	2.7	8	9	1.39	----	1.67	Silty CLAY to CLAY	"
23.97	10.80	12.97	0.290	2.7	7	9	1.39	----	1.57	"	"
24.08	9.70	11.62	0.270	2.8	6	8	1.40	----	1.39	"	"
24.18	8.40	10.04	0.230	2.7	6	7	1.40	----	1.41	"	100-110
24.28	9.10	10.86	0.240	2.6	6	7	1.41	----	1.29	"	"
24.38	8.70	10.37	0.260	3.0	6	7	1.41	----	1.46	"	"
24.48	9.50	11.30	0.370	3.9	10	11	1.42	----	1.35	CLAY	110-120
24.59	11.30	13.41	0.420	3.7	11	13	1.42	----	1.65	"	"
24.69	13.60	16.09	0.480	3.5	9	11	1.43	----	1.63	Silty CLAY to CLAY	120-130
24.76	14.40	17.01	0.480	3.3	10	11	1.43	----	1.73	"	"
24.86	13.00	15.32	0.500	3.8	13	15	1.44	----	1.55	CLAY	"
24.97	11.70	13.75	0.480	4.1	12	14	1.45	----	1.71	"	"
25.08	11.20	13.12	0.460	4.1	11	13	1.45	----	1.63	"	"
25.18	12.90	15.07	0.480	3.7	9	10	1.46	----	1.53	Silty CLAY to CLAY	"
25.29	13.80	16.08	0.480	3.5	9	11	1.47	----	1.65	"	"
25.39	13.90	16.16	0.510	3.7	9	11	1.47	----	1.66	"	"
25.50	14.30	16.57	0.560	3.9	10	11	1.48	----	1.71	"	"
25.60	14.30	16.53	0.590	4.1	14	17	1.49	----	1.71	CLAY	"
25.71	15.70	18.10	0.630	4.0	10	12	1.49	----	1.90	Silty CLAY to CLAY	"
25.81	18.00	20.69	0.700	3.9	12	14	1.50	----	2.20	"	"
25.92	20.90	23.98	0.790	3.8	14	16	1.51	----	2.59	"	"
26.02	21.70	24.84	0.870	4.0	14	17	1.51	----	2.70	"	130-140
26.13	23.10	26.38	0.940	4.1	15	18	1.52	----	2.88	"	"
26.23	20.60	23.47	0.950	4.6	21	23	1.53	----	2.55	CLAY	"
26.34	19.50	22.16	0.950	4.9	20	22	1.54	----	2.40	"	"
26.44	19.10	21.65	0.900	4.7	19	22	1.55	----	2.35	"	"
26.55	20.60	23.30	0.880	4.3	14	16	1.55	----	2.54	Silty CLAY to CLAY	"
26.65	20.10	22.68	0.880	4.4	20	23	1.56	----	2.48	CLAY	"
26.75	16.60	18.69	0.810	4.9	17	19	1.57	----	2.01	"	120-130
26.86	13.40	15.06	0.720	5.4	13	15	1.57	----	1.58	"	"
26.96	10.00	11.21	0.620	6.2	10	11	1.58	----	1.41	"	"
27.07	9.00	10.07	0.500	5.6	9	10	1.59	----	1.24	"	110-120
27.17	8.00	8.94	0.440	5.5	8	9	1.59	----	1.29	"	"
27.27	7.50	8.36	0.400	5.3	8	8	1.60	----	1.19	"	"
27.38	7.90	8.80	0.390	4.9	8	9	1.60	----	1.27	"	"
27.48	10.10	11.22	0.400	4.0	10	11	1.61	----	1.42	"	"
27.59	12.10	13.42	0.400	3.3	8	9	1.61	----	1.40	Silty CLAY to CLAY	"
27.69	12.10	13.40	0.410	3.4	8	9	1.62	----	1.40	"	"
27.80	11.60	12.82	0.510	4.4	12	13	1.62	----	1.67	CLAY	120-130
27.90	11.70	12.90	0.630	5.4	12	13	1.63	----	1.68	"	"
28.00	12.50	13.75	0.650	5.2	13	14	1.64	----	1.45	"	"
28.21	16.30	17.86	0.660	4.0	11	12	1.65	----	1.96	Silty CLAY to CLAY	"
28.32	19.70	21.54	0.670	3.4	10	11	1.66	----	2.41	Clayey SILT to Silty CLAY	"
28.42	20.80	22.69	0.660	3.2	10	11	1.66	----	2.56	"	"
28.52	18.00	19.59	0.650	3.6	12	13	1.67	----	2.18	Silty CLAY to CLAY	"
28.63	17.10	18.58	0.610	3.6	11	12	1.68	----	2.06	"	"
28.73	18.00	19.51	0.570	3.2	9	10	1.68	----	2.18	Clayey SILT to Silty CLAY	"
28.83	18.50	20.01	0.580	3.1	9	10	1.69	----	2.25	"	"

28.94	20.40	22.02	0.690	3.4	10	11	1.70	----	2.50	"	"
29.04	23.80	25.62	0.780	3.3	12	13	1.70	----	2.95	"	130-140
29.15	23.00	24.70	0.890	3.9	15	16	1.71	----	2.84	Silty CLAY to CLAY	"
29.25	20.40	21.85	0.960	4.7	20	22	1.72	----	2.50	CLAY	"
29.35	17.40	18.59	0.980	5.6	17	19	1.73	----	2.09	"	"
29.46	17.10	18.23	0.930	5.4	17	18	1.73	----	2.05	"	120-130
29.56	16.50	17.55	0.880	5.3	17	18	1.74	----	1.97	"	"
29.67	13.80	14.65	0.830	6.0	14	15	1.75	----	1.61	"	"
29.77	13.60	14.41	0.740	5.4	14	14	1.75	----	1.58	"	"
29.87	12.80	13.54	0.650	5.1	13	14	1.76	----	1.48	"	"
29.98	11.80	12.46	0.580	4.9	12	12	1.77	----	1.68	"	"
30.08	12.20	12.87	0.540	4.4	12	13	1.77	----	1.39	"	"
30.18	12.70	13.38	0.560	4.4	13	13	1.78	----	1.46	"	"
30.28	12.70	13.36	0.590	4.6	13	13	1.78	----	1.46	"	"
30.39	11.40	11.97	0.560	4.9	11	12	1.79	----	1.61	"	"
30.49	8.30	8.70	0.530	6.4	8	9	1.80	----	1.31	"	110-120
30.59	9.70	10.16	0.460	4.7	10	10	1.80	----	1.32	"	"
30.69	12.20	12.76	0.410	3.4	8	9	1.81	----	1.39	Silty CLAY to CLAY	"
30.79	10.20	10.66	0.450	4.4	10	11	1.81	----	1.40	CLAY	"
30.90	12.10	12.63	0.570	4.7	12	13	1.82	----	1.37	"	120-130
31.00	16.60	17.29	0.720	4.3	17	17	1.83	----	1.97	"	"
31.10	18.90	19.66	0.710	3.8	13	13	1.83	----	2.28	Silty CLAY to CLAY	"
31.20	19.40	20.15	0.690	3.6	13	13	1.84	----	2.35	"	"
31.29	18.00	18.67	0.660	3.7	12	12	1.84	----	2.16	"	"
31.40	17.10	17.71	0.600	3.5	11	12	1.85	----	2.04	"	"
31.50	16.00	16.55	0.540	3.4	11	11	1.86	----	1.89	"	"
31.61	16.10	16.63	0.510	3.2	8	8	1.86	----	1.90	Clayey SILT to Silty CLAY	"
31.71	15.70	16.19	0.510	3.2	10	11	1.87	----	1.85	Silty CLAY to CLAY	"
31.81	14.70	15.14	0.510	3.5	10	10	1.88	----	1.71	"	"
31.91	15.20	15.63	0.500	3.3	10	10	1.88	----	1.78	"	"
32.02	13.10	13.45	0.490	3.7	9	9	1.89	----	1.50	"	"
32.12	13.80	14.15	0.470	3.4	9	9	1.90	----	1.59	"	"
32.23	14.40	14.74	0.430	3.0	7	7	1.90	----	1.67	Clayey SILT to Silty CLAY	"
32.33	13.50	13.80	0.410	3.0	9	9	1.91	----	1.55	Silty CLAY to CLAY	"
32.43	12.60	12.86	0.430	3.4	8	9	1.92	----	1.43	"	"
32.54	14.80	15.08	0.460	3.1	10	10	1.92	----	1.72	"	"
32.64	16.50	16.78	0.540	3.3	11	11	1.93	----	1.95	"	"
32.74	17.80	18.08	0.680	3.8	12	12	1.93	----	2.12	"	"
32.85	22.20	22.51	0.750	3.4	11	11	1.94	----	2.71	Clayey SILT to Silty CLAY	"
32.95	19.50	19.74	0.720	3.7	13	13	1.95	----	2.34	Silty CLAY to CLAY	"
33.05	15.50	15.67	0.630	4.1	16	16	1.95	----	1.81	CLAY	"
33.15	14.50	14.64	0.540	3.7	10	10	1.96	----	1.68	Silty CLAY to CLAY	"
33.24	13.30	13.41	0.500	3.8	9	9	1.97	----	1.52	"	"
33.34	12.90	12.99	0.470	3.6	9	9	1.97	----	1.46	"	"
33.44	11.80	11.86	0.490	4.2	12	12	1.98	----	1.64	CLAY	"
33.54	10.60	10.64	0.490	4.6	11	11	1.98	----	1.44	"	"
33.65	9.60	9.62	0.460	4.8	10	10	1.99	----	1.27	"	110-120
33.75	9.00	9.01	0.430	4.8	9	9	2.00	----	1.17	"	"
33.85	10.00	10.00	0.390	3.9	10	10	2.00	----	1.34	"	"
33.96	9.70	9.70	0.360	3.7	10	10	2.01	----	1.29	"	"
34.06	9.70	9.70	0.380	3.9	10	10	2.01	----	1.29	"	"
34.16	10.30	10.30	0.400	3.9	10	10	2.02	----	1.39	"	"
34.26	9.80	9.80	0.420	4.3	10	10	2.02	----	1.30	"	"
34.37	11.00	10.99	0.470	4.3	11	11	2.03	----	1.50	"	120-130
34.47	10.80	10.79	0.450	4.2	11	11	2.03	----	1.47	"	110-120

34.57	11.20	11.19	0.450	4.0	11	11	2.04	----	1.53	"	120-130
34.60	6.60	6.59	0.450	6.8	7	7	2.04	----	0.92	"	110-120
34.66	12.30	12.29	0.460	3.7	8	8	2.05	----	1.37	Silty CLAY to CLAY	120-130
34.76	12.20	12.19	0.440	3.6	8	8	2.05	----	1.36	"	"
34.86	13.10	13.08	0.420	3.2	9	9	2.06	----	1.48	"	"
34.97	12.70	12.68	0.460	3.6	8	8	2.07	----	1.42	"	"
35.07	14.50	14.48	0.500	3.4	10	10	2.07	----	1.66	"	"
35.17	14.80	14.78	0.510	3.4	10	10	2.08	----	1.70	"	"
35.27	14.50	14.48	0.540	3.7	10	10	2.08	----	1.66	"	"
35.38	13.80	13.77	0.560	4.1	14	14	2.09	----	1.56	CLAY	"
35.46	14.10	14.07	0.520	3.7	9	9	2.10	----	1.60	Silty CLAY to CLAY	"
35.56	13.90	13.87	0.480	3.5	9	9	2.10	----	1.58	"	"
35.67	12.20	12.17	0.470	3.9	12	12	2.11	----	1.35	CLAY	"
35.77	10.70	10.68	0.460	4.3	11	11	2.11	----	1.44	"	110-120
35.87	10.00	9.98	0.440	4.4	10	10	2.12	----	1.32	"	"
35.98	11.00	10.97	0.450	4.1	11	11	2.13	----	1.48	"	"
36.08	11.70	11.67	0.490	4.2	12	12	2.13	----	1.60	"	120-130
36.18	12.70	12.66	0.530	4.2	13	13	2.14	----	1.41	"	"
36.29	13.30	13.26	0.580	4.4	13	13	2.14	----	1.49	"	"
36.39	14.60	14.56	0.620	4.2	15	15	2.15	----	1.66	"	"
36.49	15.90	15.85	0.620	3.9	11	11	2.16	----	1.84	Silty CLAY to CLAY	"
36.60	17.10	17.04	0.650	3.8	11	11	2.16	----	1.99	"	"
36.70	20.10	20.03	0.680	3.4	10	10	2.17	----	2.39	Clayey SILT to Silty CLAY	"
36.80	21.40	21.32	0.720	3.4	11	11	2.18	----	2.57	"	"
36.90	19.80	19.73	0.740	3.7	13	13	2.18	----	2.35	Silty CLAY to CLAY	"
37.00	19.10	19.03	0.740	3.9	13	13	2.19	----	2.26	"	"
37.11	18.40	18.33	0.720	3.9	12	12	2.20	----	2.16	"	"
37.21	17.20	17.13	0.680	4.0	11	11	2.20	----	2.00	"	"
37.31	17.20	17.13	0.710	4.1	11	11	2.21	----	2.00	"	"
37.41	18.20	18.12	1.030	5.7	18	18	2.22	----	2.13	CLAY	130-140
37.52	23.20	23.10	1.770	7.6	23	23	2.22	----	2.80	"	"
37.62	60.50	60.22	2.140	3.5	30	30	2.23	----	7.77	Clayey SILT to Silty CLAY	"
37.72	72.70	72.35	2.490	3.4	29	29	2.24	----	9.40	Sandy SILT to Clayey SILT	"
37.79	71.40	71.05	2.700	3.8	36	36	2.24	----	9.22	Clayey SILT to Silty CLAY	"
37.97	81.70	81.28	1.860	2.3	27	27	2.26	37	----	Silty SAND to Sandy SILT	"
38.07	90.30	89.82	1.760	1.9	30	30	2.26	37	----	"	"
38.15	83.50	83.05	1.890	2.3	28	28	2.27	37	----	"	"
38.24	63.60	63.25	1.630	2.6	25	25	2.28	----	8.18	Sandy SILT to Clayey SILT	"
38.33	39.10	38.88	1.260	3.2	20	19	2.28	----	4.91	Clayey SILT to Silty CLAY	"
38.43	21.50	21.38	1.120	5.2	22	21	2.29	----	2.57	CLAY	"
38.53	14.40	14.31	1.110	7.7	14	14	2.30	----	1.62	"	"
38.63	19.40	19.28	0.870	4.5	19	19	2.30	----	2.28	"	120-130
38.74	20.70	20.57	0.820	4.0	14	14	2.31	----	2.46	Silty CLAY to CLAY	"
38.84	22.90	22.75	0.850	3.7	15	15	2.32	----	2.75	"	130-140
38.94	26.60	26.43	0.740	2.8	13	13	2.33	----	3.24	Clayey SILT to Silty CLAY	"
39.04	20.70	20.56	0.620	3.0	10	10	2.33	----	2.45	"	120-130
39.14	15.60	15.49	0.560	3.6	10	10	2.34	----	1.77	Silty CLAY to CLAY	"
39.24	14.80	14.70	0.580	3.9	10	10	2.34	----	1.67	"	"
39.34	15.30	15.19	0.600	3.9	10	10	2.35	----	1.73	"	"
39.44	15.40	15.29	0.630	4.1	15	15	2.36	----	1.74	CLAY	"
39.54	23.20	23.03	0.870	3.8	15	15	2.36	----	2.78	Silty CLAY to CLAY	130-140
39.64	35.70	35.44	1.120	3.1	18	18	2.37	----	4.45	Clayey SILT to Silty CLAY	"
39.74	31.70	31.46	1.080	3.4	16	16	2.38	----	3.91	"	"
39.84	23.70	23.52	1.210	5.1	24	24	2.39	----	2.85	CLAY	"
39.94	22.70	22.52	1.250	5.5	23	23	2.39	----	2.71	"	"

40.04	26.90	26.68	1.250	4.6	27	27	2.40	----	3.27	"	"
40.14	28.10	27.87	1.380	4.9	28	28	2.41	----	3.43	"	"
40.24	28.60	28.36	1.260	4.4	19	19	2.41	----	3.50	Silty CLAY to CLAY	"
40.34	28.30	28.06	1.030	3.6	14	14	2.42	----	3.46	Clayey SILT to Silty CLAY	"
40.44	20.40	20.23	0.790	3.9	14	13	2.43	----	2.40	Silty CLAY to CLAY	120-130
40.54	14.00	13.88	0.640	4.6	14	14	2.43	----	1.55	CLAY	"
40.64	12.80	12.69	0.540	4.2	13	13	2.44	----	1.39	"	"
40.74	11.70	11.60	0.460	3.9	12	12	2.45	----	1.55	"	"
40.84	10.90	10.80	0.470	4.3	11	11	2.45	----	1.41	"	"
40.95	11.60	11.49	0.500	4.3	12	11	2.46	----	1.53	"	"
41.05	12.50	12.38	0.500	4.0	13	12	2.47	----	1.34	"	"
41.26	12.40	12.28	0.510	4.1	12	12	2.48	----	1.33	"	"
41.37	11.00	10.89	0.460	4.2	11	11	2.49	----	1.43	"	"
41.47	11.70	11.58	0.440	3.8	12	12	2.49	----	1.54	"	"
41.57	13.80	13.66	0.500	3.6	9	9	2.50	----	1.51	Silty CLAY to CLAY	"
41.67	19.50	19.27	0.630	3.2	10	10	2.51	----	2.27	Clayey SILT to Silty CLAY	"
41.77	23.80	23.46	0.750	3.2	12	12	2.51	----	2.84	"	130-140
41.87	26.00	25.57	0.880	3.4	13	13	2.52	----	3.14	"	"
41.97	24.50	24.03	0.900	3.7	12	12	2.53	----	2.93	"	"
42.08	22.30	21.82	0.840	3.8	15	15	2.53	----	2.64	Silty CLAY to CLAY	"
42.18	20.70	20.21	0.740	3.6	14	13	2.54	----	2.43	"	120-130
42.28	17.80	17.34	0.640	3.6	12	12	2.55	----	2.04	"	"
42.38	17.60	17.11	0.540	3.1	9	9	2.55	----	2.01	Clayey SILT to Silty CLAY	"
42.48	17.90	17.37	0.520	2.9	9	9	2.56	----	2.05	"	"
42.59	17.90	17.33	0.560	3.1	9	9	2.57	----	2.05	"	"
42.69	18.50	17.87	0.590	3.2	9	9	2.57	----	2.13	"	"
42.79	18.50	17.83	0.610	3.3	9	9	2.58	----	2.13	"	"
42.90	18.90	18.18	0.640	3.4	9	9	2.59	----	2.18	"	"
43.00	19.80	19.00	0.650	3.3	10	9	2.59	----	2.30	"	"
43.10	20.40	19.53	0.680	3.3	10	10	2.60	----	2.38	"	"
43.20	20.50	19.58	0.730	3.6	14	13	2.61	----	2.39	Silty CLAY to CLAY	"
43.30	21.70	20.68	0.790	3.6	14	14	2.61	----	2.55	"	"
43.40	24.60	23.39	0.860	3.5	12	12	2.62	----	2.94	Clayey SILT to Silty CLAY	130-140
43.51	27.00	25.61	0.910	3.4	14	13	2.63	----	3.26	"	"
43.61	29.10	27.53	1.000	3.4	15	14	2.63	----	3.53	"	"
43.71	30.20	28.49	1.170	3.9	15	14	2.64	----	3.68	"	"
43.81	31.00	29.17	1.230	4.0	21	19	2.65	----	3.79	Silty CLAY to CLAY	"
43.91	29.50	27.69	1.240	4.2	20	18	2.66	----	3.59	"	"
44.01	26.80	25.09	1.160	4.3	18	17	2.66	----	3.22	"	"
44.12	24.60	22.97	1.350	5.5	25	23	2.67	----	2.93	CLAY	"
44.22	24.10	22.44	2.270	9.4	24	22	2.68	----	2.86	"	"
44.30	84.90	78.91	2.750	3.2	34	32	2.68	----	10.97	Sandy SILT to Clayey SILT	"
44.34	111.50	103.51	3.600	3.2	45	41	2.69	----	14.51	"	"
44.42	186.50	172.78	5.170	2.8	62	58	2.69	41	----	Silty SAND to Sandy SILT	"
44.52	303.60	280.54	5.830	1.9	61	56	2.70	44	----	SAND	"
44.60	373.60	344.56	7.040	1.9	75	69	2.71	45	----	"	"
44.70	393.00	361.45	10.740	2.7	197	181	2.71	45	----	SAND to Clayey SAND *	>140
44.77	401.80	368.77	11.270	2.8	201	184	2.72	46	----	"	"
44.87	402.70	368.60	12.470	3.1	201	184	2.73	46	----	"	"
44.96	340.90	311.21	10.290	3.0	170	156	2.73	45	----	"	"
45.01	357.60	326.06	9.310	2.6	179	163	2.74	45	----	"	130-140
45.12	303.00	275.38	9.780	3.2	152	138	2.75	44	----	"	>140
45.17	294.20	267.03	8.510	2.9	147	134	2.75	44	----	"	"
45.29	302.00	273.25	7.900	2.6	151	137	2.76	44	----	"	130-140
45.38	308.70	278.64	7.770	2.5	103	93	2.76	44	----	Silty SAND to Sandy SILT	"

45.47	290.10	261.17	13.710	4.7	290	261	2.77	----	38.32	Very Stiff Fine Grained *	>140
45.56	318.30	285.85	15.570	4.9	318	286	2.78	----	42.08	"	"
45.64	408.90	366.34	13.810	3.4	204	183	2.79	45	----	SAND to Clayey SAND *	"
45.72	512.60	458.24	14.620	2.9	256	229	2.79	47	----	"	"
45.77	428.40	382.37	12.710	3.0	214	191	2.80	46	----	"	"
45.83	516.30	460.11	13.500	2.6	258	230	2.80	47	----	"	"
45.87	613.40	546.00	13.460	2.2	307	273	2.80	48	----	"	130-140
45.90	713.40	634.45	9.070	1.3	143	127	2.81	>48	----	SAND	"
45.94	666.80	592.55	6.080	0.9	111	99	2.81	>48	----	Gravelly SAND to SAND	120-130
45.97	647.60	574.93	7.460	1.2	130	115	2.81	>48	----	SAND	130-140
46.01	617.00	547.20	8.820	1.4	123	109	2.81	48	----	"	"
46.05	474.00	419.93	8.970	1.9	95	84	2.82	46	----	"	"
46.09	649.20	574.49	9.090	1.4	130	115	2.82	>48	----	"	"
46.13	649.90	574.56	8.820	1.4	130	115	2.82	>48	----	"	"
46.16	642.00	567.11	8.590	1.3	128	113	2.82	>48	----	"	"
46.22	602.60	531.45	9.240	1.5	121	106	2.83	48	----	"	"
46.30	625.40	550.37	9.120	1.5	125	110	2.83	48	----	"	"
46.38	587.90	516.23	8.860	1.5	118	103	2.84	47	----	"	"
46.46	571.90	501.03	8.120	1.4	114	100	2.85	47	----	"	"
46.54	532.50	465.49	6.710	1.3	107	93	2.85	47	----	"	"
46.65	532.10	464.00	4.420	0.8	89	77	2.86	47	----	Gravelly SAND to SAND	120-130
46.69	526.30	458.47	3.960	0.8	88	76	2.86	47	----	"	"
46.72	592.80	516.00	4.580	0.8	99	86	2.86	47	----	"	"

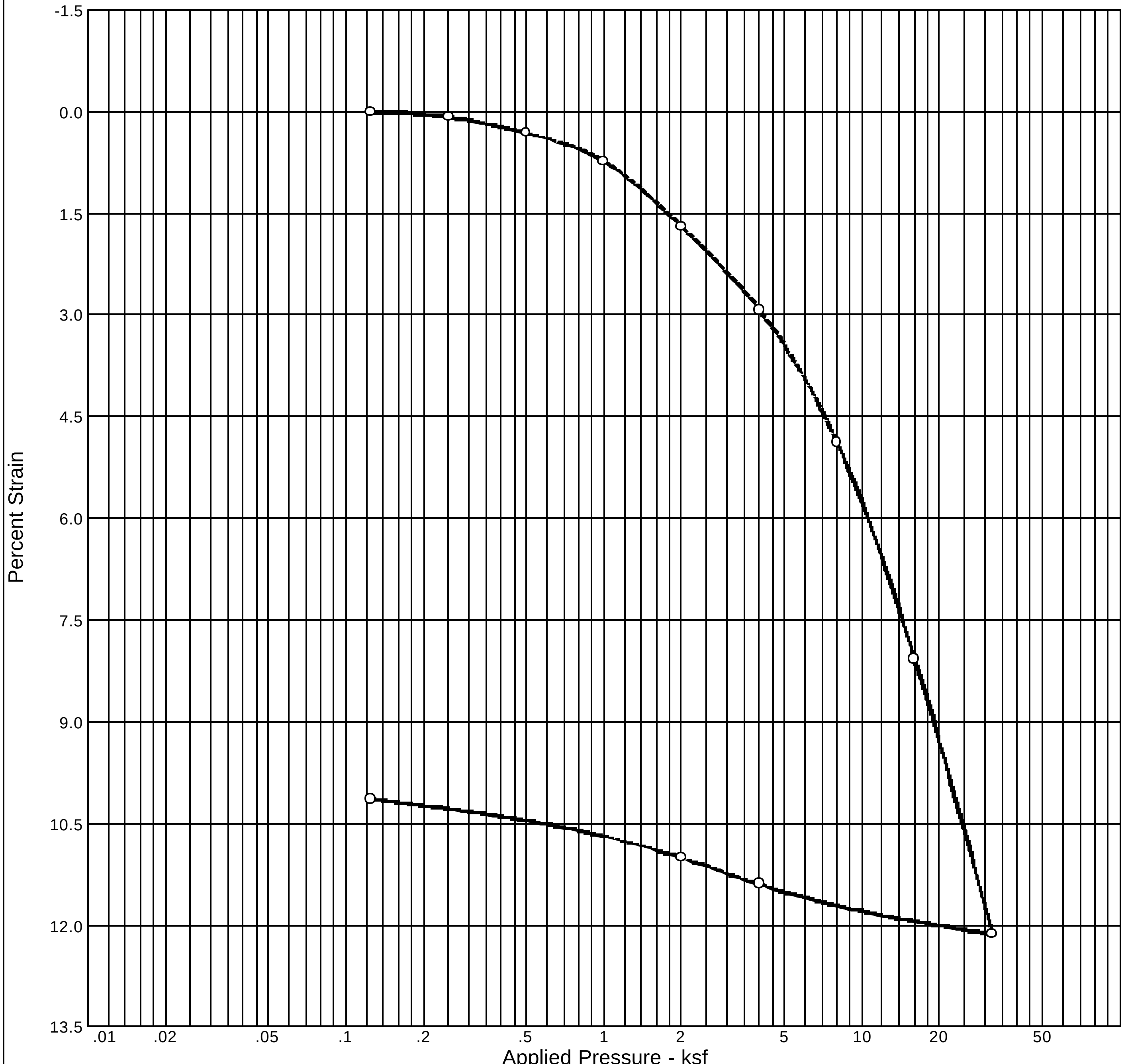
APPENDIX B1

ENGEO INCORPORATED (2008)

Laboratory Test Results

6486.200.601
November 24, 2008

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.5 %	36.6 %	84.9	31	NP	2.72	SM	A-4(0)	1.000

MATERIAL DESCRIPTION

Dark yellowish brown silty SAND

Project No. 6486.200.601 **Client:**

Project: Sutter Medical Center. Santa Rosa, CA

Source: **Sample No.:** 3-B1@18 **Elev./Depth:** 18.0 ft.

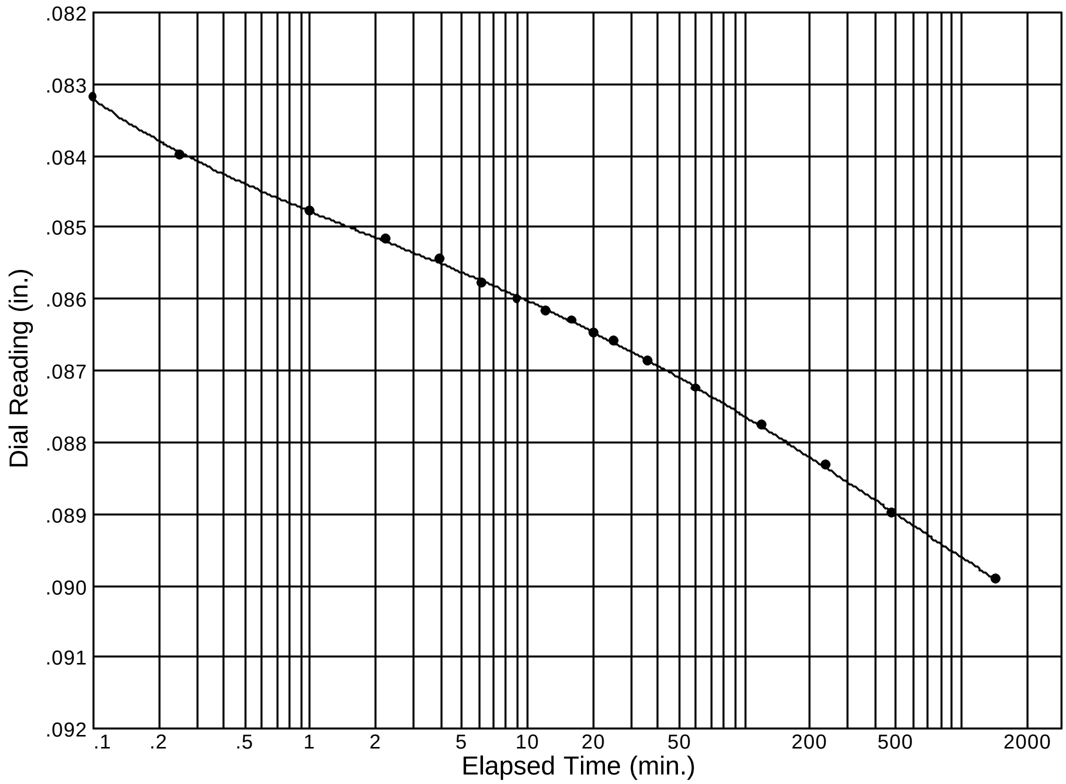
Remarks:

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Dial Reading vs. Time

Project No.: 6486.200.601
Project: Sutter Medical Center. Santa Rosa, CA

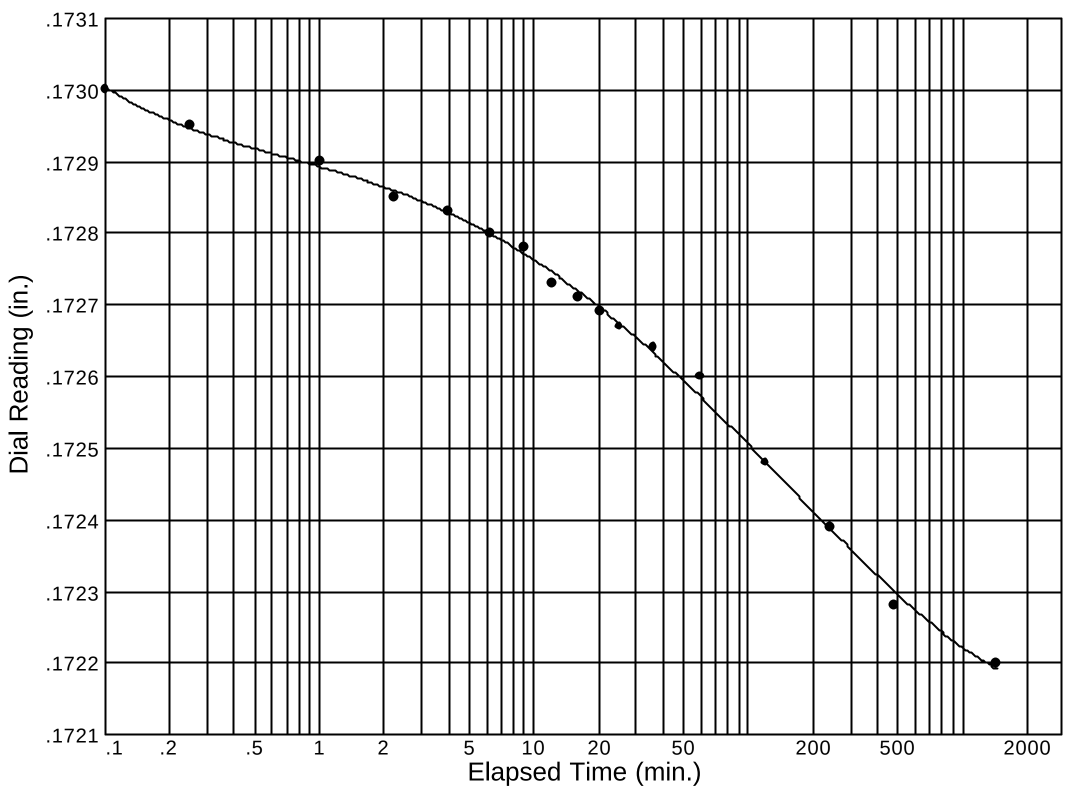
Source: Sample No.: 3-B1@18 Elev./Depth: 18.0 ft.



Load No.= 6
Load= 4.00 ksf
D_0 = 0.07730
D_{50} = 0.08344
D_{100} = 0.08958
T_{50} = 0.13 min.

C_v @ T_{50}
3.83 ft.^{2}/day

C_α = 0.002



Load No.= 11
Load= 2.00 ksf
D_0 = 0.17308
D_{50} = 0.17267
D_{100} = 0.17226
T_{50} = 25.69 min.

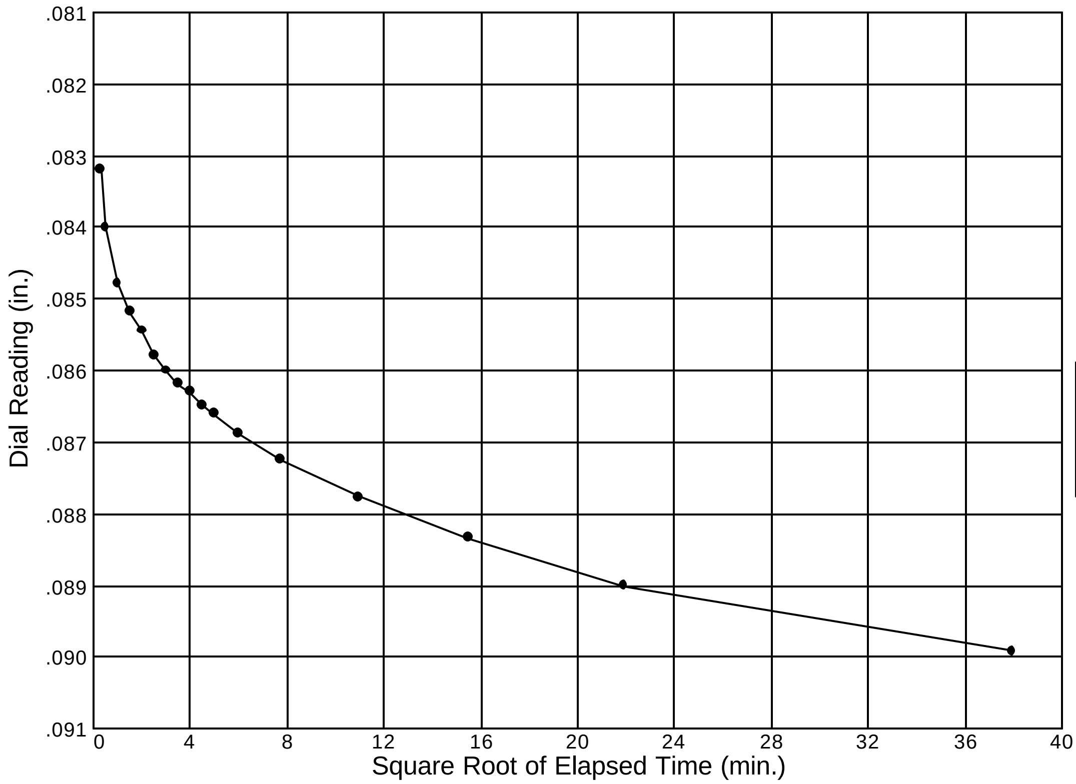
C_v @ T_{50}
0.02 ft.^{2}/day

ENGEO, INC.

Dial Reading vs. Time

Project No.: 6486.200.601
Project: Sutter Medical Center. Santa Rosa, CA

Source: Sample No.: 3-B1@18 Elev./Depth: 18.0 ft.



Load No.= 6

Load= 4.00 ksf

D_0 = 0.08299

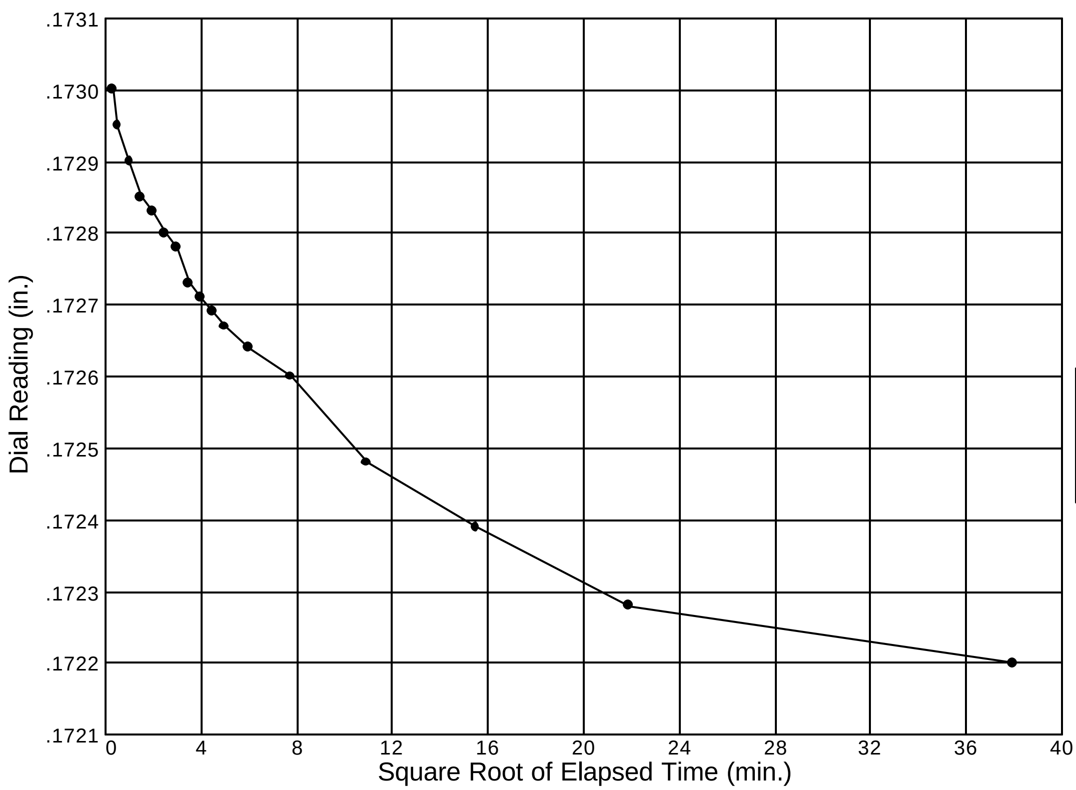
D_{90} = 0.08527

D_{100} = 0.08552

T_{90} = 2.79 min.

C_v @ T_{90}

0.75 ft.^{2}/day



Load No.= 11

Load= 2.00 ksf

D_0 = 0.17299

D_{90} = 0.17267

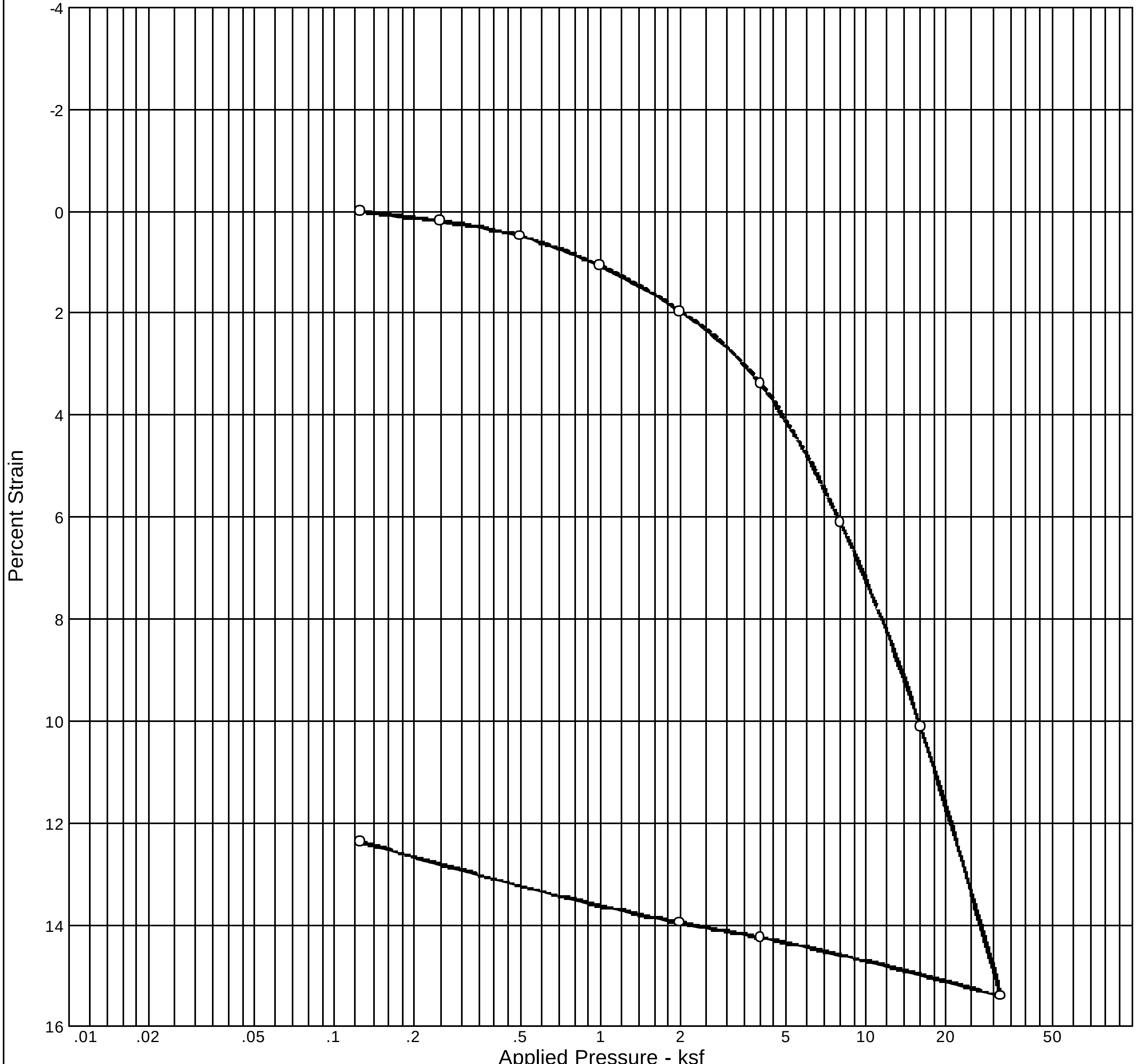
D_{100} = 0.17263

T_{90} = 25.28 min.

C_v @ T_{90}

0.07 ft.^{2}/day

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.4 %	33.9 %	86.7	40	21	2.64	CL	A-6(12)	0.901

MATERIAL DESCRIPTION

Dark yellowish brown silty CLAY with very fine sand

Project No. 6486.200.601 **Client:**

Project: Sutter Medical Center. Santa Rosa, CA

Source: **Sample No.:** 3-B3@18 **Elev./Depth:** 18.0 ft.

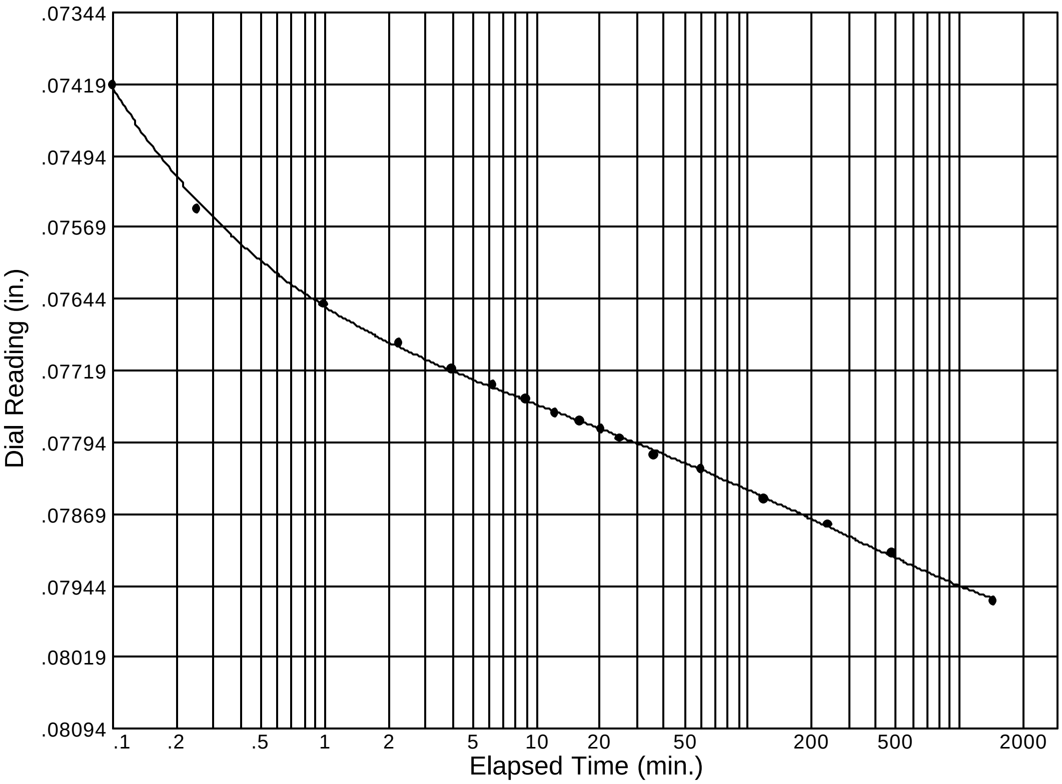
ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Remarks:

Dial Reading vs. Time

Project No.: 6486.200.601
Project: Sutter Medical Center. Santa Rosa, CA

Source: Sample No.: 3-B3@18 Elev./Depth: 18.0 ft.



Load No.= 5

Load= 2.00 ksf

D_0 = 0.07070

D_{50} = 0.07602

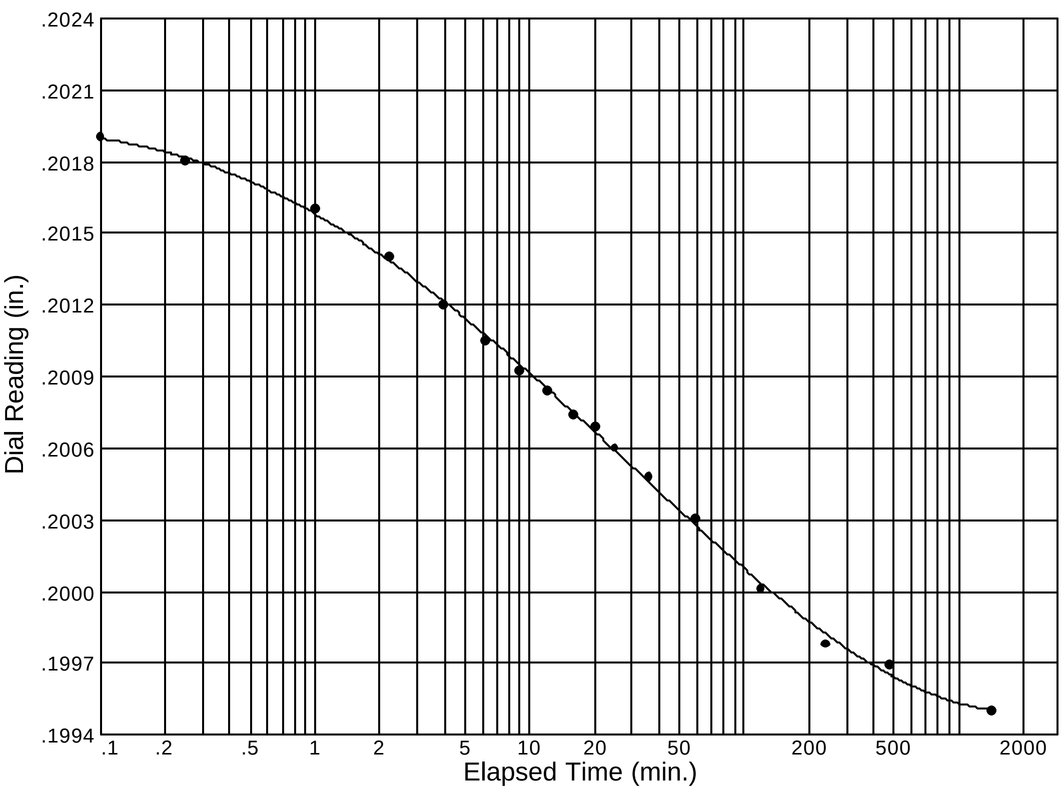
D_{100} = 0.08133

T_{50} = 0.48 min.

C_v @ T_{50}

0.99 ft.^{2}/day

C_α = 0.001



Load No.= 11

Load= 2.00 ksf

D_0 = 0.20205

D_{50} = 0.20095

D_{100} = 0.19985

T_{50} = 9.01 min.

C_v @ T_{50}

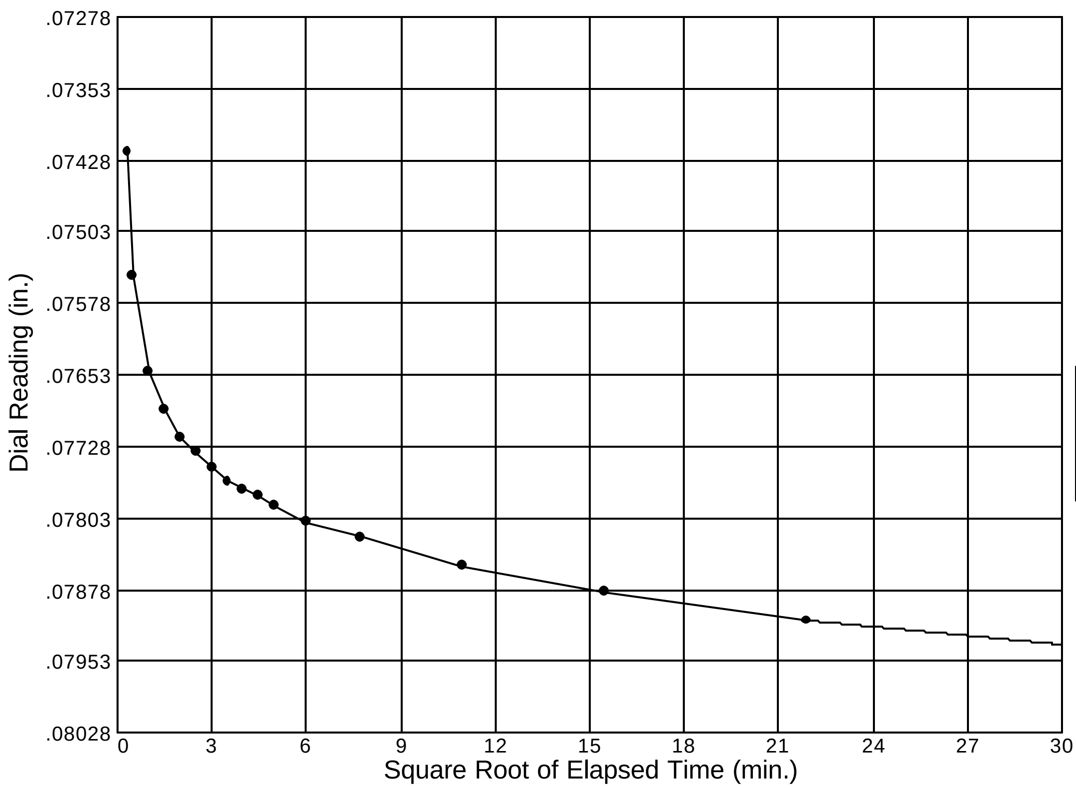
0.04 ft.^{2}/day

ENGEO, INC.

Dial Reading vs. Time

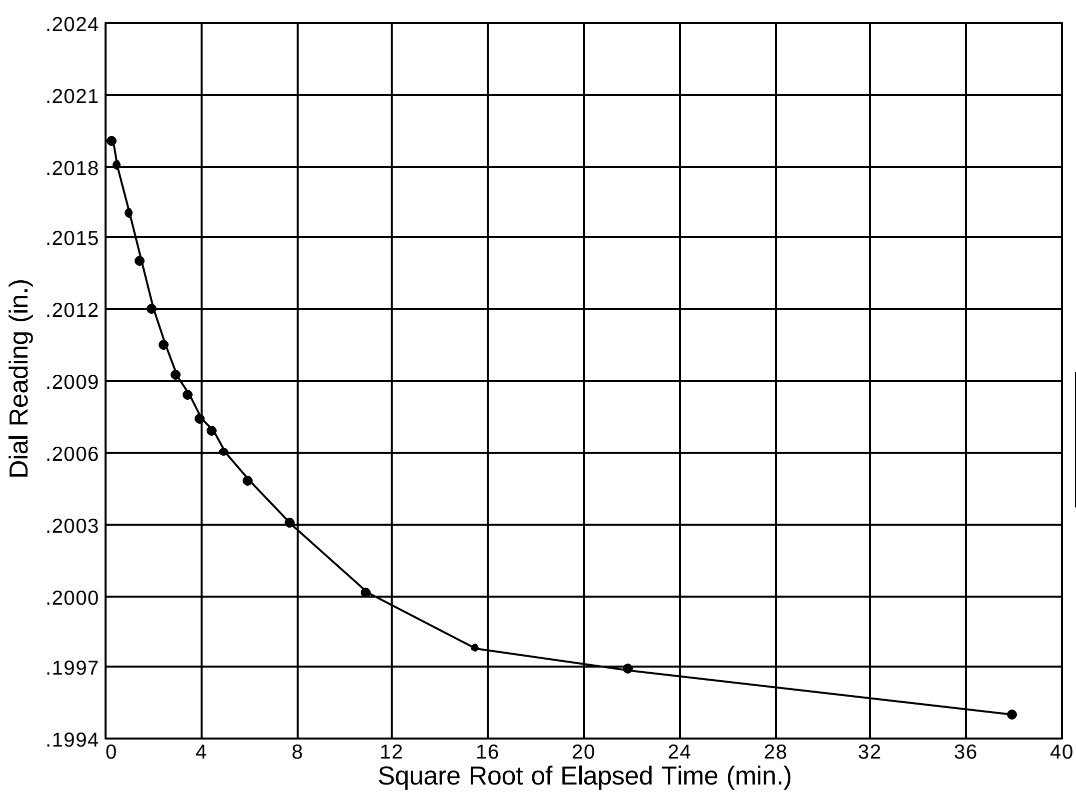
Project No.: 6486.200.601
Project: Sutter Medical Center. Santa Rosa, CA

Source: Sample No.: 3-B3@18 Elev./Depth: 18.0 ft.



Load No.= 5
Load= 2.00 ksf
D_0 = 0.07354
D_{90} = 0.07662
D_{100} = 0.07697
T_{90} = 1.33 min.

C_v @ T_{90}
1.55 ft.^{2}/day

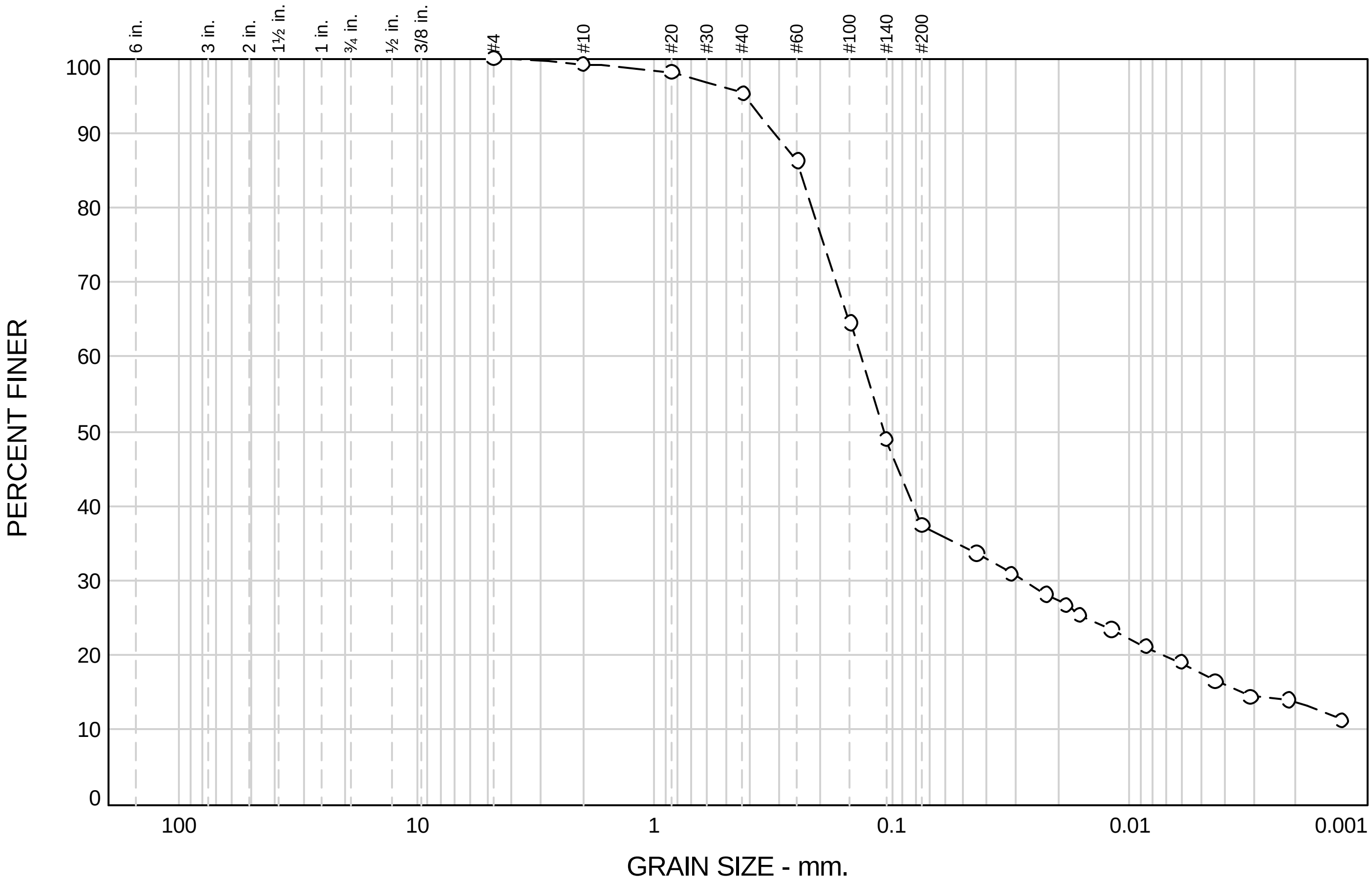


Load No.= 11
Load= 2.00 ksf
D_0 = 0.20198
D_{90} = 0.20081
D_{100} = 0.20068
T_{90} = 13.25 min.

C_v @ T_{90}
0.12 ft.^{2}/day

ENGEO, INC.

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	1	4	58	23	14

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	99		
#20	98		
#40	95		
#60	86		
#100	65		
#140	49		
#200	37		
0.0440 mm.	34		
0.0316 mm.	31		
0.0226 mm.	28		
0.0186 mm.	27		
0.0162 mm.	25		
0.0120 mm.	23		
0.0086 mm.	21		
0.0061 mm.	19		
0.0044 mm.	17		
0.0031 mm.	14		
0.0022 mm.	14		
0.0013 mm.	11		

* (no specification provided)

Soil Description

Dark yellowish brown silty SAND

Atterberg Limits

PL= 32 LL= 31 PI= NP

Coefficients

D_{85}= 0.2425 D_{60}= 0.1355 D_{50}= 0.1086
D_{30}= 0.0282 D_{15}= 0.0034 D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

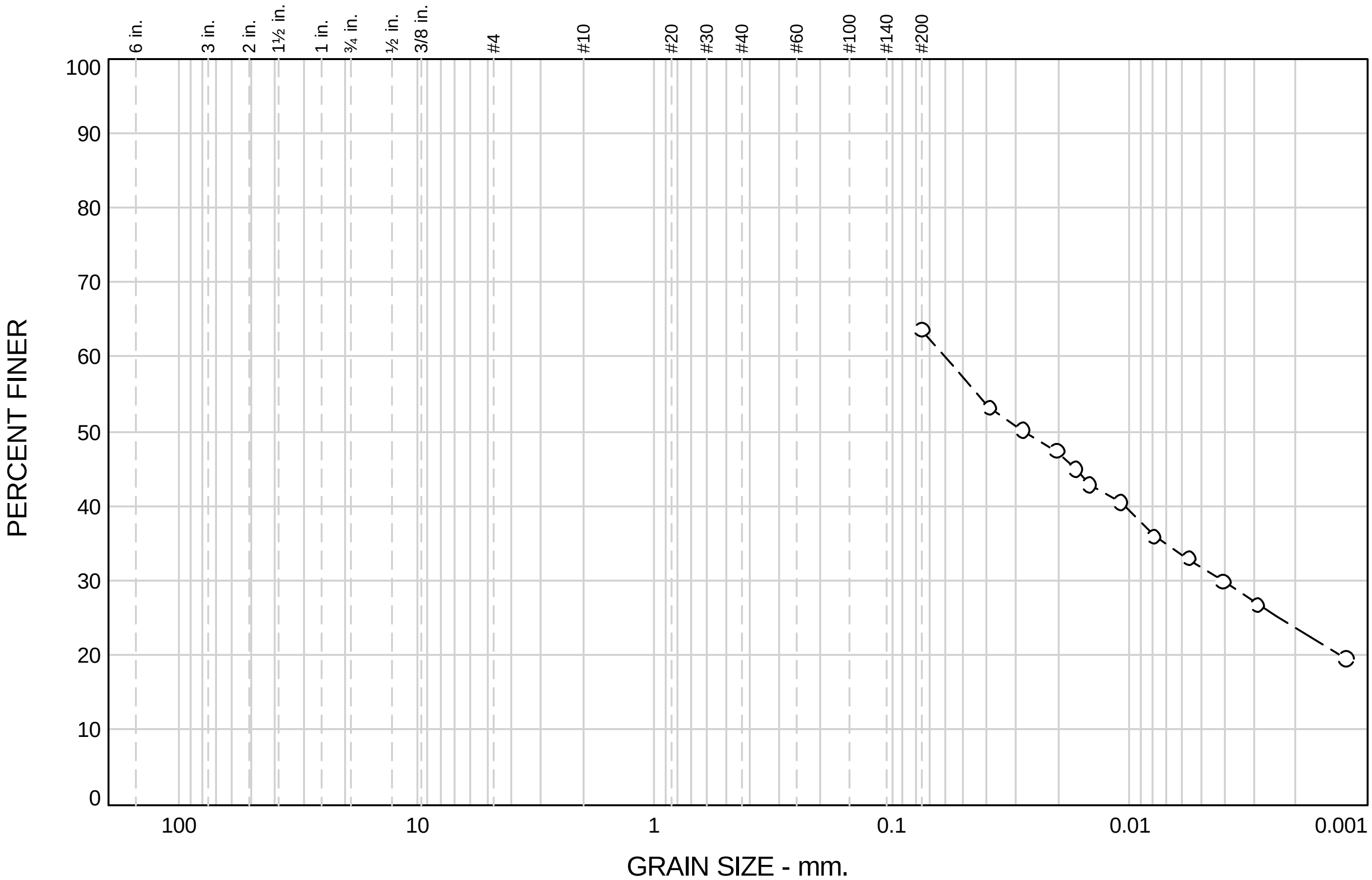
Sample No.: 3-B1@18 **Source of Sample:** **Date:**
Location: **Elev./Depth:** 17.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						40.0	23.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	63.6		
0.0392 mm.	53.2		
0.0283 mm.	50.2		
0.0203 mm.	47.4		
0.0169 mm.	44.9		
0.0148 mm.	42.8		
0.0109 mm.	40.5		
0.0079 mm.	36.0		
0.0057 mm.	32.9		
0.0041 mm.	29.9		
0.0029 mm.	26.7		
0.0012 mm.	19.5		

* (no specification provided)

Soil Description

Dark grayish brown sandy CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.0598 D_{50}= 0.0277
D_{30}= 0.0041 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

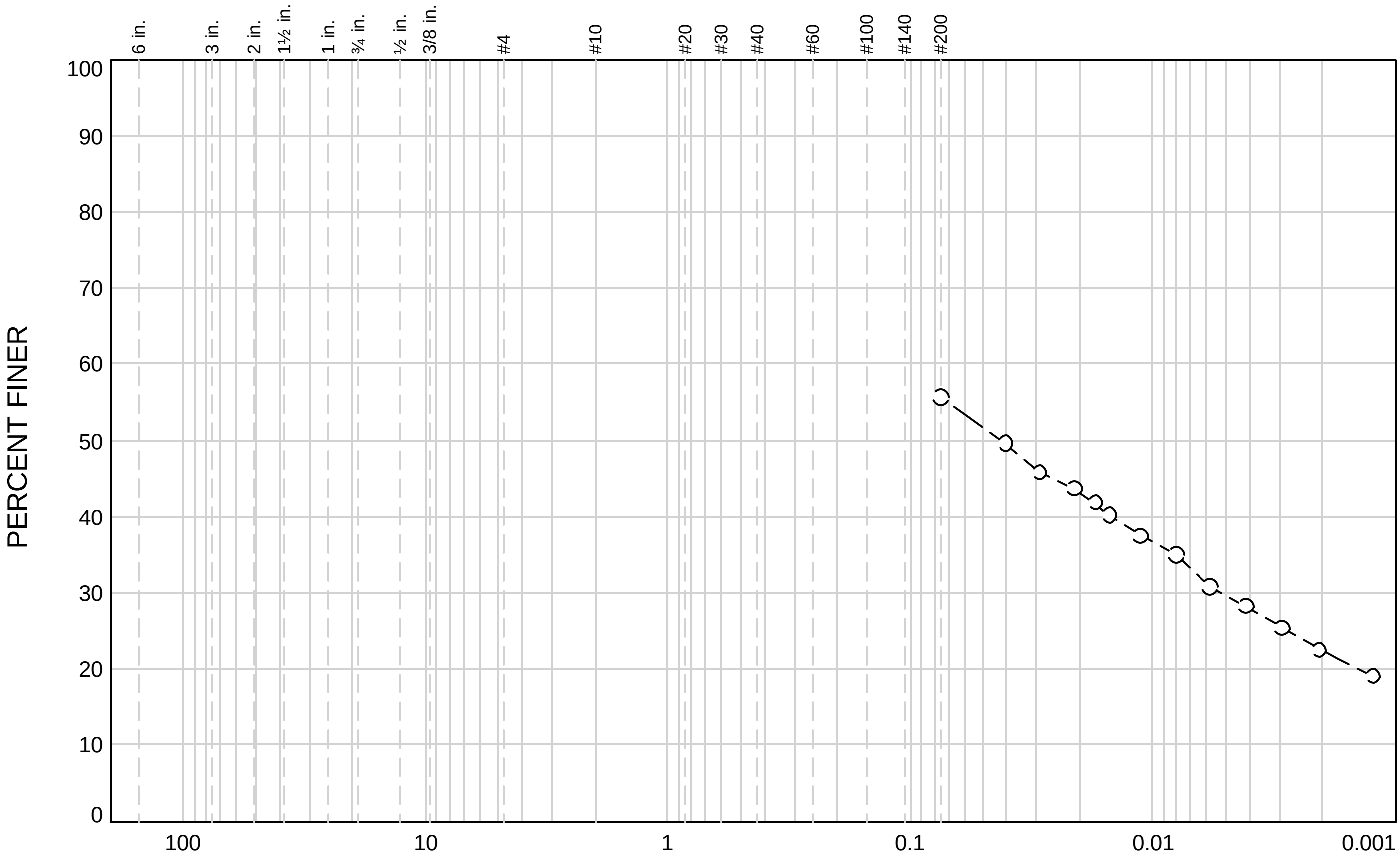
Sample No.: 3-B1@26 **Source of Sample:** **Date:** 10/23/08
Location: **Elev./Depth:** 26.0 feet

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						33.3	22.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	55.7		
0.0407 mm.	49.7		
0.0294 mm.	45.9		
0.0211 mm.	43.7		
0.0174 mm.	41.9		
0.0152 mm.	40.2		
0.0113 mm.	37.5		
0.0080 mm.	35.0		
0.0058 mm.	30.8		
0.0041 mm.	28.2		
0.0029 mm.	25.5		
0.0021 mm.	22.6		
0.0012 mm.	19.1		

* (no specification provided)

Soil Description

Dark yellowish brown sandy CLAY to clayey SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}= 0.0421
D_{30}= 0.0052 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL-SC AASHTO=

Remarks

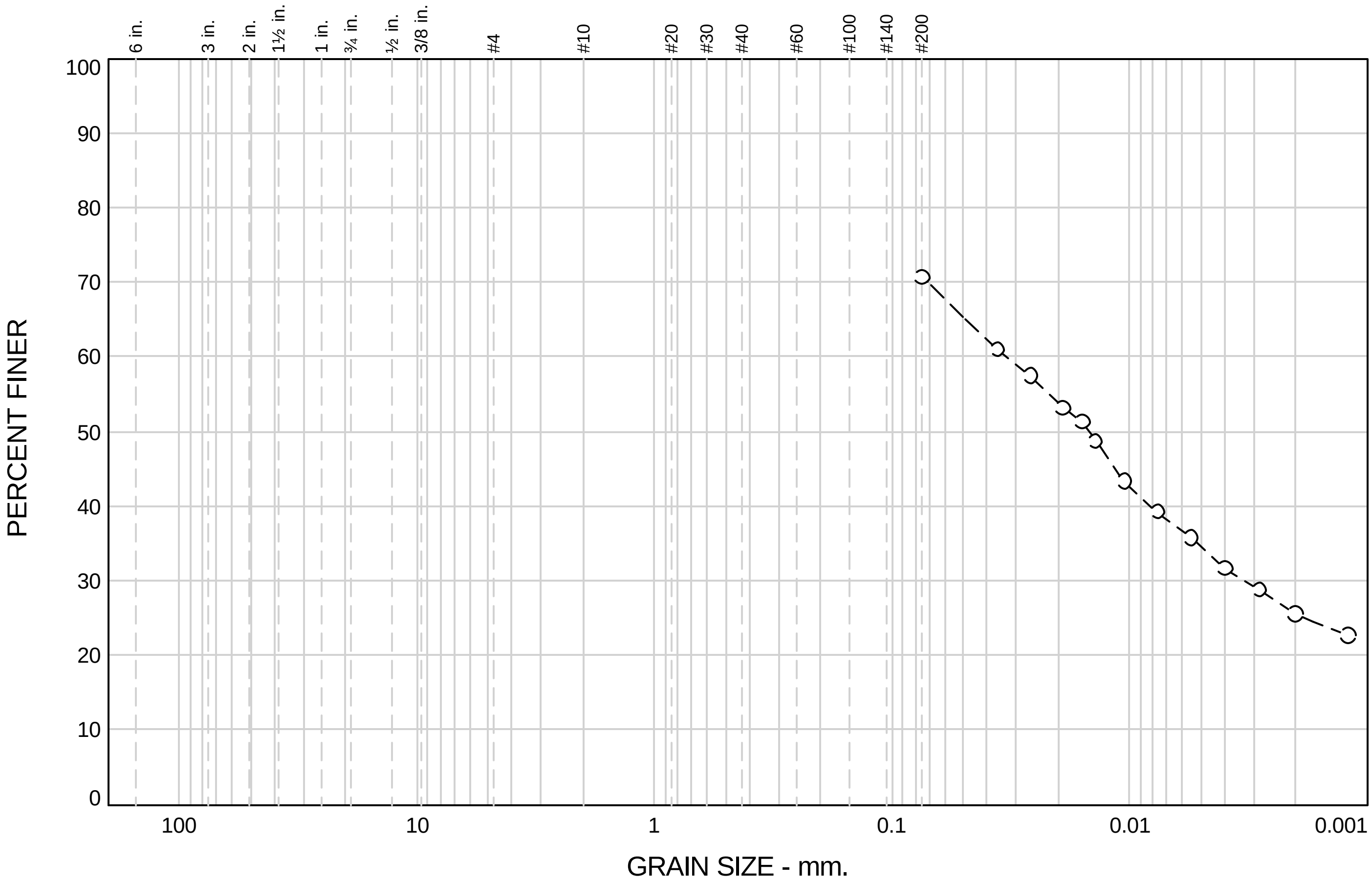
Sample No.: 3-B2@11 **Source of Sample:** **Date:** 10/23/08
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						45.2	25.5

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	70.7		
0.0361 mm.	61.0		
0.0263 mm.	57.5		
0.0192 mm.	53.3		
0.0159 mm.	51.3		
0.0140 mm.	48.8		
0.0106 mm.	43.4		
0.0077 mm.	39.2		
0.0055 mm.	35.8		
0.0040 mm.	31.7		
0.0028 mm.	28.7		
0.0020 mm.	25.6		
0.0012 mm.	22.7		

* (no specification provided)

Soil Description

Dark grayish brown sandy CLAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.0330 D_{50}= 0.0149
D_{30}= 0.0033 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

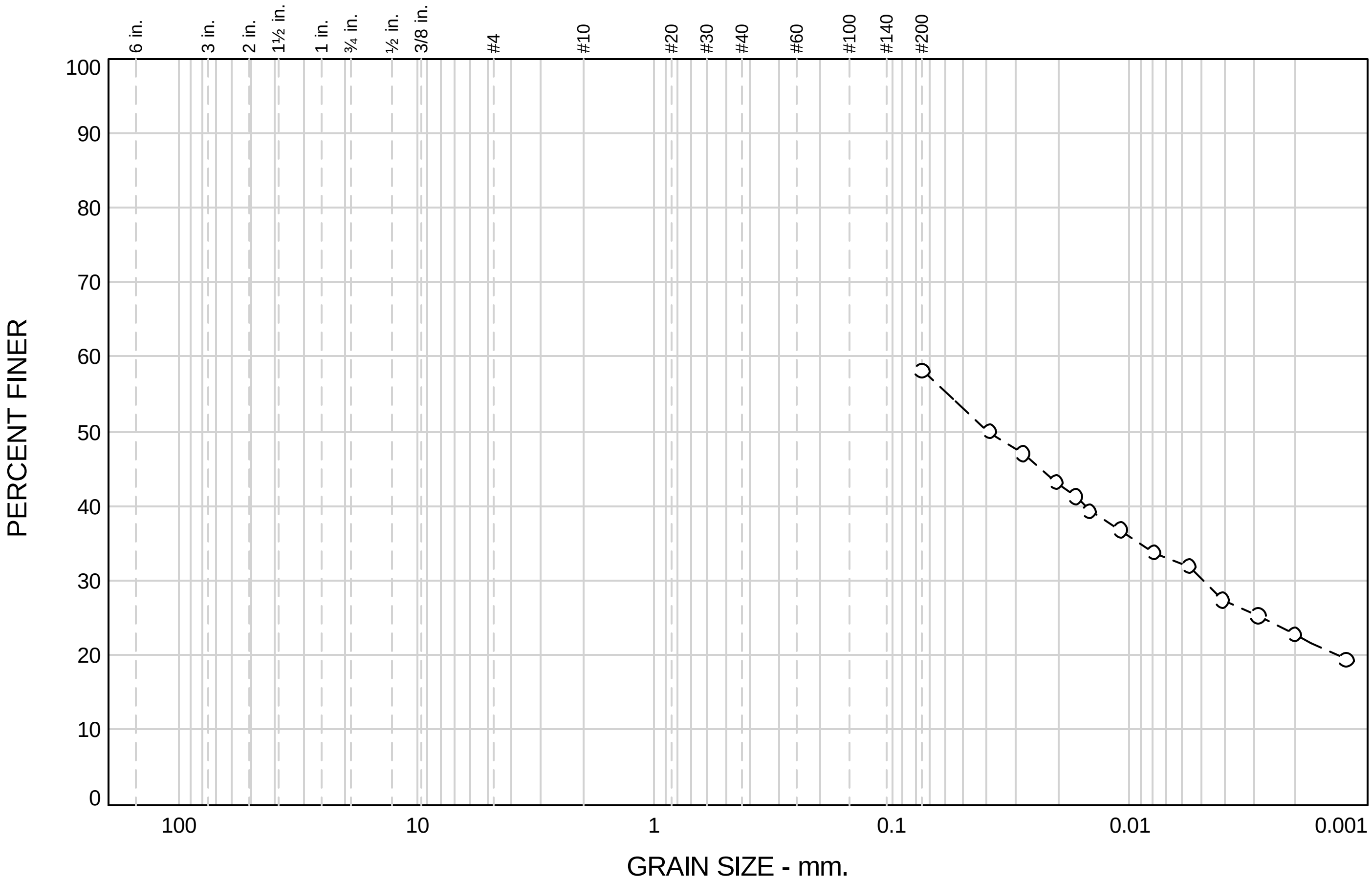
Sample No.: 3-B2@18 **Source of Sample:** **Date:** 10/23/08
Location: **Elev./Depth:** 18.0 feet

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						35.5	22.7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	58.2		
0.0391 mm.	50.0		
0.0282 mm.	47.0		
0.0205 mm.	43.2		
0.0169 mm.	41.3		
0.0148 mm.	39.4		
0.0110 mm.	36.8		
0.0079 mm.	33.8		
0.0056 mm.	32.0		
0.0041 mm.	27.4		
0.0029 mm.	25.3		
0.0020 mm.	22.8		
0.0012 mm.	19.5		

* (no specification provided)

Soil Description

Dark yellowish brown sandy silty CLAY

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}= 0.0392
D_{30}= 0.0049 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

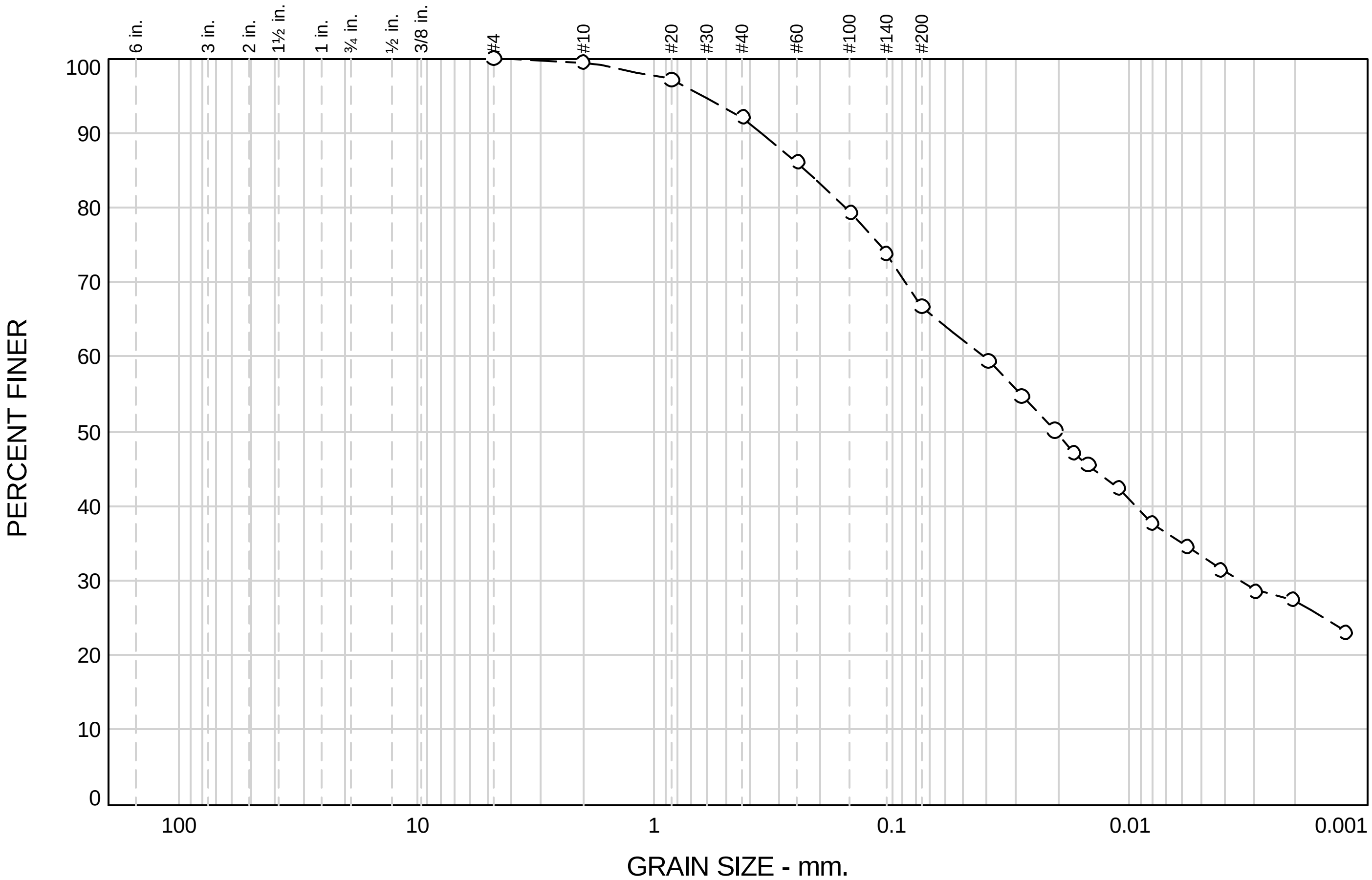
Sample No.: 3-B3@10 **Source of Sample:** **Date:** 10/23/05
Location: **Elev./Depth:** 10.0 feet

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	8	25	40	27

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	97		
#40	92		
#60	86		
#100	79		
#140	74		
#200	67		
0.0393 mm.	60		
0.0286 mm.	55		
0.0207 mm.	50		
0.0172 mm.	47		
0.0150 mm.	46		
0.0111 mm.	42		
0.0081 mm.	38		
0.0058 mm.	35		
0.0041 mm.	31		
0.0029 mm.	29		
0.0021 mm.	28		
0.0012 mm.	23		

* (no specification provided)

Soil Description

Dark yellowish brown sandy CLAY

Atterberg Limits

PL= 19 LL= 40 PI= 21

Coefficients

D_{85}= 0.2286 D_{60}= 0.0411 D_{50}= 0.0205
D_{30}= 0.0035 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO= A-6(12)

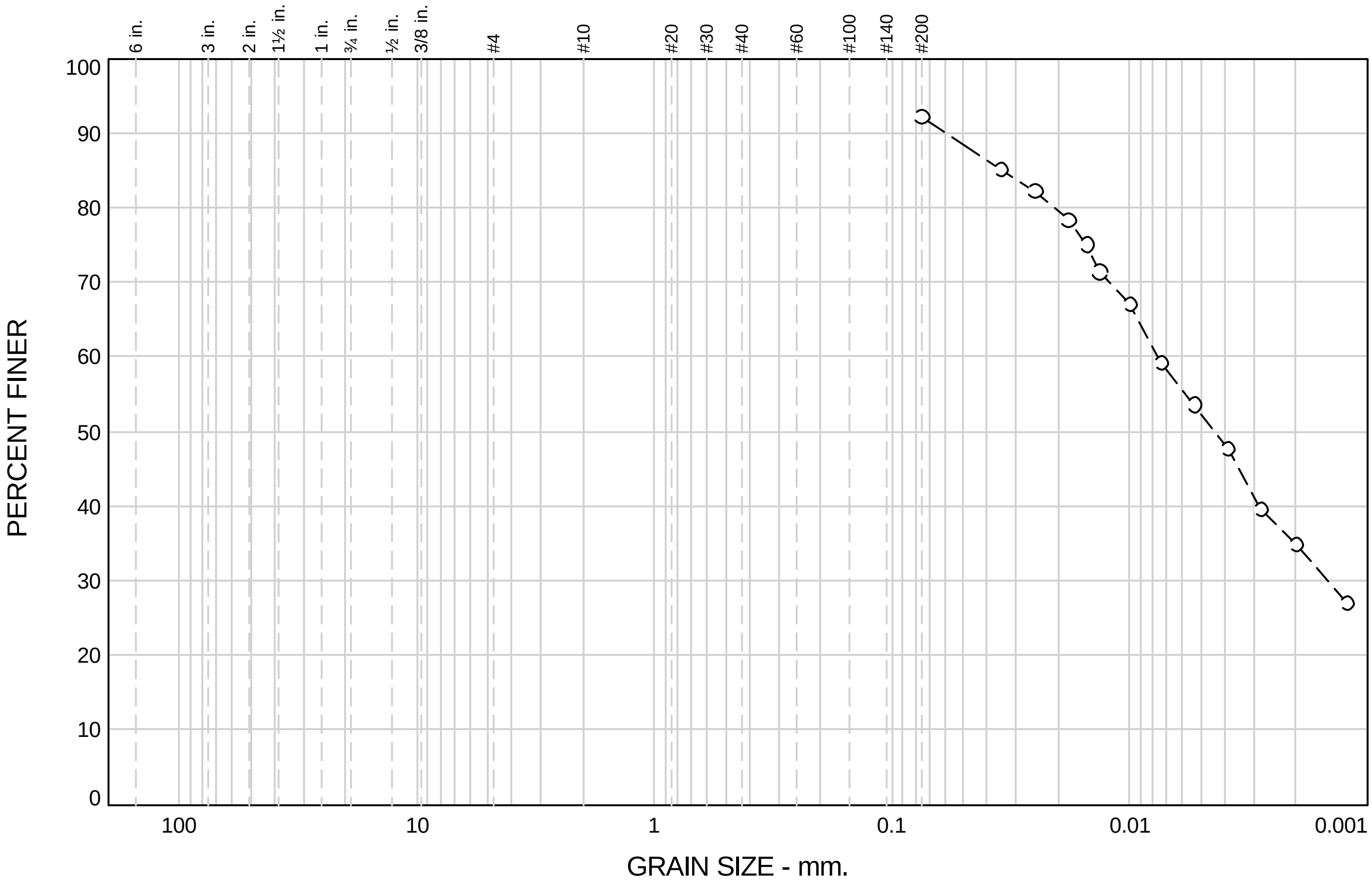
Remarks

Sample No.: 3-B3@18 **Source of Sample:** **Date:**
Location: **Elev./Depth:** 17.5 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA
Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						57.2	35.0

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	92.2		
0.0347 mm.	85.1		
0.0250 mm.	82.2		
0.0181 mm.	78.4		
0.0151 mm.	75.0		
0.0134 mm.	71.4		
0.0100 mm.	67.1		
0.0074 mm.	59.3		
0.0053 mm.	53.6		
0.0039 mm.	47.6		
0.0028 mm.	39.6		
0.0020 mm.	34.9		
0.0012 mm.	27.1		

* (no specification provided)

Soil Description

Dark grayish brown silty CLAY. Trace sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0344 D_{60}= 0.0076 D_{50}= 0.0044
D_{30}= 0.0015 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

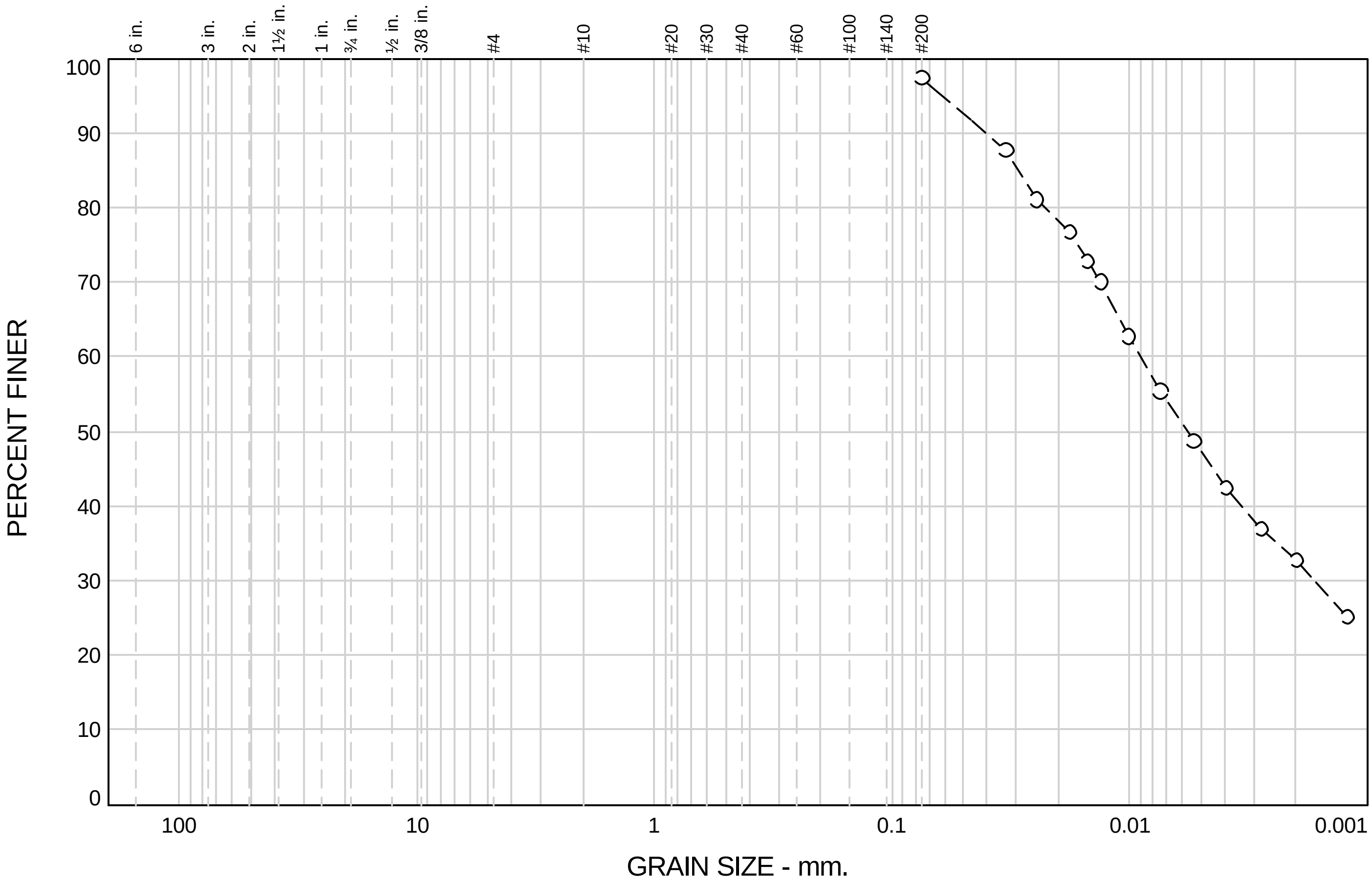
Sample No.: 3-B3@33 **Source of Sample:** **Date:** 10/23/08
Location: **Elev./Depth:** 33.0 feet

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						64.5	32.9

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	97.4		
0.0332 mm.	87.7		
0.0247 mm.	81.1		
0.0180 mm.	76.8		
0.0150 mm.	72.9		
0.0133 mm.	70.0		
0.0101 mm.	62.8		
0.0074 mm.	55.4		
0.0054 mm.	48.8		
0.0039 mm.	42.4		
0.0028 mm.	37.0		
0.0020 mm.	32.8		
0.0012 mm.	25.2		

* (no specification provided)

Soil Description

Dark grayish brown CLAY.

Atterberg Limits

PL= 25 LL= 60 PI= 35

Coefficients

D_{85}= 0.0294 D_{60}= 0.0090 D_{50}= 0.0057
D_{30}= 0.0017 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CH AASHTO=

Remarks

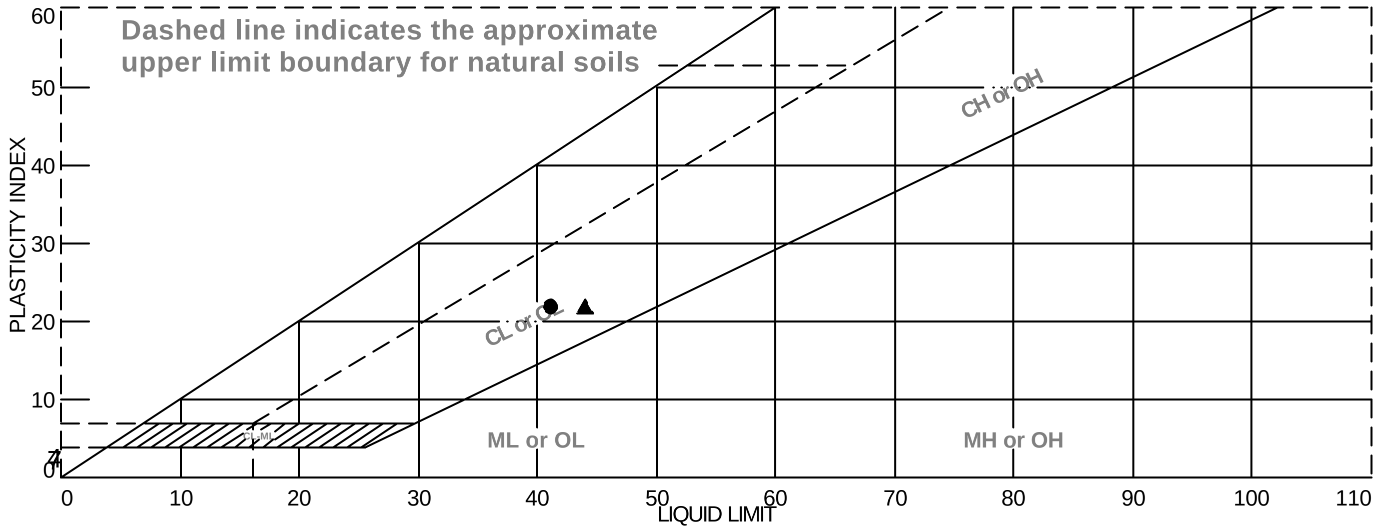
Sample No.: 3-B3@38 **Source of Sample:** **Date:**
Location: **Elev./Depth:** 38.0 ft.

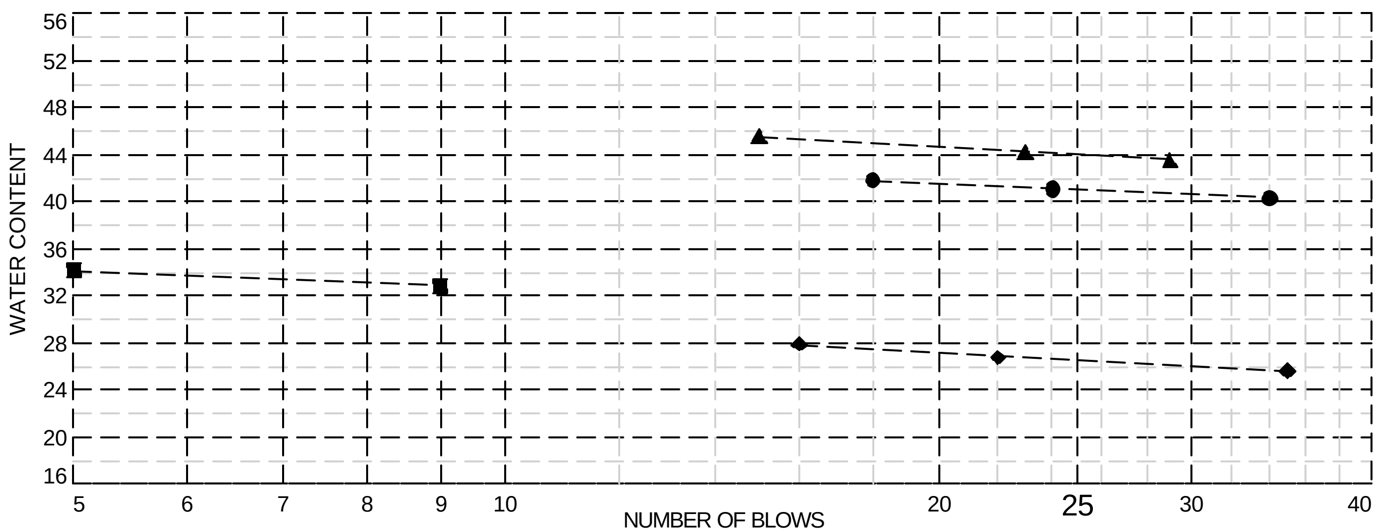
ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center. Santa Rosa, CA

Project No: 6486.200.601 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown sandy CLAY.	41	19	22			CL
■	Dark yellowish brown silty SAND	31	32	NP	95.4	37.4	SM
▲	Dark grayish brown sandy CLAY.	44	22	22			CL
◆	Dark grayish brown silty SAND.	26	26	NP			SM

Project No. 6486.200.601 **Client:**

Project: Sutter Medical Center. Santa Rosa, CA

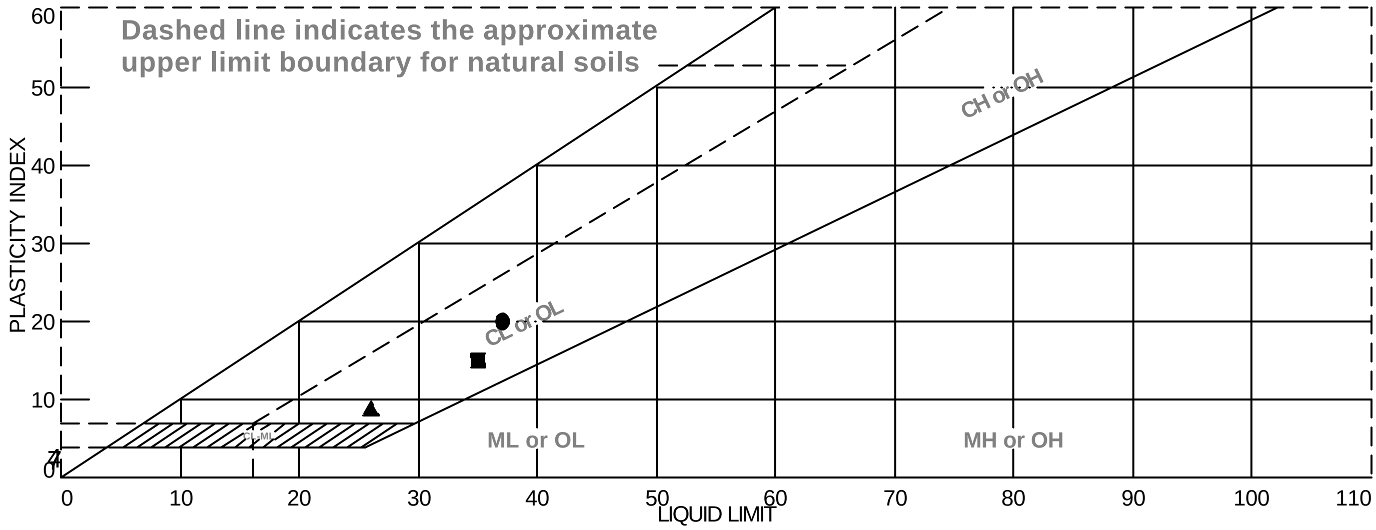
● **Sample Number:** 3-B1@10.5
■ **Sample Number:** 3-B1@18
▲ **Sample Number:** 3-B1@31
◆ **Sample Number:** 3-B1@35.5

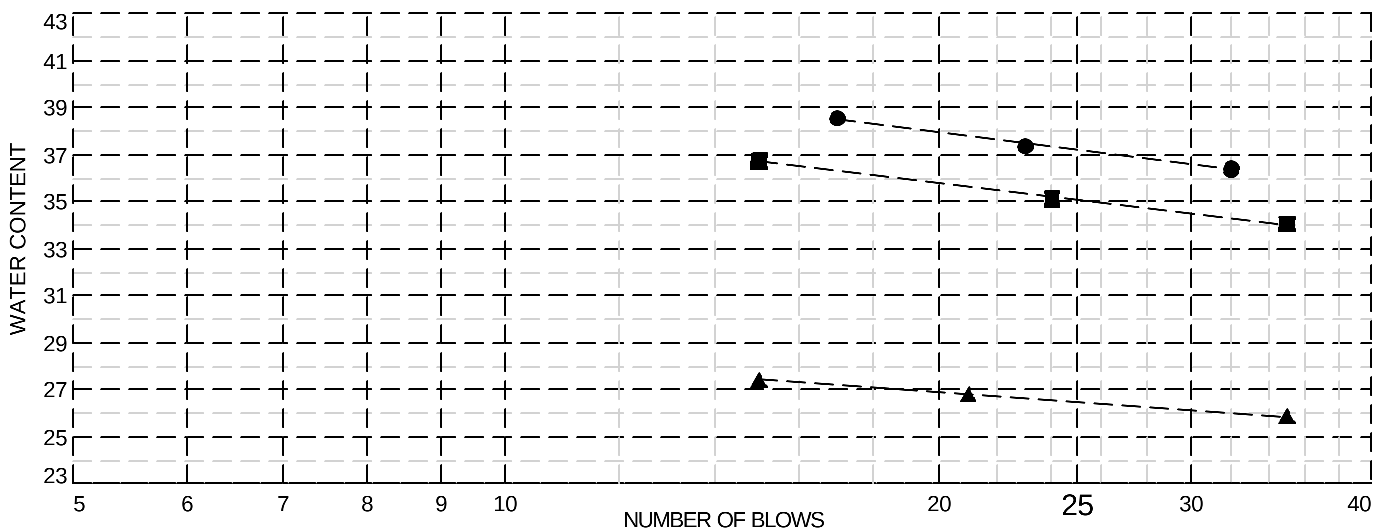
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Remarks:
● 3-B1@10.5'
■ 3-B1@18'
▲ 3-B1@31'
◆ 3-B1@35.5'

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown sandy CLAY.	37	17	20			CL
■	Dark grayish brown sandy CLAY.	35	20	15			CL
▲	Dark grayish brown sandy CLAY to clayey SAND	26	17	9			CL-SC

Project No. 6486.200.601 **Client:**

Project: Sutter Medical Center. Santa Rosa, CA

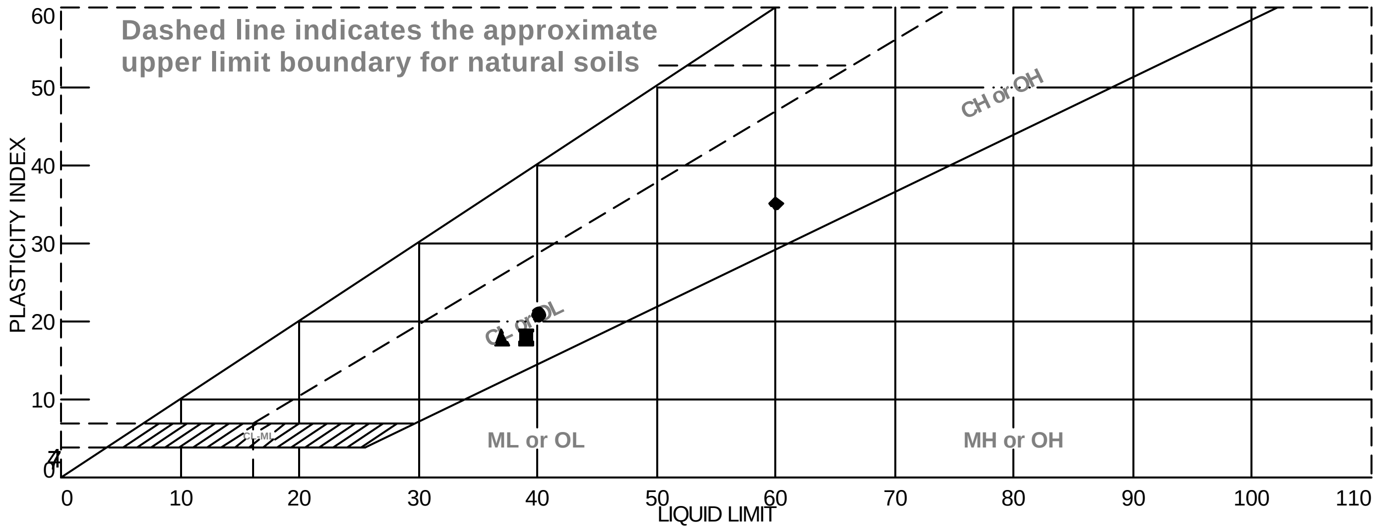
● **Sample Number:** 3-B2@16
■ **Sample Number:** 3-B2@23
▲ **Sample Number:** 3-B2@28

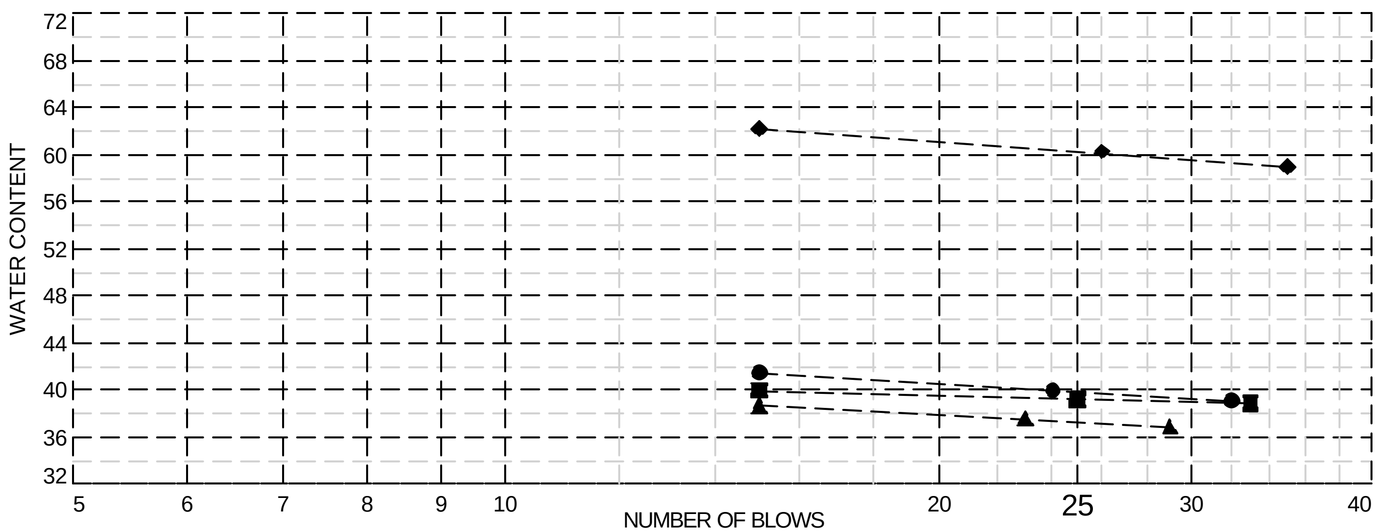
Remarks:
● 3-B2@16'
■ 3-B2@23'
▲ 3-B3@28'

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark yellowish brown silty CLAY with very fine sand	40	19	21	92.1	66.7	CL
■	Dark grayish brown sandy CLAY.	39	21	18			CL
▲	Dark grayish brown sandy CLAY.	37	19	18			CL
◆	Dark grayish brown CLAY.	60	25	35		97.4	CH

Project No. 6486.200.601 **Client:**

Project: Sutter Medical Center. Santa Rosa, CA

● **Sample Number:** 3-B3@18
■ **Sample Number:** 3-B3@23
▲ **Sample Number:** 3-B3@28
◆ **Sample Number:** 3-B3@38

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Remarks:
● 3-B3@18'
■ 3-B3@23'
▲ 3-B3@28'
◆ 3-B3@38'

Plate

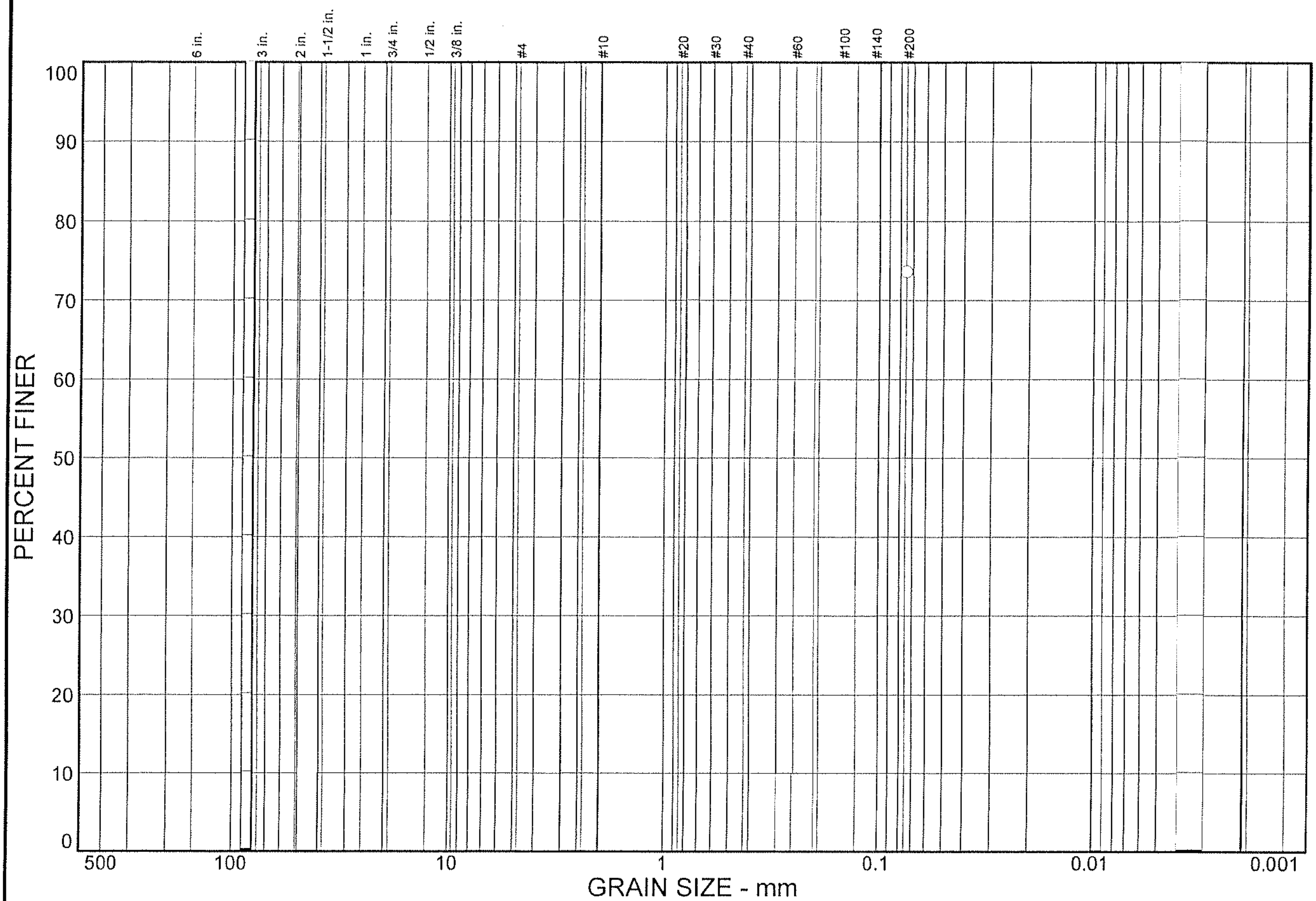
APPENDIX B2

ENGEO INCORPORATED (2004 AND 2005)

Laboratory Test Results

6486.200.601
November 24, 2008

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			73.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	73.6		#20●

* (no specification provided)

Soil Description

Brown sandy CLAY

Atterberg Limits

PL= 23 LL= 42 PI= 19

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

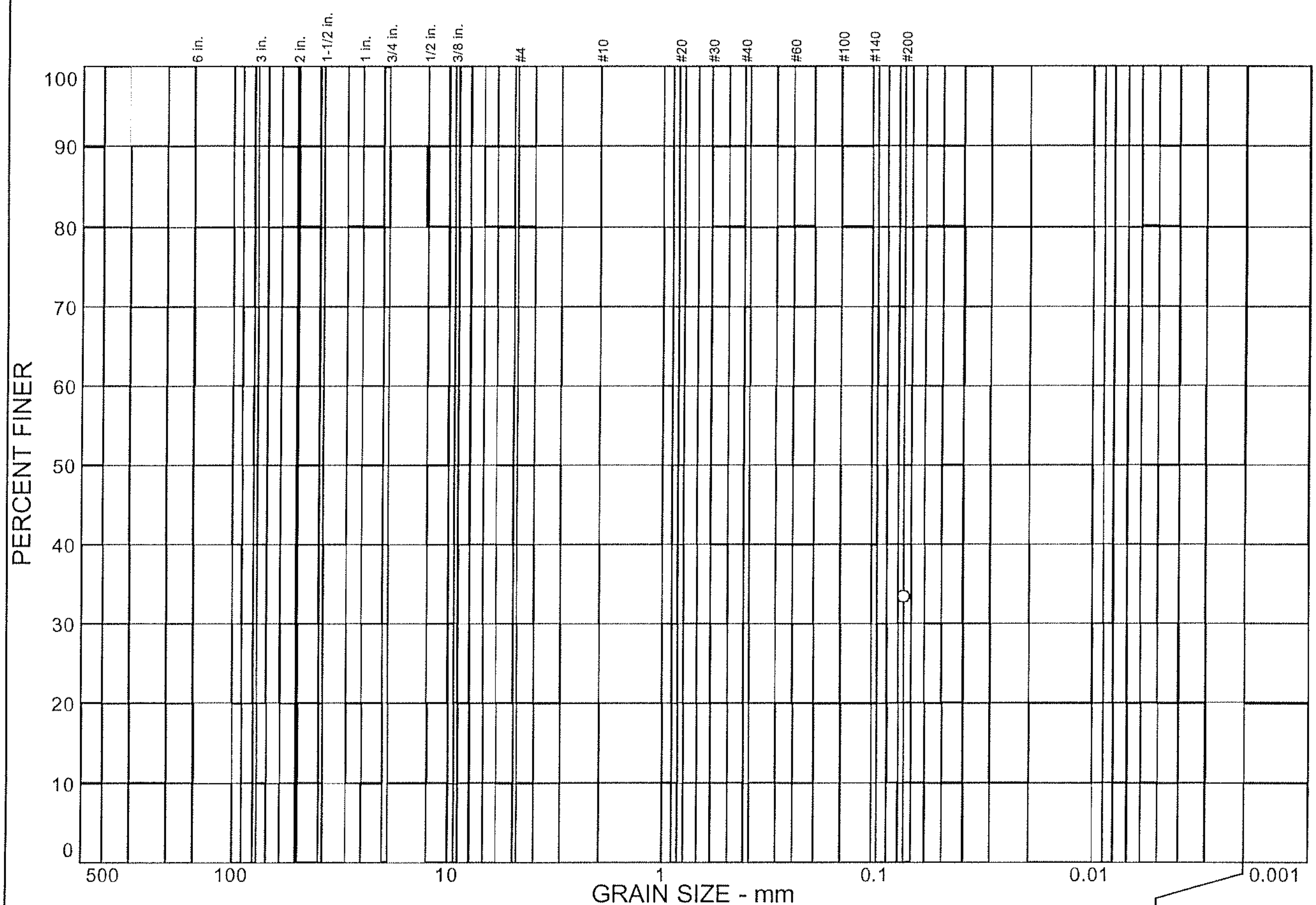
Remarks

Sample No.: B1-6-1 **Source of Sample:** GEX **Date:** 11/22/04
Location: **Elev./Depth:** 20 feet

ENGEO INCORPORATED

Client:
Project: Sutter Medical Center
Project No: 6486.2.001.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		% SAND	33.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	33.4		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand with gravel

Atterberg Limits

PL= 19 LL= 34 PI= 15

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

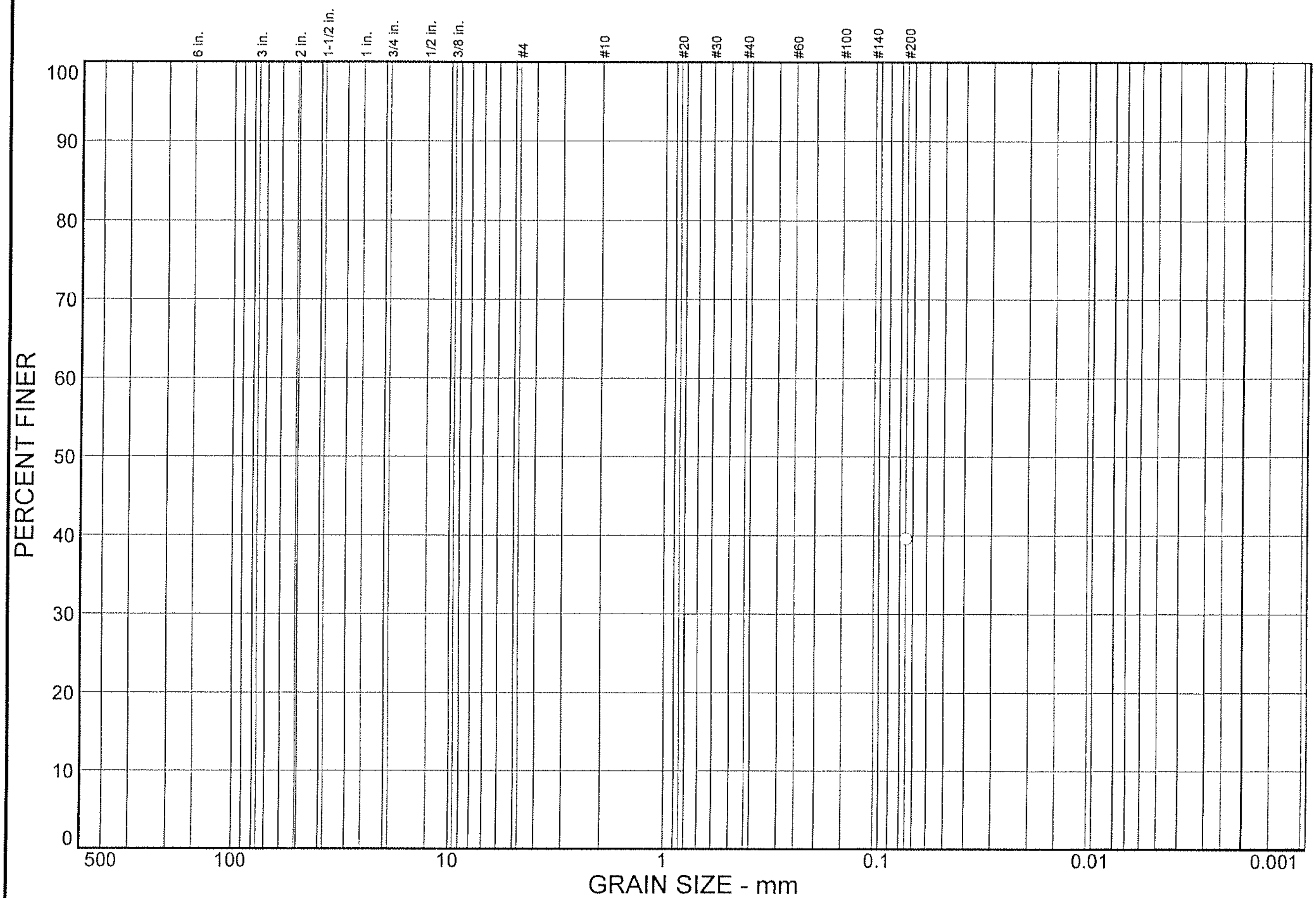
Remarks

Sample No.: 2-6-1 **Source of Sample:** PI **Date:** 11/23/04
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa
Project No: 6486.2.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			39.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	39.6		#200

* (no specification provided)

Soil Description

Brown clayey SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

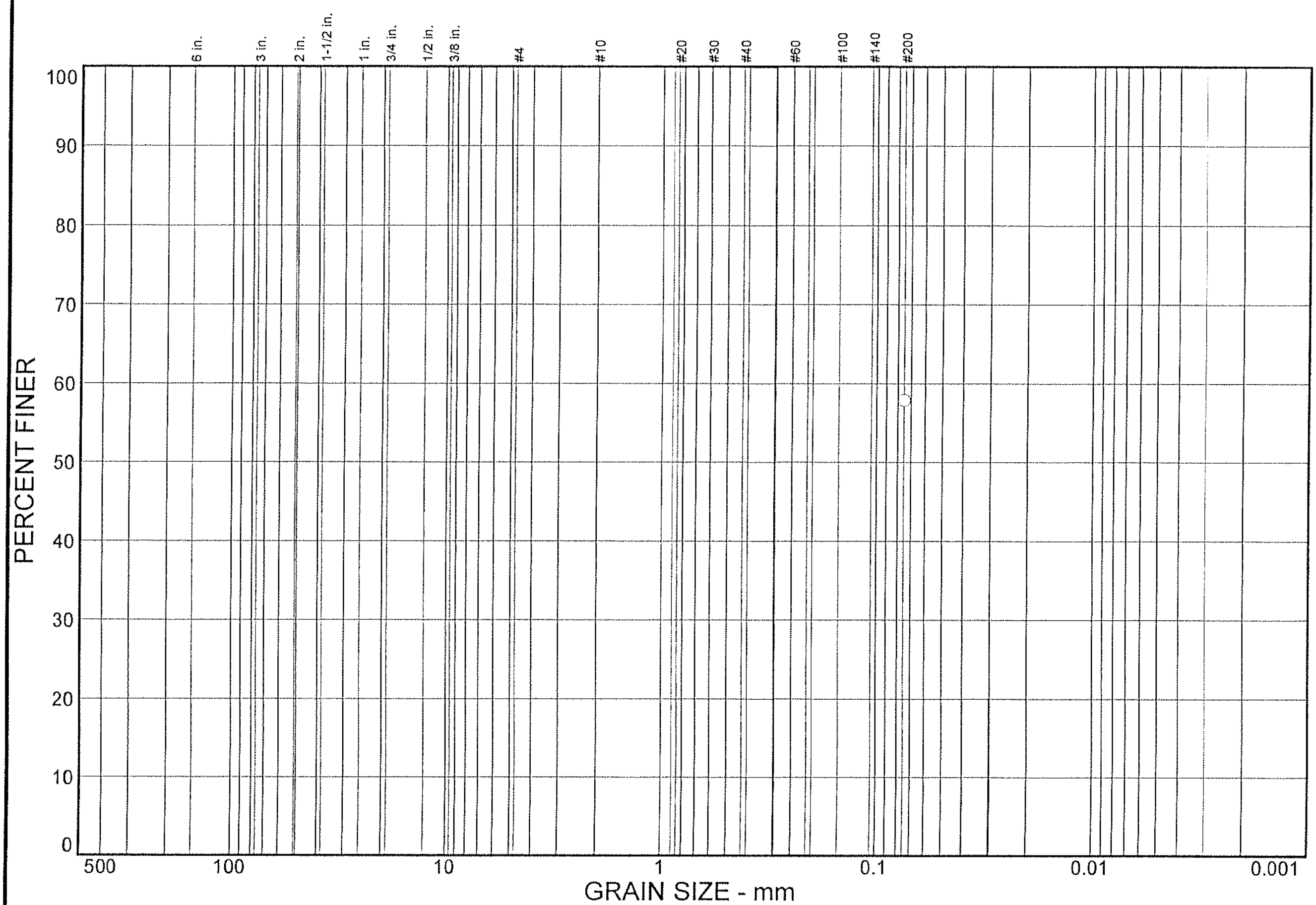
Remarks

Sample No.: B5-4-1 **Source of Sample:** GEX **Date:** 11/22/04
Location: **Elev./Depth:** 11 feet

ENGEO INCORPORATED

Client:
Project: Sutter Medical Center
Project No: 6486.2.001.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			57.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	57.8		#200

* (no specification provided)

Soil Description

Brown sandy CLAY

Atterberg Limits

PL= 19 LL= 36 PI= 17

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

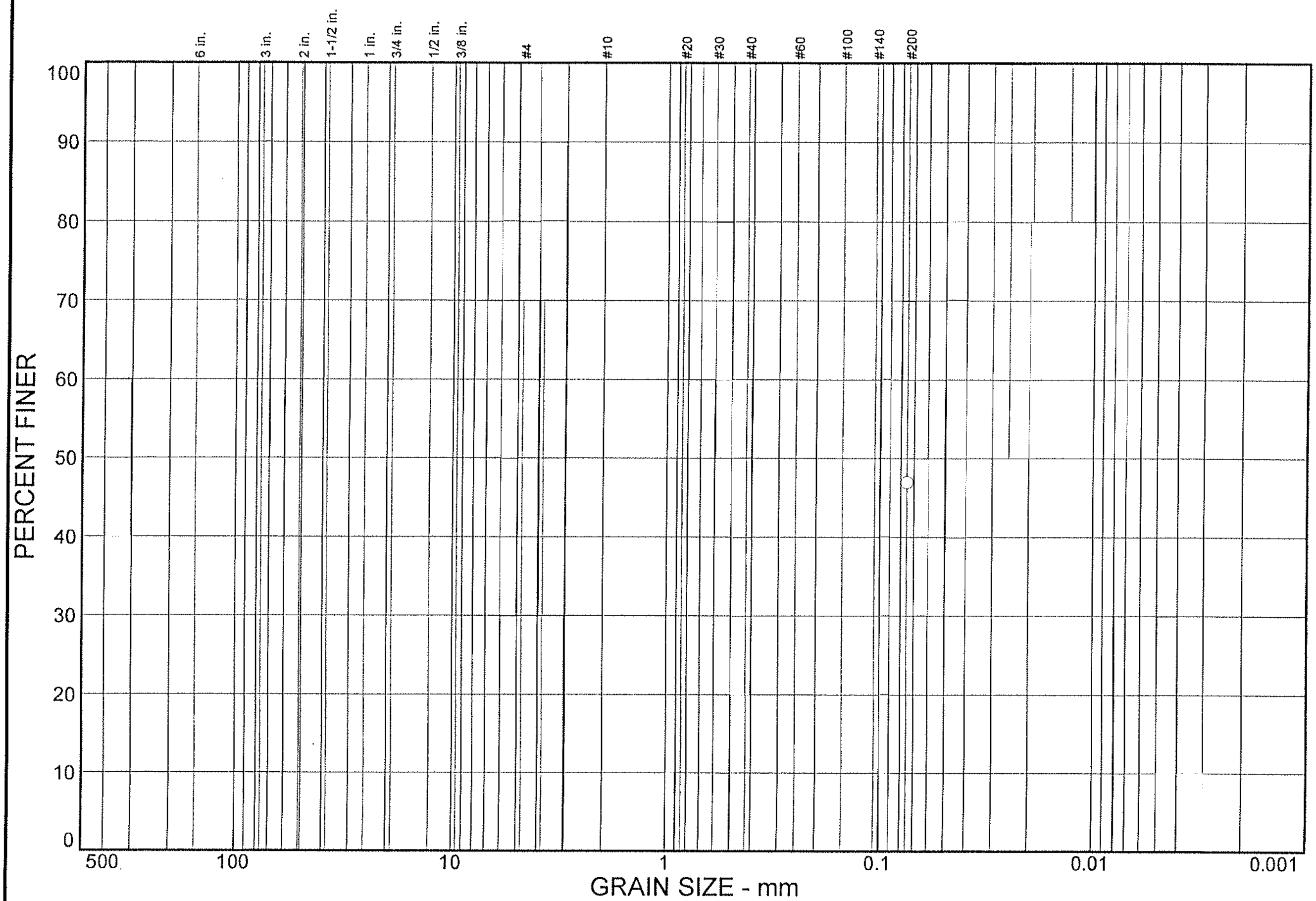
Remarks

Sample No.: B6-5-1 **Source of Sample:** GEX **Date:** 11/22/04
Location: **Elev./Depth:** 16 feet

ENGEO INCORPORATED

Client:
Project: Sutter Medical Center
Project No: 6486.2.001.01 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
		% SAND	46.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	46.9		

* (no specification provided)

Soil Description

Dark brown clayey SAND to sandy CLAY

Atterberg Limits

PL= 22 LL= 48 PI= 26

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC-CL AASHTO=

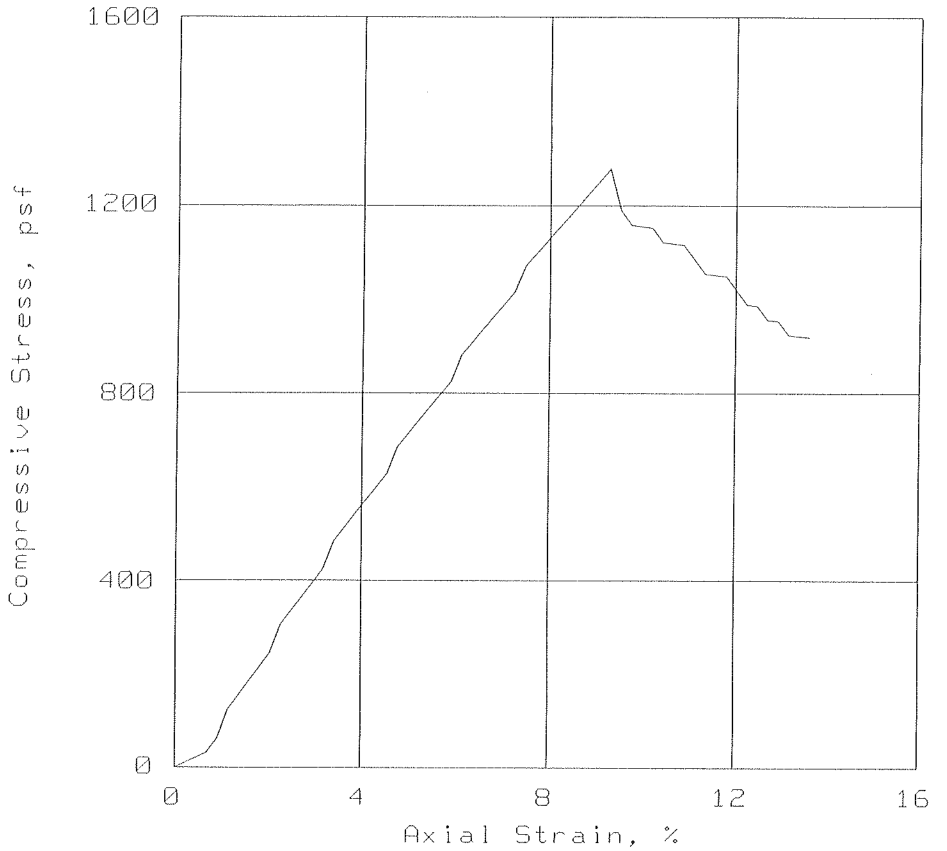
Remarks

Sample No.: B9-4-2 **Source of Sample:** GEX **Date:** 11/22/04
Location: **Elev./Depth:** 15 1/2 feet

ENGEO INCORPORATED

Client:
Project: Sutter Medical Center
Project No: 6486.2.001.01 **Figure**

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	1278			
Undrained shear strength, psf	639			
Failure strain, %	9.3			
Strain rate, %/min	1.94			
Water content, %	41.4			
Wet density, pcf	111.4			
Dry density, pcf	78.8			
Saturation, %	99.9			
Void ratio	1.0995			
Specimen diameter, in	2.42			
Specimen height, in	4.41			
Height/diameter ratio	1.82			

Description: Brown sandy clay (CL)

GS= 2.65 | Type: In situ

Project No.: 6486.2.001.01

Date: 11/18/04

Remarks:
Assumed Specific
Gravity

Fig. No.: ______

Client:

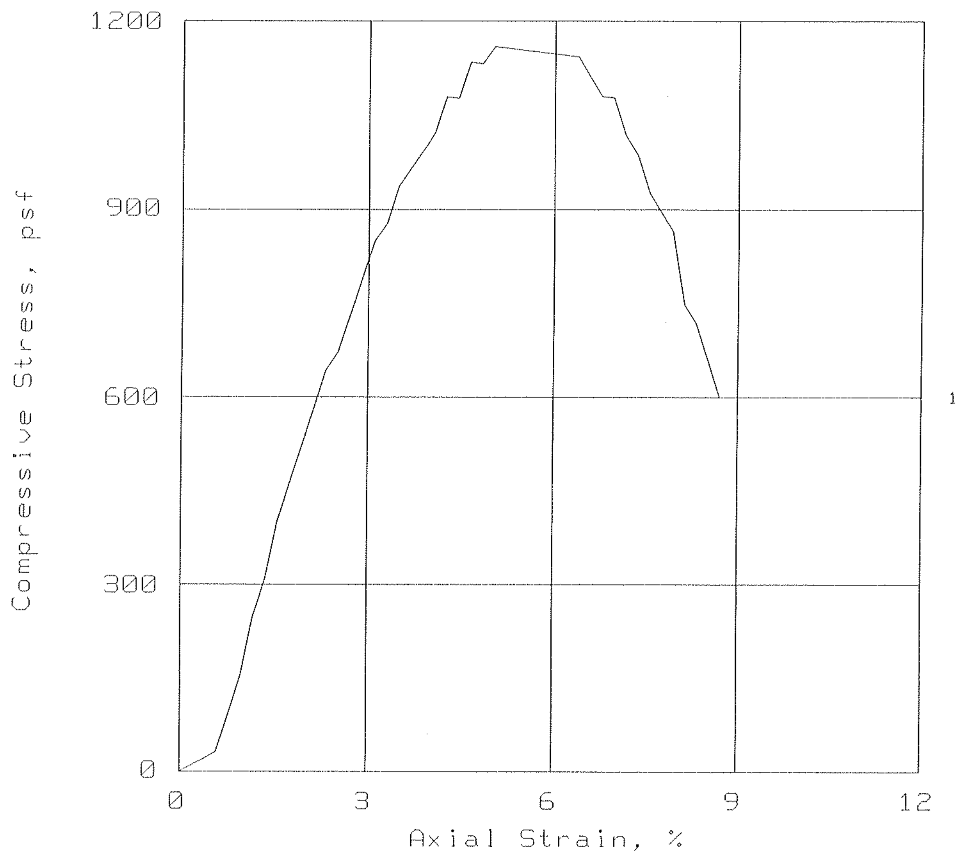
Project: Sutter Medical Center

Location: B11-5-1; 15 1/2 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	1160			
Undrained shear strength, psf	580			
Failure strain, %	5.0			
Strain rate, %/min	1.74			
Water content, %	31.0			
Wet density, pcf	117.5			
Dry density, pcf	89.6			
Saturation, %	97.3			
Void ratio	0.8457			
Specimen diameter, in	2.42			
Specimen height, in	5.17			
Height/diameter ratio	2.14			

Description: Brown clayey sand (SC)

GS= 2.65 | Type: In situ

Project No.: 6486.2.001.01

Date: 11/18/04

Remarks:
Assumed Specific Gravity

Fig. No.: ______

Client:

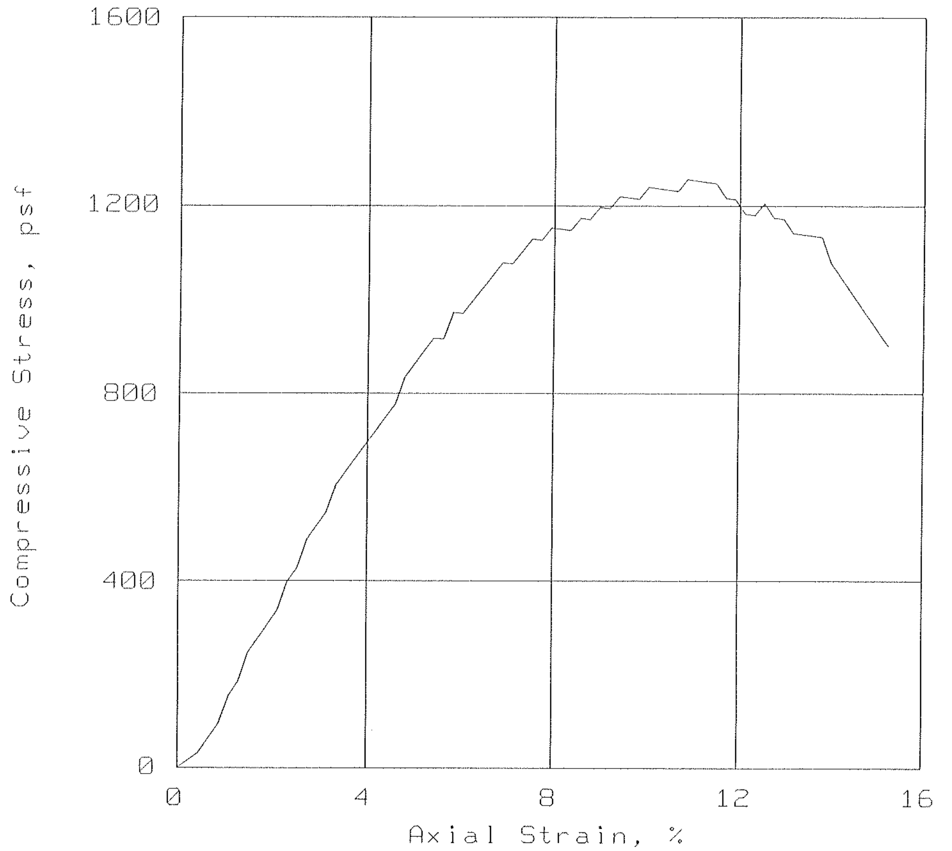
Project: Sutter Medical Center

Location: B12-4-1; 10 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	1256			
Undrained shear strength, psf	628			
Failure strain, %	10.9			
Strain rate, %/min	1.91			
Water content, %	31.3			
Wet density, pcf	113.9			
Dry density, pcf	86.7			
Saturation, %	91.4			
Void ratio	0.9071			
Specimen diameter, in	2.42			
Specimen height, in	4.79			
Height/diameter ratio	1.98			

Description: Brown sandy clay (CL)

			GS= 2.65	Type: In situ

Project No.: 6486.2.001.01

Date: 11/19/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

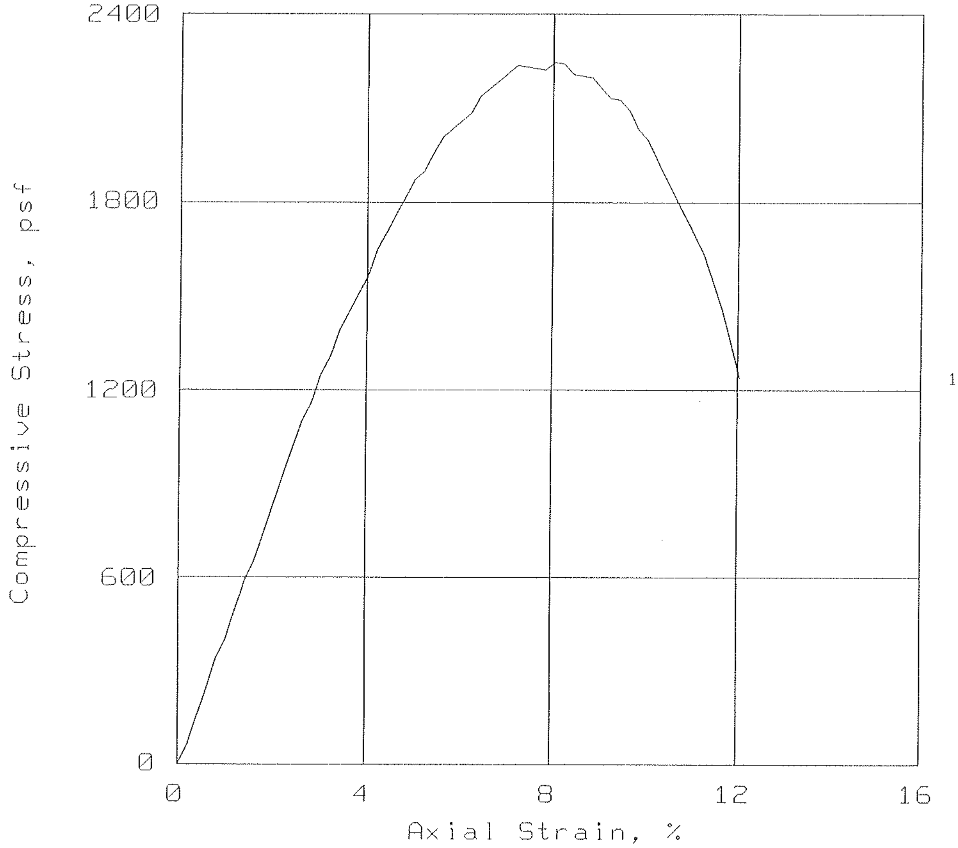
Project: Sutter Medical Center

Location: B1-4-1; 11 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	2246			
Undrained shear strength, psf	1123			
Failure strain, %	8.0			
Strain rate, %/min	1.75			
Water content, %	31.9			
Wet density, pcf	118.5			
Dry density, pcf	89.8			
Saturation, %	100.6			
Void ratio	0.8417			
Specimen diameter, in	2.42			
Specimen height, in	4.98			
Height/diameter ratio	2.06			

Description: Brown clay with silt (CL)

GS= 2.65 Type: In situ

Project No.: 6486.2.001.01

Date: 11/18/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

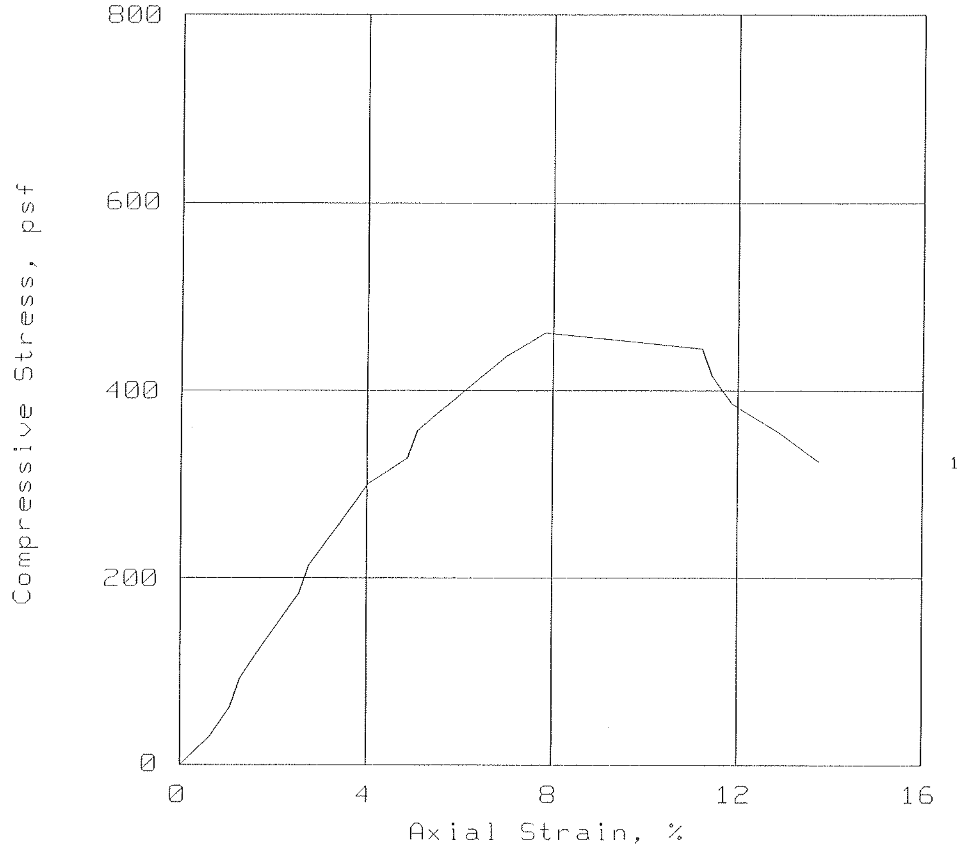
Project: Sutter Medical Center

Location: B22-6-1; 21 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	462			
Undrained shear strength, psf	231			
Failure strain, %	7.8			
Strain rate, %/min	1.65			
Water content, %	47.2			
Wet density, pcf	108.3			
Dry density, pcf	73.6			
Saturation, %	100.1			
Void ratio	1.2482			
Specimen diameter, in	2.42			
Specimen height, in	4.72			
Height/diameter ratio	1.95			

Description: Brown clayey sand (SC)

GS= 2.65 Type: In situ

Project No.: 6486.2.001.01

Date: 11/19/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

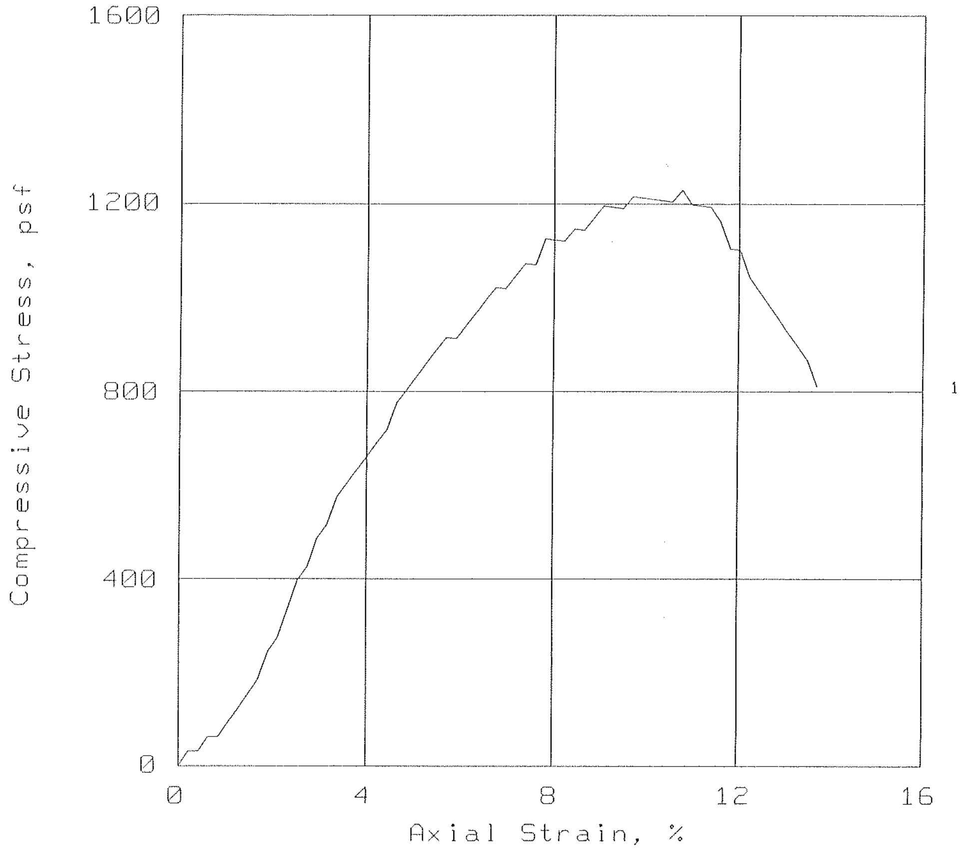
Project: Sutter Medical Center

Location: B3-6-1; 21 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	1229			
Undrained shear strength, psf	615			
Failure strain, %	10.8			
Strain rate, %/min	1.68			
Water content, %	31.6			
Wet density, pcf	118.3			
Dry density, pcf	89.9			
Saturation, %	99.6			
Void ratio	0.8410			
Specimen diameter, in	2.42			
Specimen height, in	4.74			
Height/diameter ratio	1.96			

Description: Olive gray sandy clay (CL)

GS= 2.65 | Type: In situ

Project No.: 6486.2.001.01

Date: 11/19/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

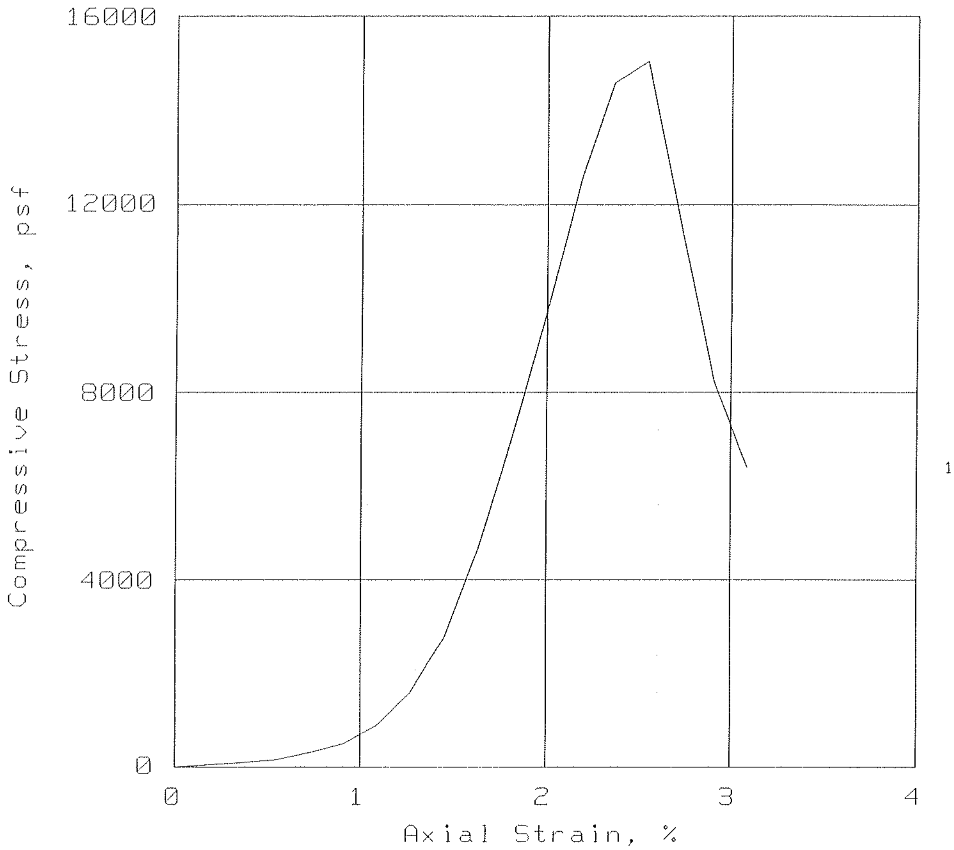
Project: Sutter Medical Center

Location: B4-7-1; 25 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	15042			
Undrained shear strength, psf	7521			
Failure strain, %	2.5			
Strain rate, %/min	1.24			
Water content, %	10.1			
Wet density, pcf	118.2			
Dry density, pcf	107.3			
Saturation, %	49.4			
Void ratio	0.5416			
Specimen diameter, in	2.42			
Specimen height, in	5.50			
Height/diameter ratio	2.27			

Description: Brown-Dark Brown clayey sand with gravel (SC)

GS= 2.65 | Type: In situ

Project No.: 6486.2.001.01

Date: 11/19/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

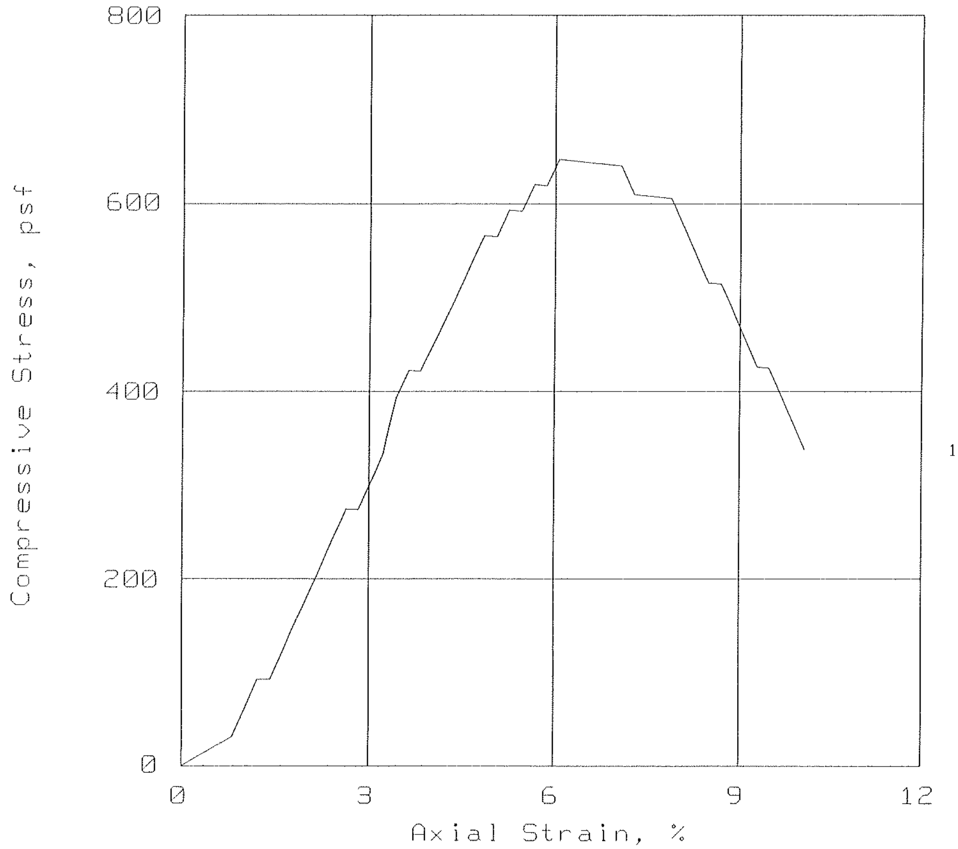
Project: Sutter Medical Center

Location: B7-2-2; 1 1/2 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

UNCONFINED COMPRESSION TEST



SAMPLE NO.:	1			
Unconfined strength, psf	647			
Undrained shear strength, psf	324			
Failure strain, %	6.1			
Strain rate, %/min	1.43			
Water content, %	38.5			
Wet density, pcf	110.4			
Dry density, pcf	79.7			
Saturation, %	94.9			
Void ratio	1.0758			
Specimen diameter, in	2.42			
Specimen height, in	4.95			
Height/diameter ratio	2.05			

Description: Olive brown sandy clay (CL)

GS= 2.65 | Type: In situ

Project No.: 6486.2.001.01

Date: 11/19/04

Remarks:

Assumed Specific Gravity

Fig. No.: ______

Client:

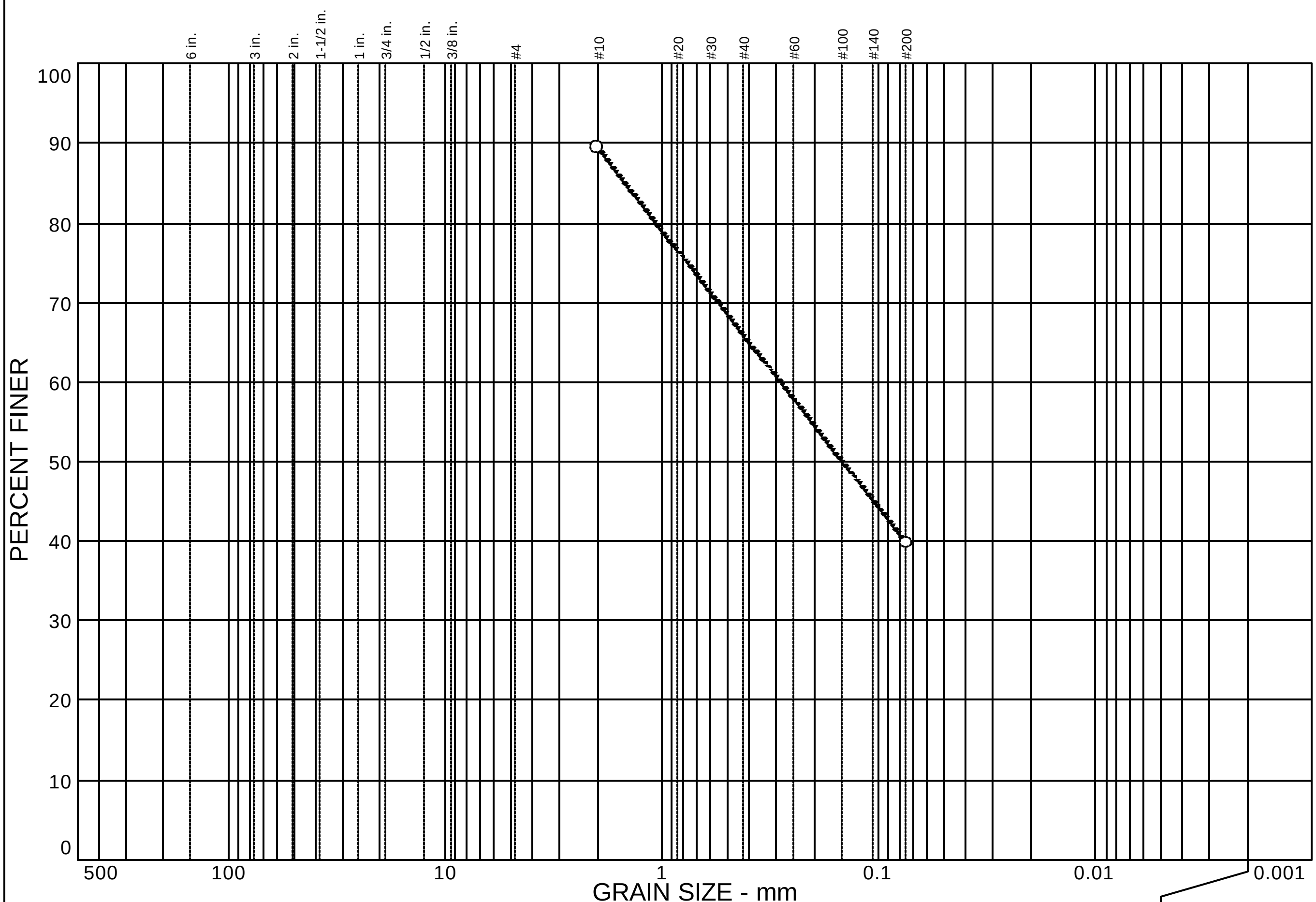
Project: Sutter Medical Center

Location: B8-4-1; 10 feet

UNCONFINED COMPRESSION TEST

ENGEO, INCORPORATED

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			39.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	89.5		
#200	39.8		

* (no specification provided)

Soil Description

Very dark grayish brown clayey Sand

Atterberg Limits

PL= 16 LL= 35 PI= 19

Coefficients

D_{85}= 1.49 D_{60}= 0.285 D_{50}= 0.147
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

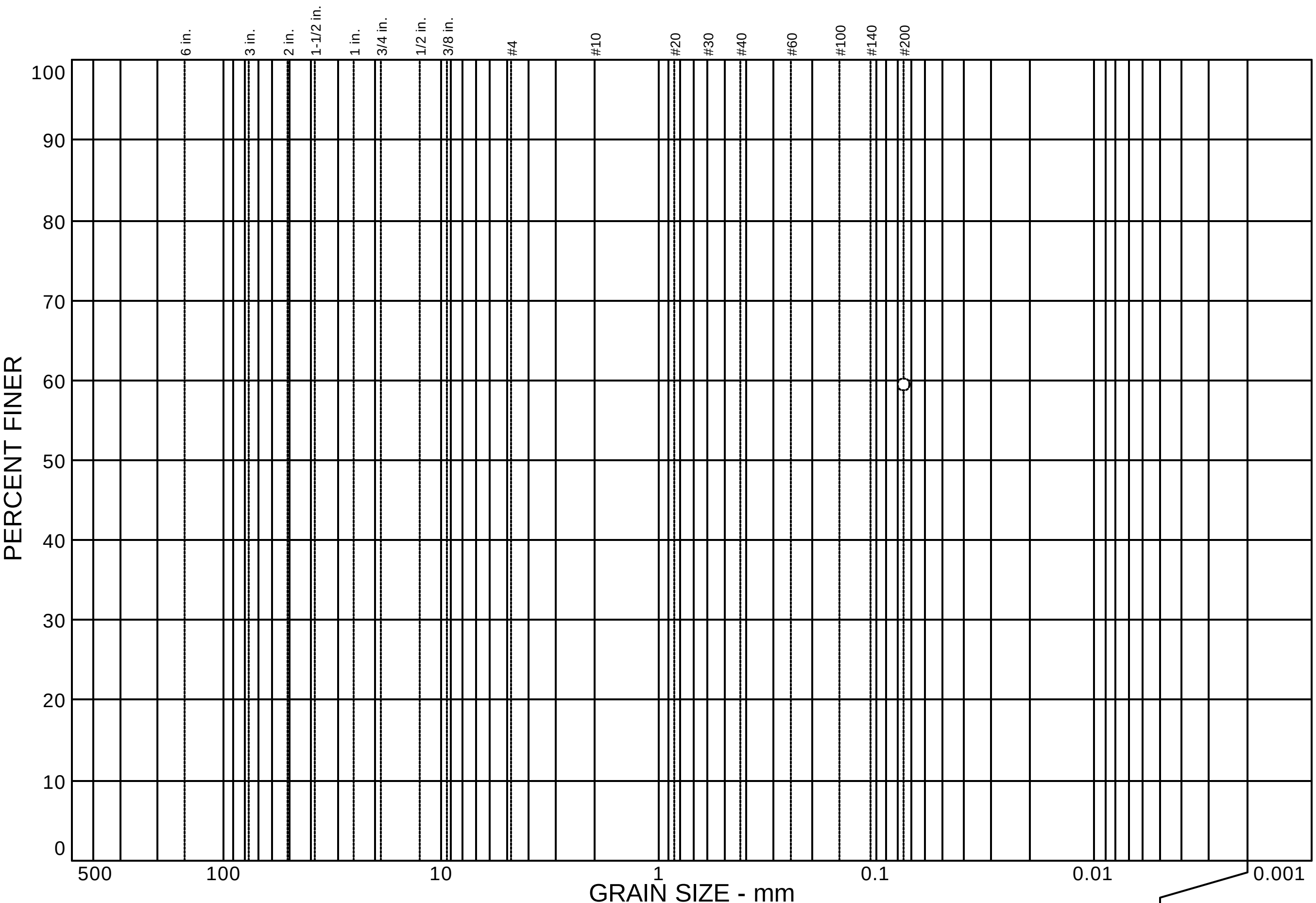
Sample No.: 2-B1@5' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			59.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	59.4		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay, trace gravel

Atterberg Limits

PL= 18 LL= 37 PI= 19

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

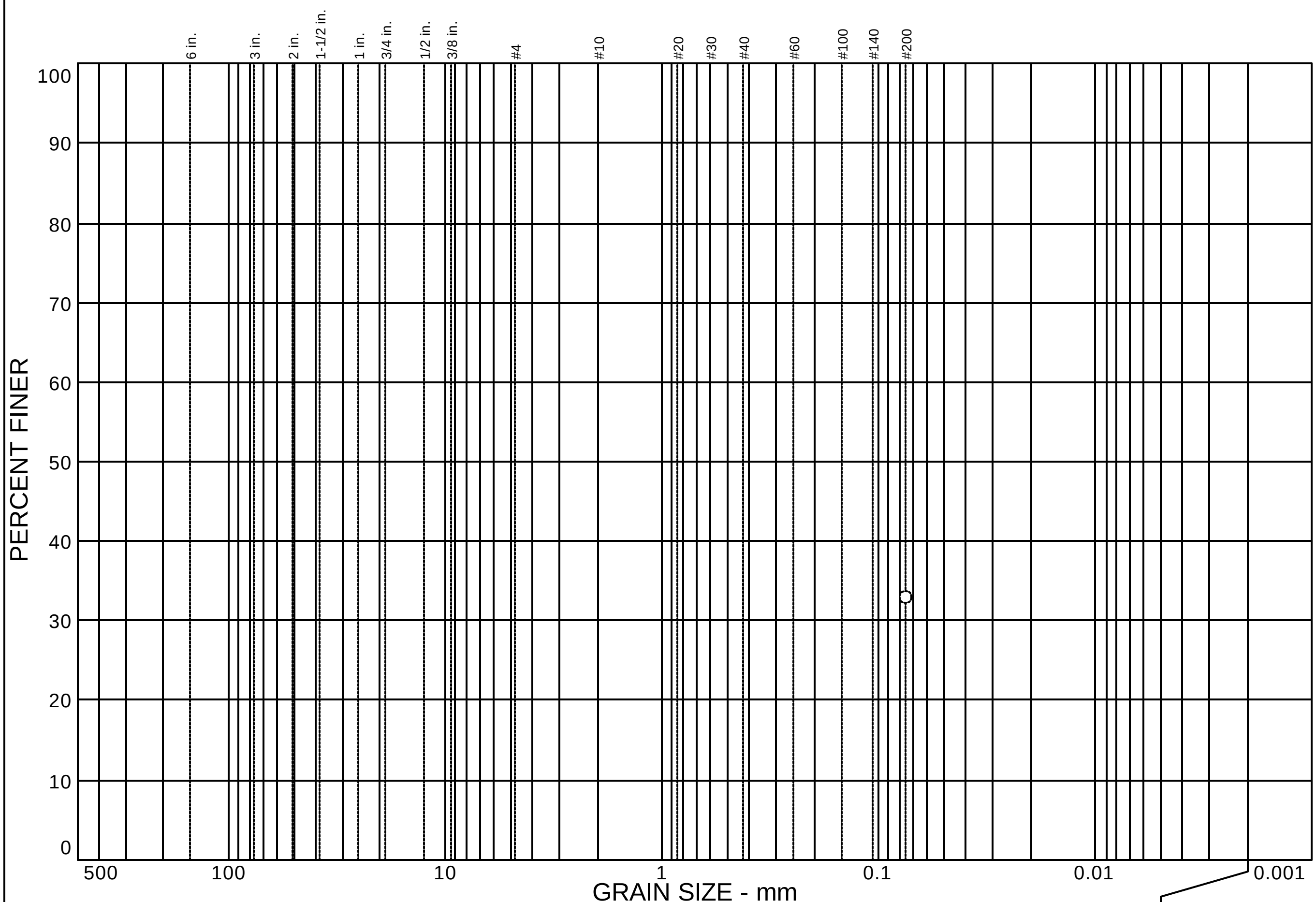
Remarks

Sample No.: 2-B2@23' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 23 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA
Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			32.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	32.8		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 16 LL= 29 PI= 13

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

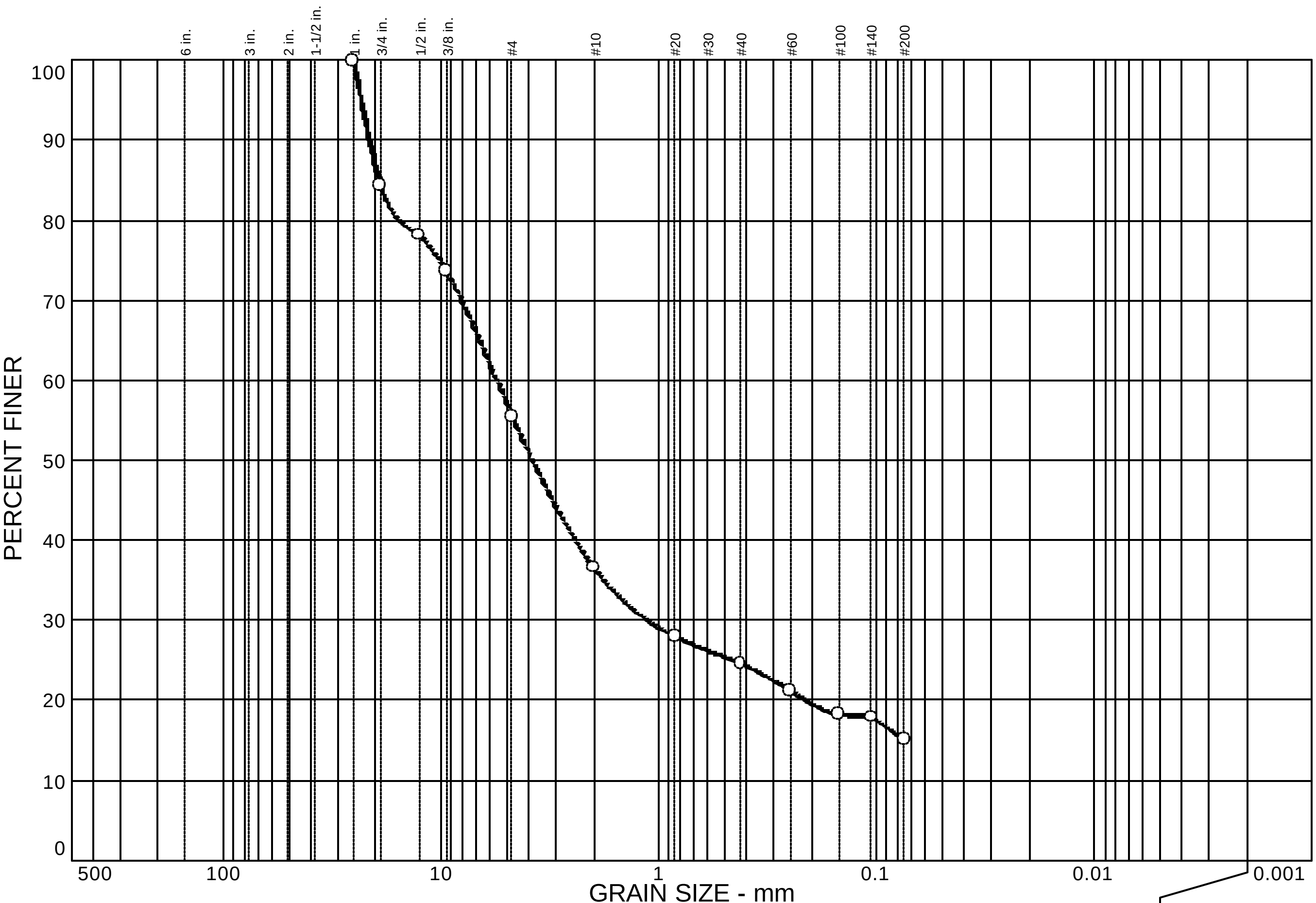
Sample No.: 2-B3@10.5' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 10.5 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	44.5	40.4	15.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	84.3		
1/2 in.	78.2		
3/8 in.	73.6		
#4	55.5		
#10	36.6		
#20	28.0		
#40	24.6		
#60	21.2		
#100	18.2		
#140	17.9		
#200	15.1		

* (no specification provided)

Soil Description

Dark olive gray silty Gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 19.4 D_{60}= 5.60 D_{50}= 3.84
D_{30}= 1.13 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

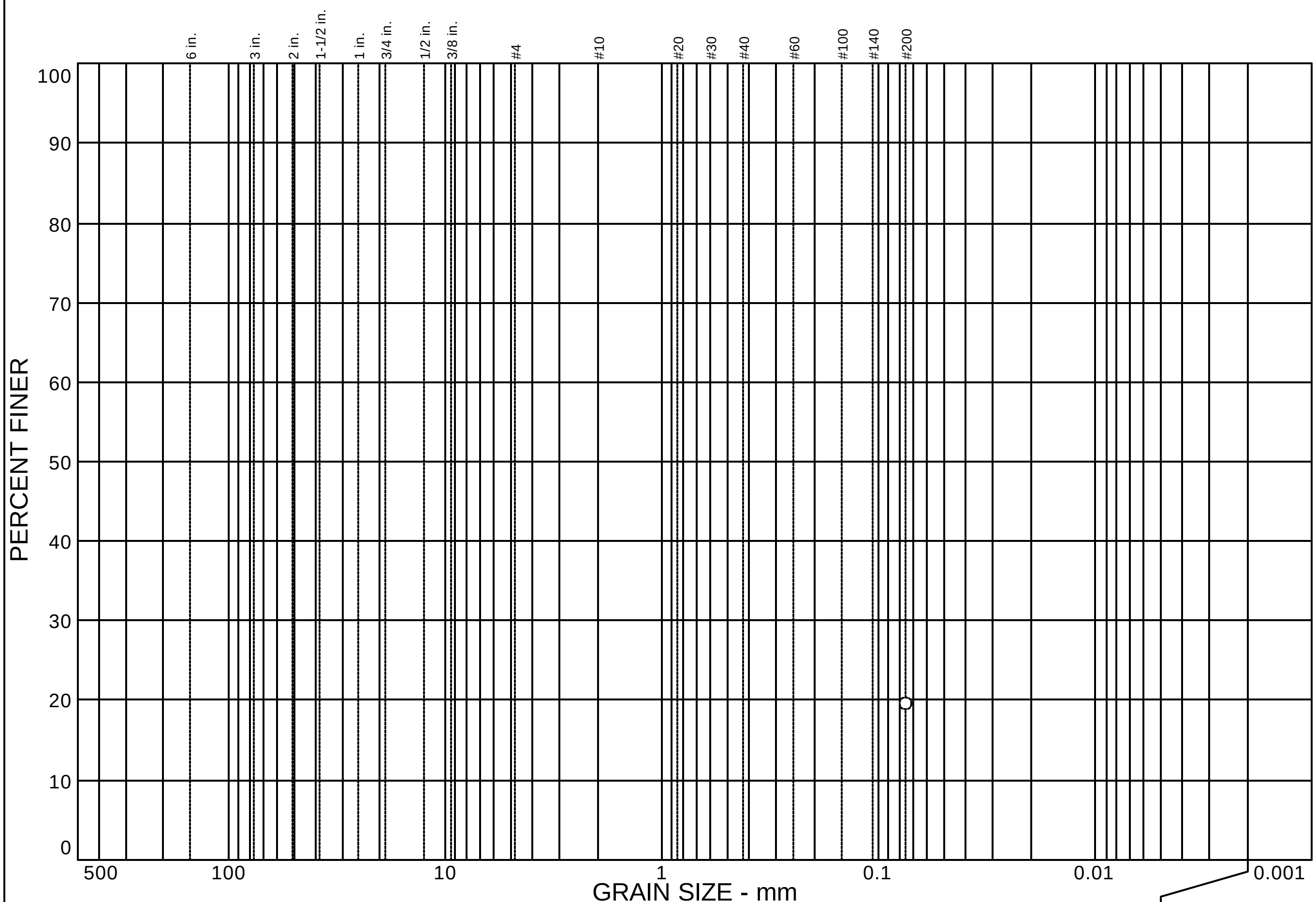
Sample No.: 2-B3@101' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 101 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			19.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	19.5		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 15 LL= 36 PI= 21

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

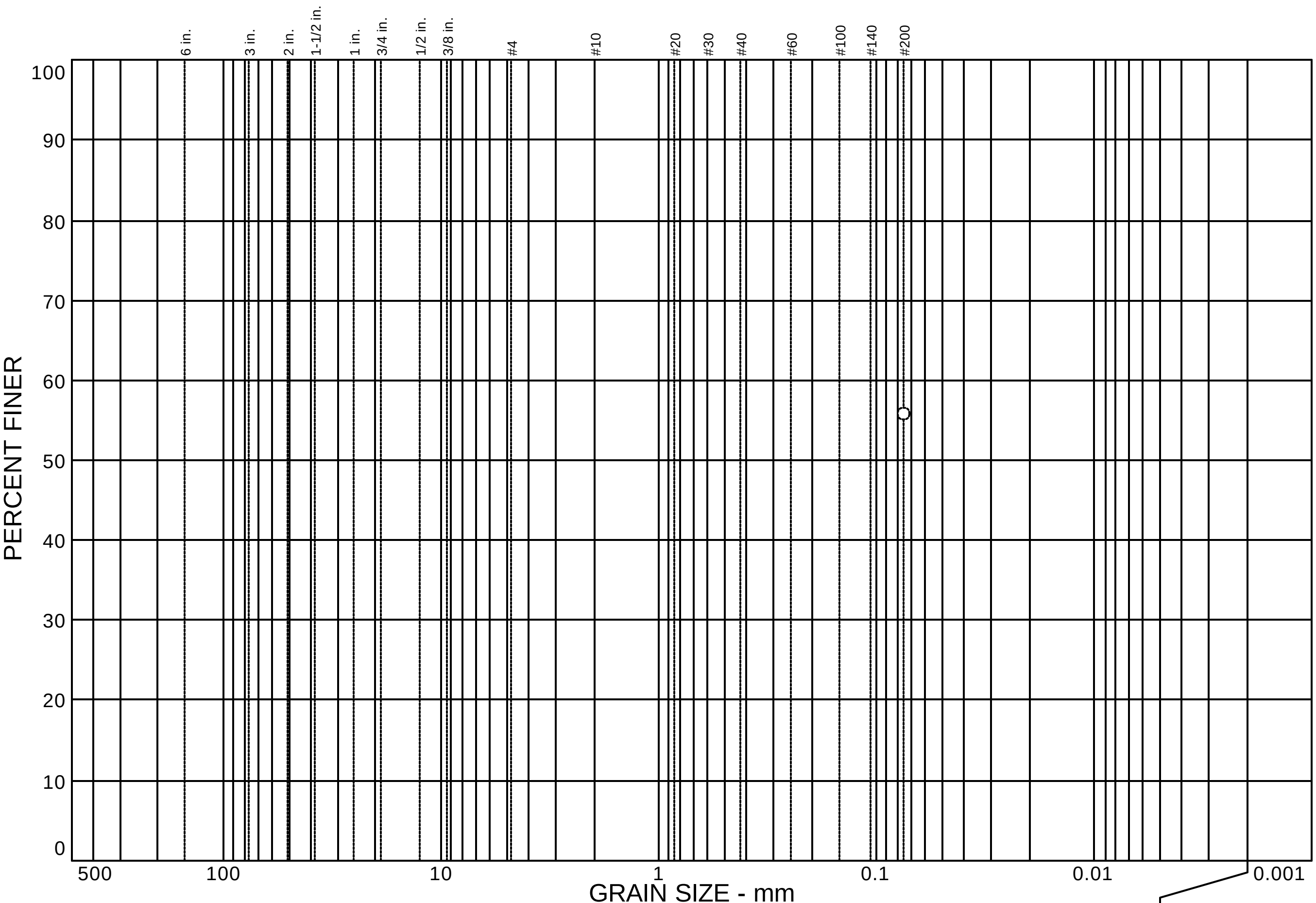
Sample No.: 2-B4@6.5' **Source of Sample:** **Date:** 6-27-05
Location: **Elev./Depth:** 6.5 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			55.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	55.7		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay

Atterberg Limits

PL= 19 LL= 37 PI= 18

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

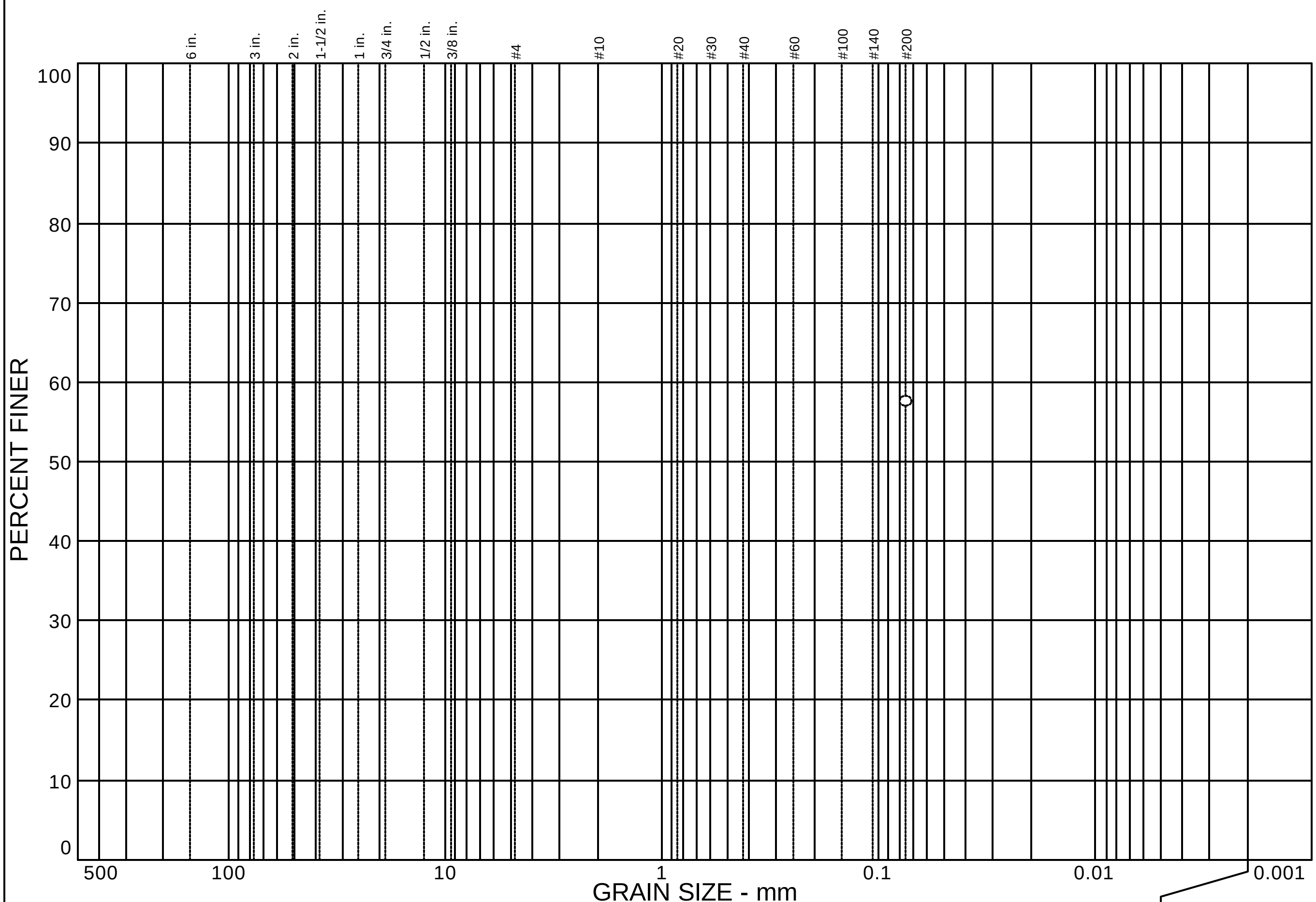
Sample No.: 2-B5@29' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 29 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			57.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	57.5		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay

Atterberg Limits

PL= 18 LL= 39 PI= 21

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

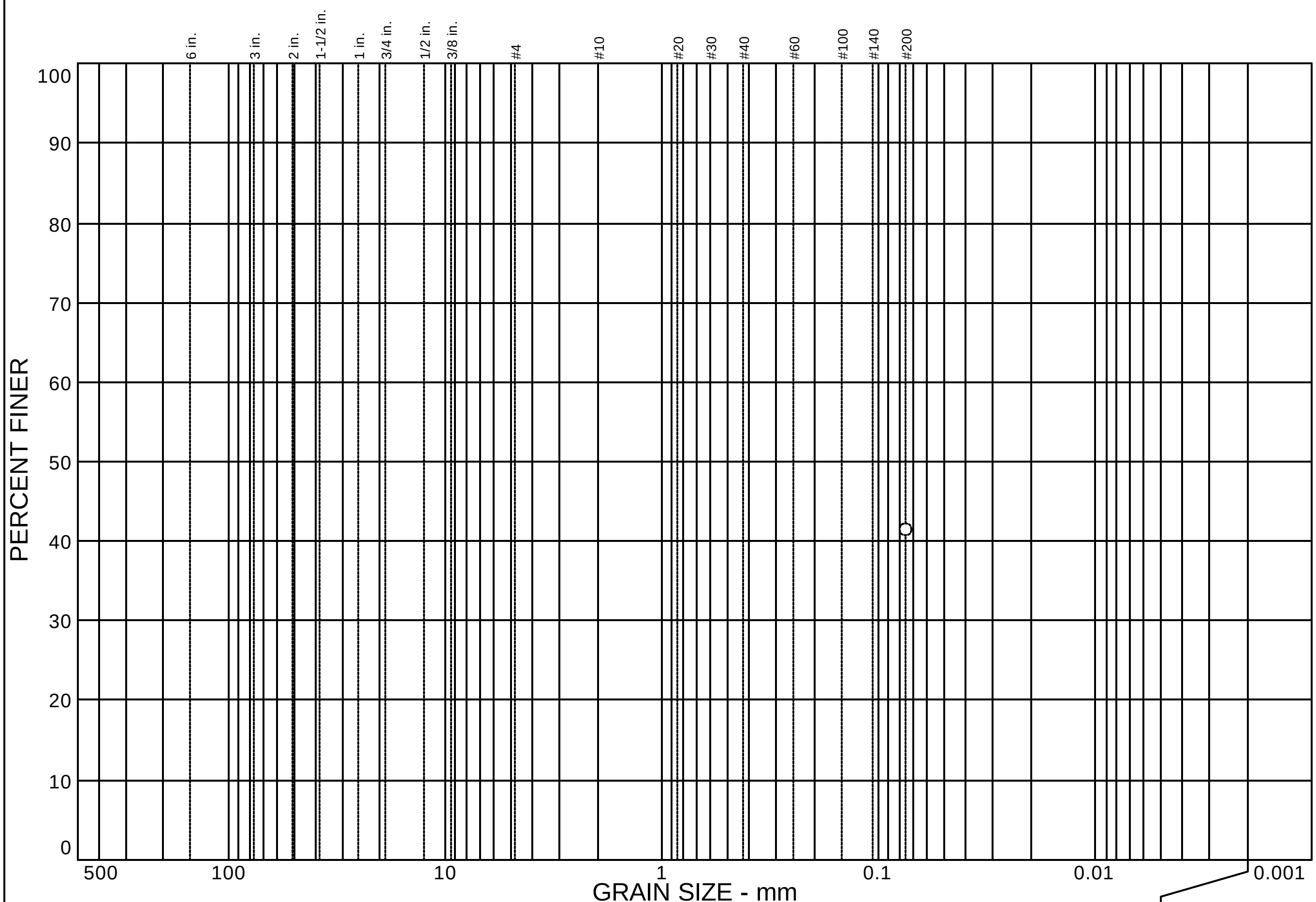
Sample No.: 2-B7@21' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 21 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			41.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	41.3		

* (no specification provided)

Soil Description

Dark grayish brown clayey Sand

Atterberg Limits

PL= 20 LL= 28 PI= 8

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

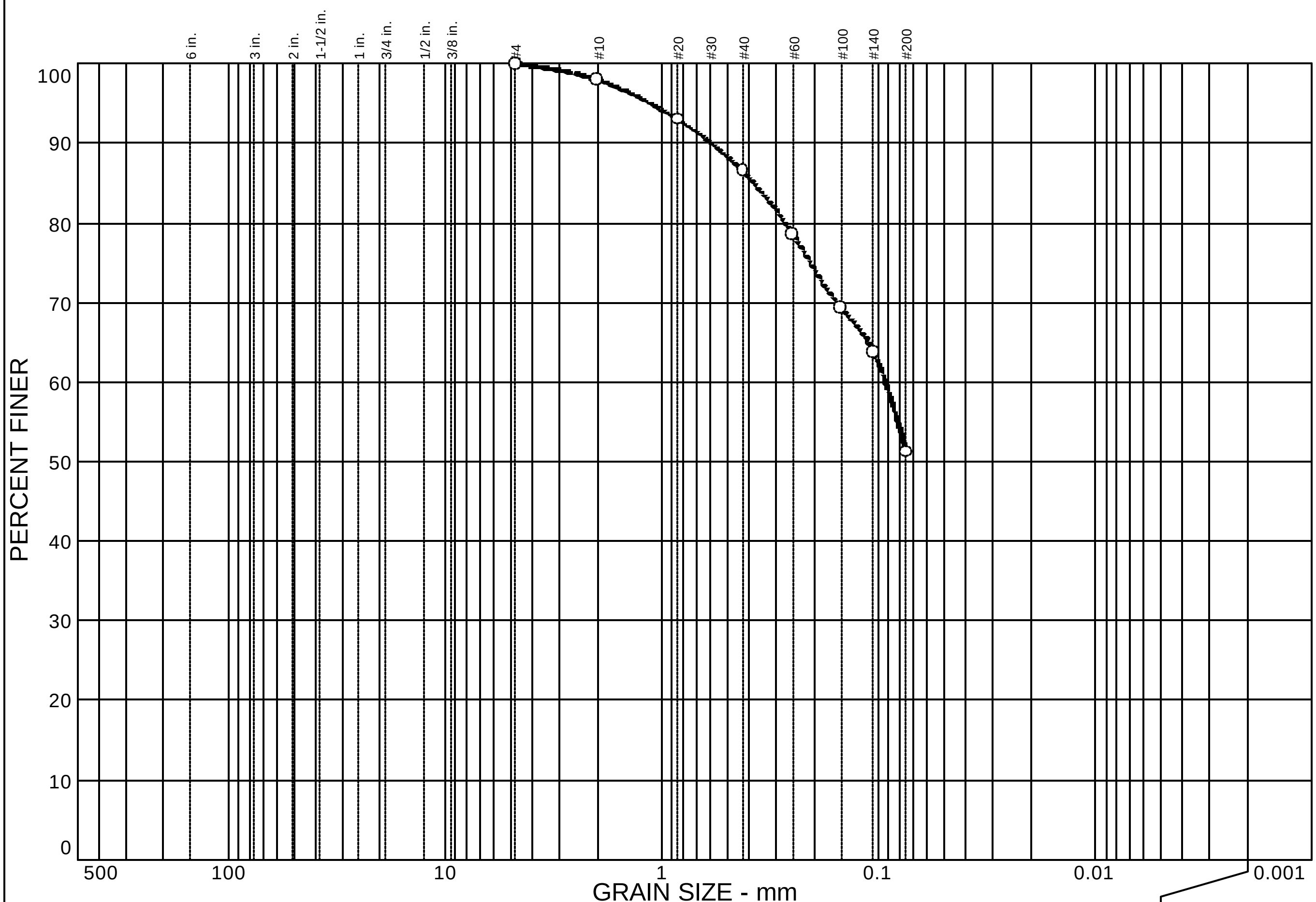
Sample No.: 2-B9@6' **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 6 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	48.8	51.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	98.0		
#20	93.0		
#40	86.5		
#60	78.5		
#100	69.3		
#140	63.7		
#200	51.2		

* (no specification provided)

Soil Description

Dark grayish brown sandy Clay to Clayey Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.378 D_{60}= 0.0938 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

Sample No.: 2-B11@30' **Source of Sample:** **Date:** 06/27/05
Location: **Elev./Depth:** 30 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Particle Size Distribution Report

% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	13.2	58.9	27.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3 in.	100.0		
1 in.	100.0		
3/4 in.	100.0		
1/2 in.	97.8		
3/8 in.	94.1		
#4	86.8		
#10	78.1		
#20	69.0		
#40	61.0		
#60	49.2		
#100	38.1		
#140	37.1		
#200	27.9		

* (no specification provided)

Soil Description

Dark grayish brown clayey sand with gravel

Atterberg Limits

PL= 15 LL= 33 PI= 18

Coefficients

D_{85}= 3.93 D_{60}= 0.401 D_{50}= 0.258
D_{30}= 0.0812 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

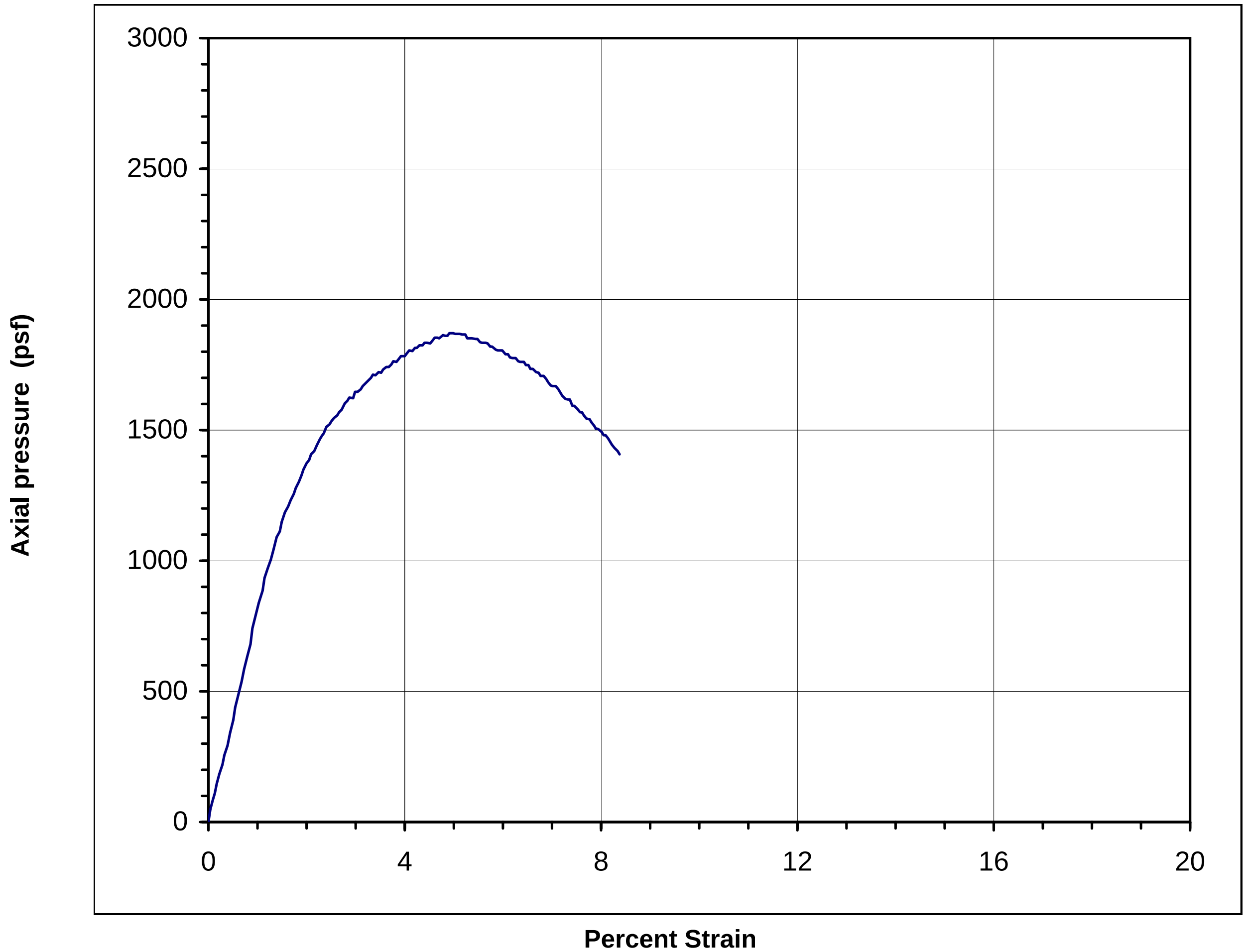
Sample No.: 2-B12@6 **Source of Sample:** **Date:** 06/29/05
Location: **Elev./Depth:** 6ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Project No: 6486.2.003.01 **Plate**

Unconfined Compression Test
ASTM Test Method D2166



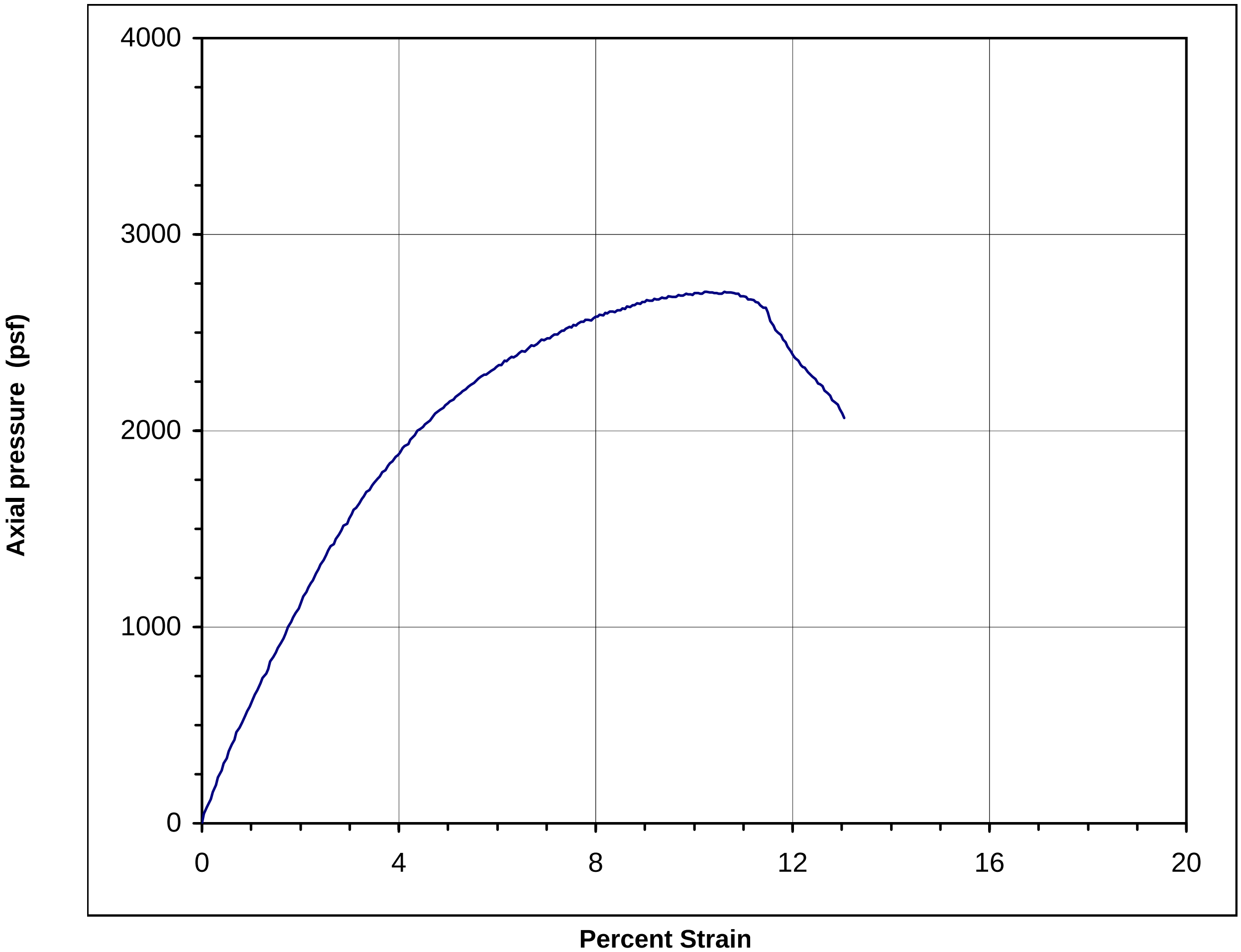
Unconfined Compressive Strength:		**1860 psf**	**0.9 tsf**

Sample Description: **Dark grayish brown silty Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B9@10'	
Initial Height:	**4.72**	**in.**	**Dry Unit Weight:**	**81.2**	**pcf**
Strain Rate:	**1.602**	**%/min**	**Moisture Content:**	**39.2**	**%**
Total Strain:	**8.38**	**%**	**Depth of Sample:**	**10.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER**	**Job No.:** 6486.2.003.01	**Figure No.**
		Sample Number: 2-B9@10'	
	Sonoma County, California	**Date:** 6/21/2005	

Unconfined Compression Test
ASTM Test Method D2166



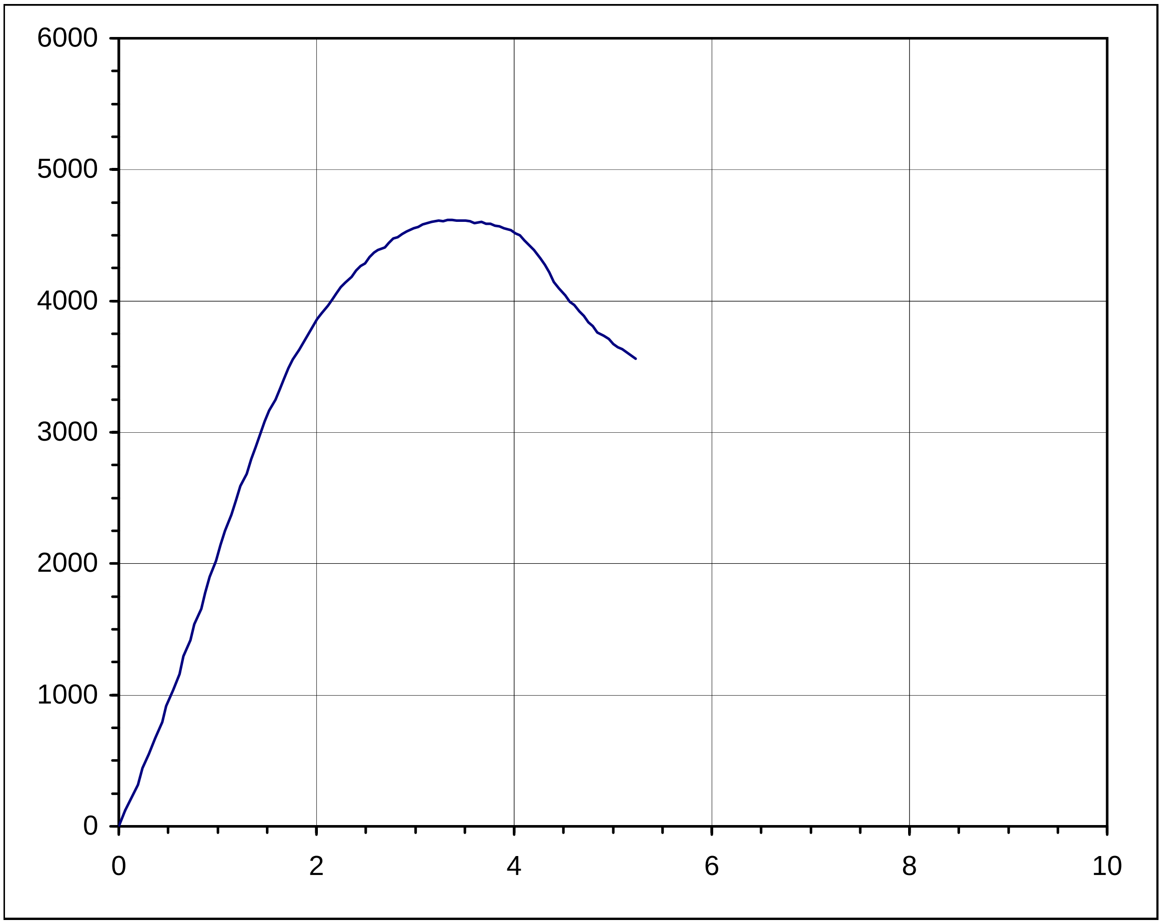
Unconfined Compressive Strength:	**2700 psf**	**1.4 tsf**

Sample Description: **Dark grayish brown Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B10@11'	
Initial Height:	**4.70**	**in.**	**Dry Unit Weight:**	**88.6**	**pcf**
Strain Rate:	**1.532**	**%/min**	**Moisture Content:**	**33.2**	**%**
Total Strain:	**13.05**	**%**	**Depth of Sample:**	**11.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01 **Sample Number:** 2-B10@11' **Date:** 6/21/2005	**Figure No.**

Unconfined Compression Test
ASTM Test Method D2166



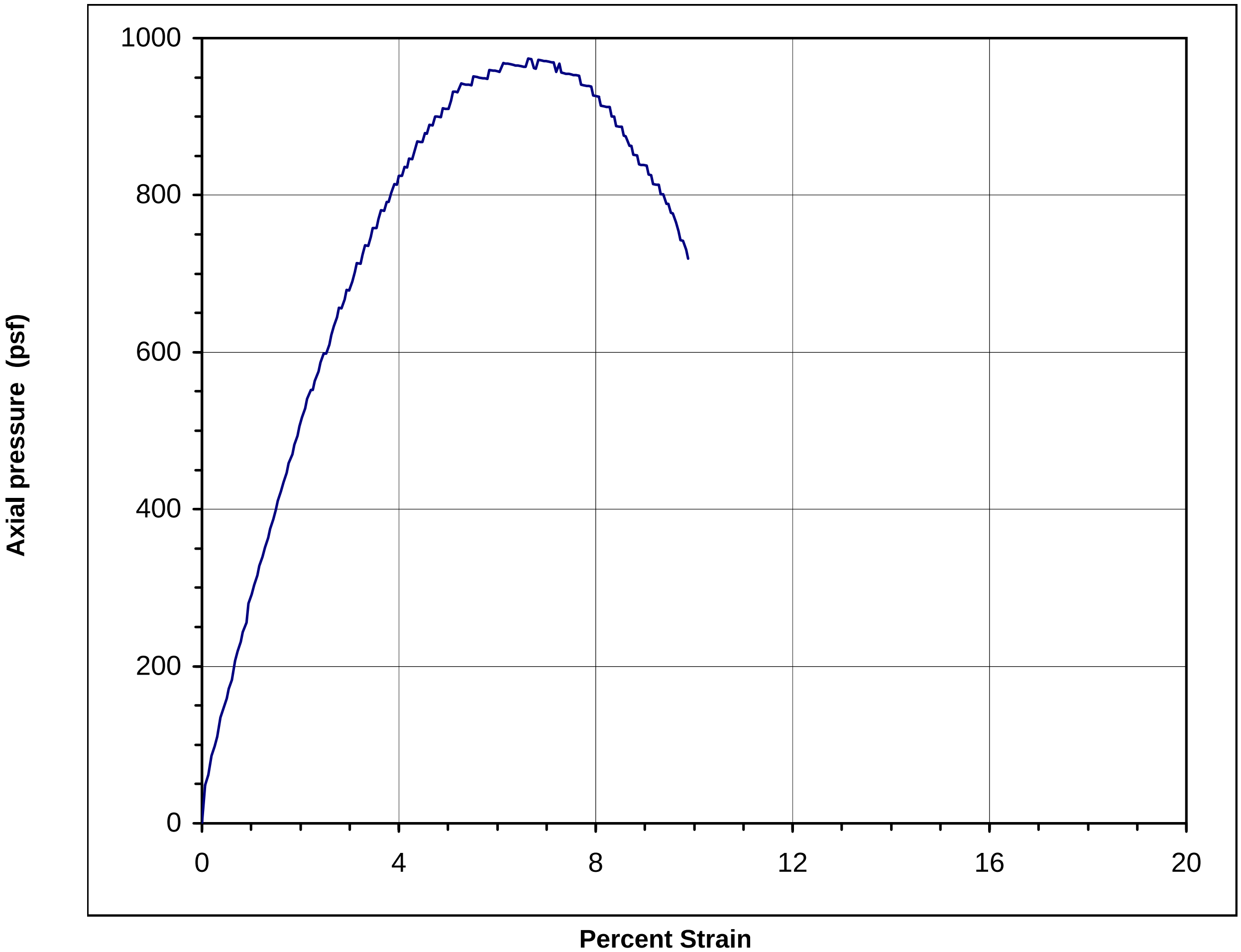
Unconfined Compressive Strength: **4610 psf** **2.3 tsf**

Sample Description: **Dark grayish brown Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B11@26'	
Initial Height:	**4.71**	**in.**	**Dry Unit Weight:**	**88.6**	**pcf**
Strain Rate:	**1.535**	**%/min**	**Moisture Content:**	**32.9**	**%**
Total Strain:	**5.23**	**%**	**Depth of Sample:**	**26.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01 / **Sample Number:** 2-B11@26' / **Date:** 6/21/2005	**Figure No.**

Unconfined Compression Test
ASTM Test Method D2166



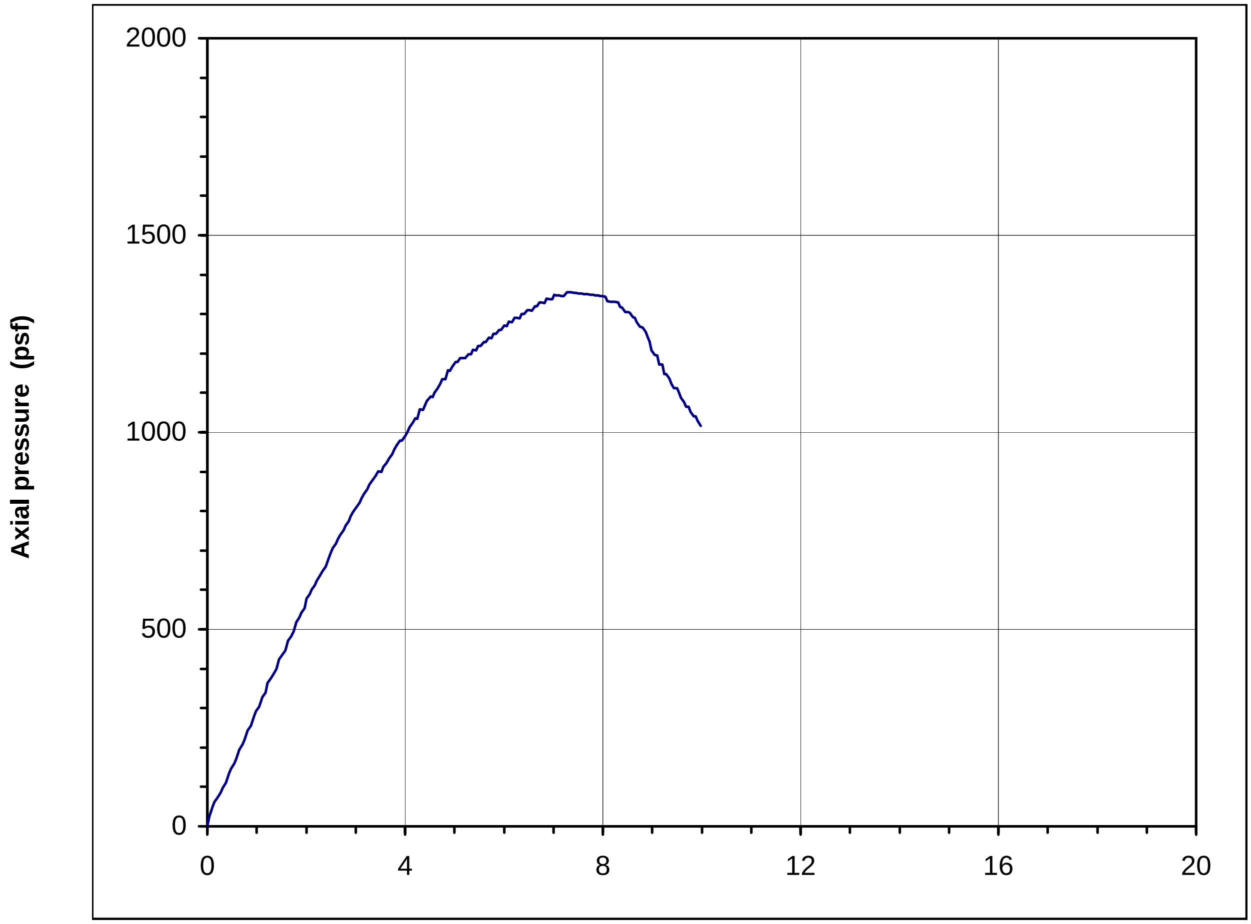
Unconfined Compressive Strength: 970 psf 0.5 tsf

Sample Description: Dark grayish brown silty Clay

Initial Diameter:	2.420	in.	Sample Number:	2-B12@26'	
Initial Height:	4.70	in.	Dry Unit Weight:	87.9	pcf
Strain Rate:	1.615	%/min	Moisture Content:	33.9	%
Total Strain:	9.88	%	Depth of Sample:	26.0	ft.

EN GEO INCORPORATED	SUTTER MEDICAL CENTER	Job No.: 6486.2.003.01	Figure No.
		Sample Number: 2-B12@26'	
	Sonoma County, California	Date: 6/21/2005	

Unconfined Compression Test
ASTM Test Method D2166



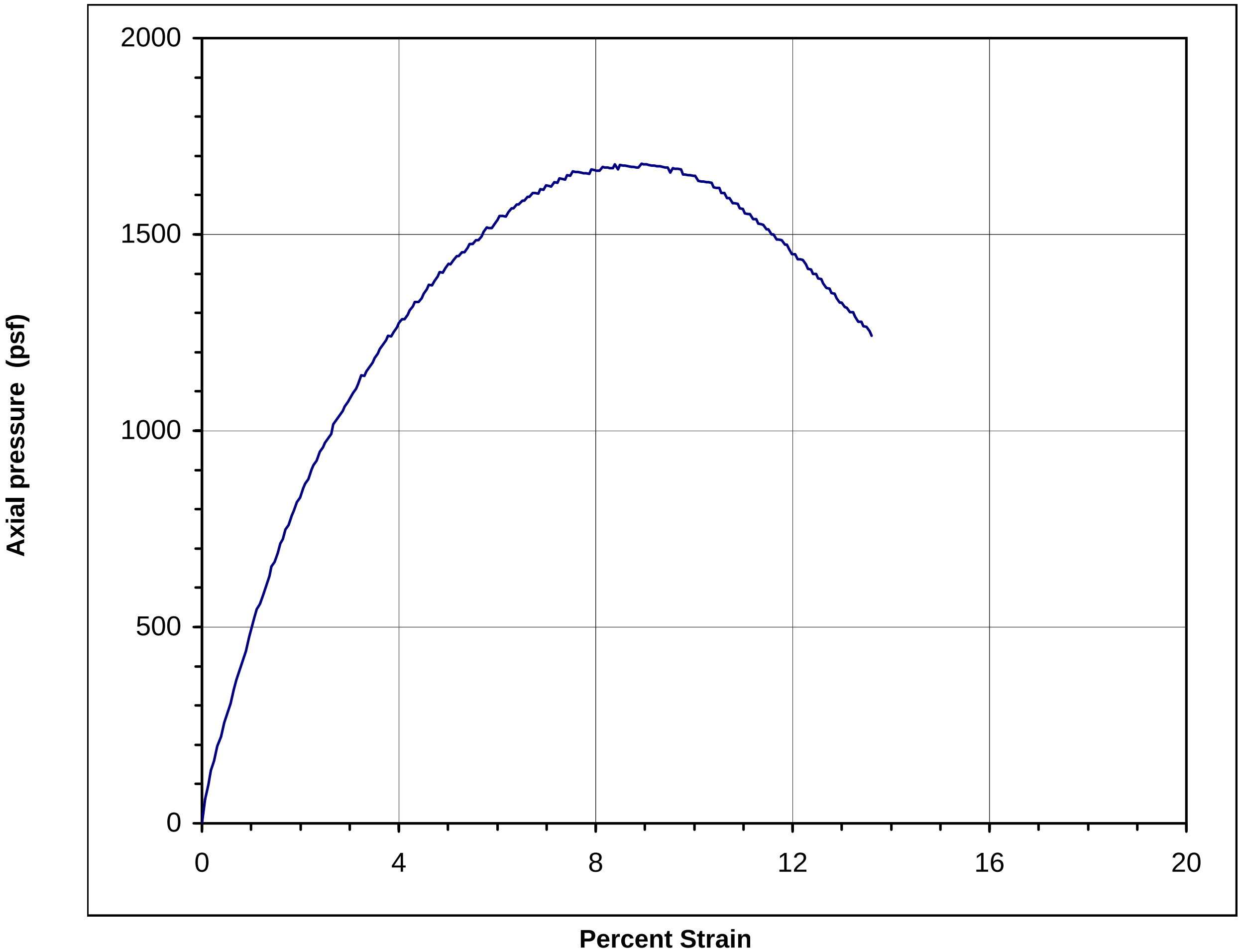
Unconfined Compressive Strength:		**1350 psf**	**0.7 tsf**

Sample Description: **Very dark grayish brown silty Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B12@41'	
Initial Height:	**4.91**	**in.**	**Dry Unit Weight:**	**70.8**	**pcf**
Strain Rate:	**1.592**	**%/min**	**Moisture Content:**	**51.1**	**%**
Total Strain:	**9.99**	**%**	**Depth of Sample:**	**41.0**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01	**Figure No.**
		Sample Number: 2-B12@41'	
		Date: 6/23/2005	

Unconfined Compression Test
ASTM Test Method D2166



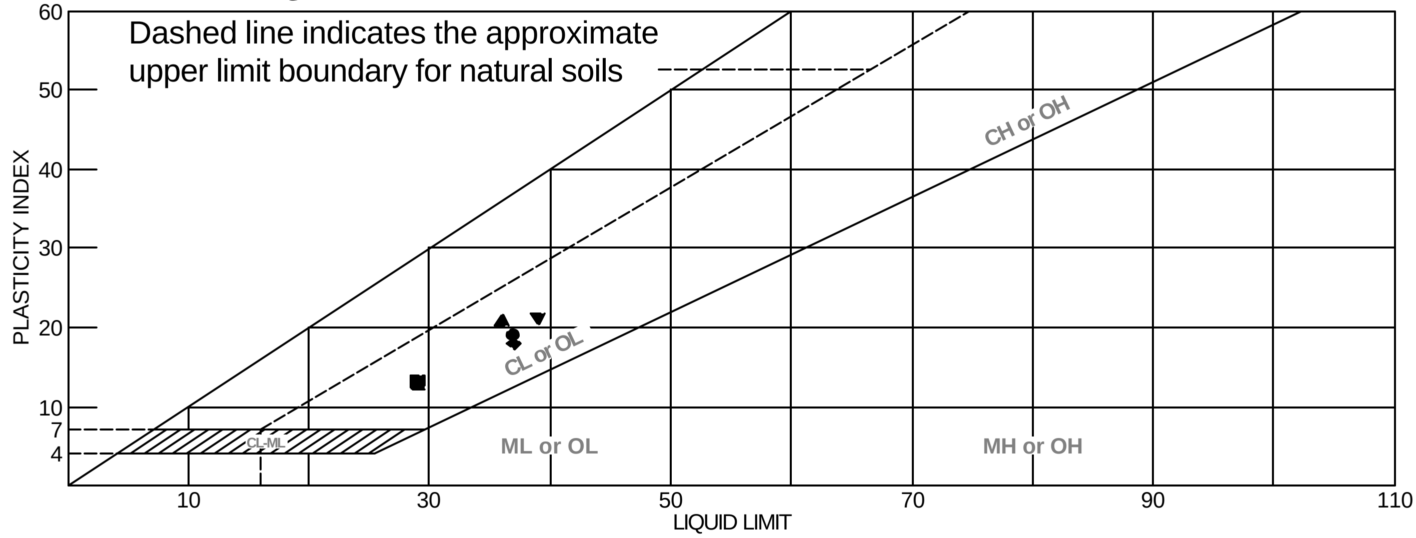
Unconfined Compressive Strength: **1670 psf** **0.8 tsf**

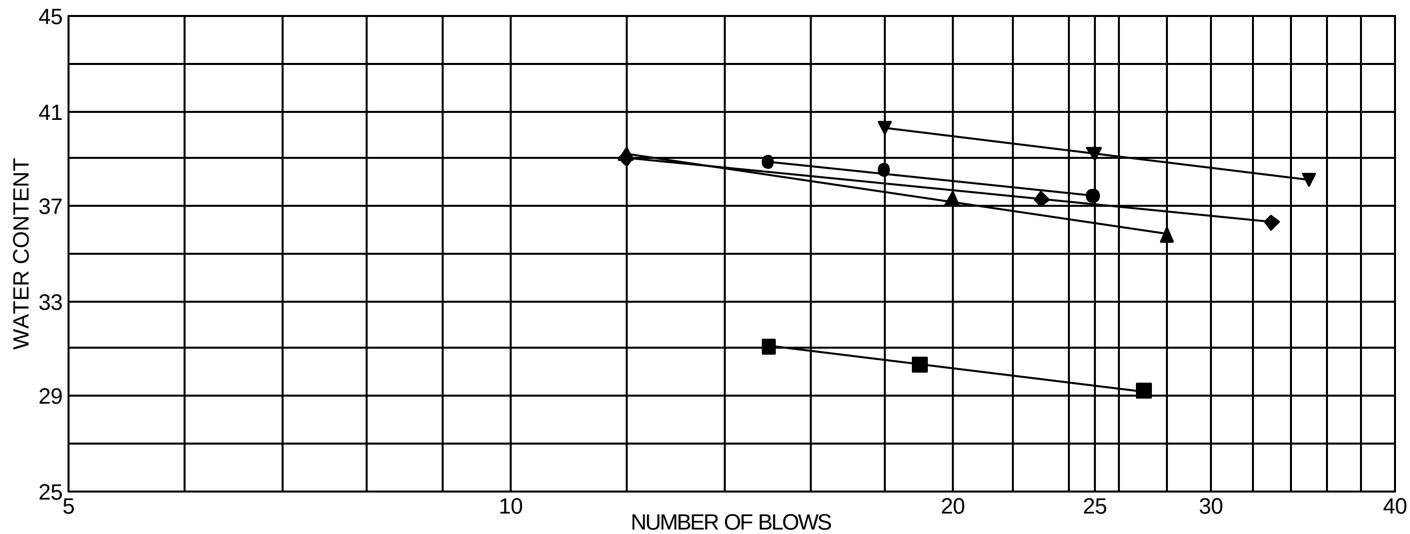
Sample Description: **Dark gryaish brown silty Clay with fine sand**

Initial Diameter:	**2.420**	**in.**	**Sample Number:**	2-B1@8.5'	
Initial Height:	**4.97**	**in.**	**Dry Unit Weight:**	**89.3**	**pcf**
Strain Rate:	**1.680**	**%/min**	**Moisture Content:**	**32.6**	**%**
Total Strain:	**13.61**	**%**	**Depth of Sample:**	**8.5**	**ft.**

***EN* GEO** INCORPORATED	**SUTTER MEDICAL CENTER** **Sonoma County, California**	**Job No.:** 6486.2.003.01	**Figure No.**
		Sample Number: 2-B1@8.5'	
		Date: 6/23/2005	

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark grayish brown sandy Clay, trace gravel	37	18	19		59.4	CL
■	Dark grayish brown clayey Sand	29	16	13		32.8	SC
▲	Dark grayish brown clayey Sand	36	15	21		19.5	SC
◆	Dark grayish brown sandy Clay	37	19	18		55.7	CL
▼	Dark grayish brown sandy Clay	39	18	21		57.5	CL

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

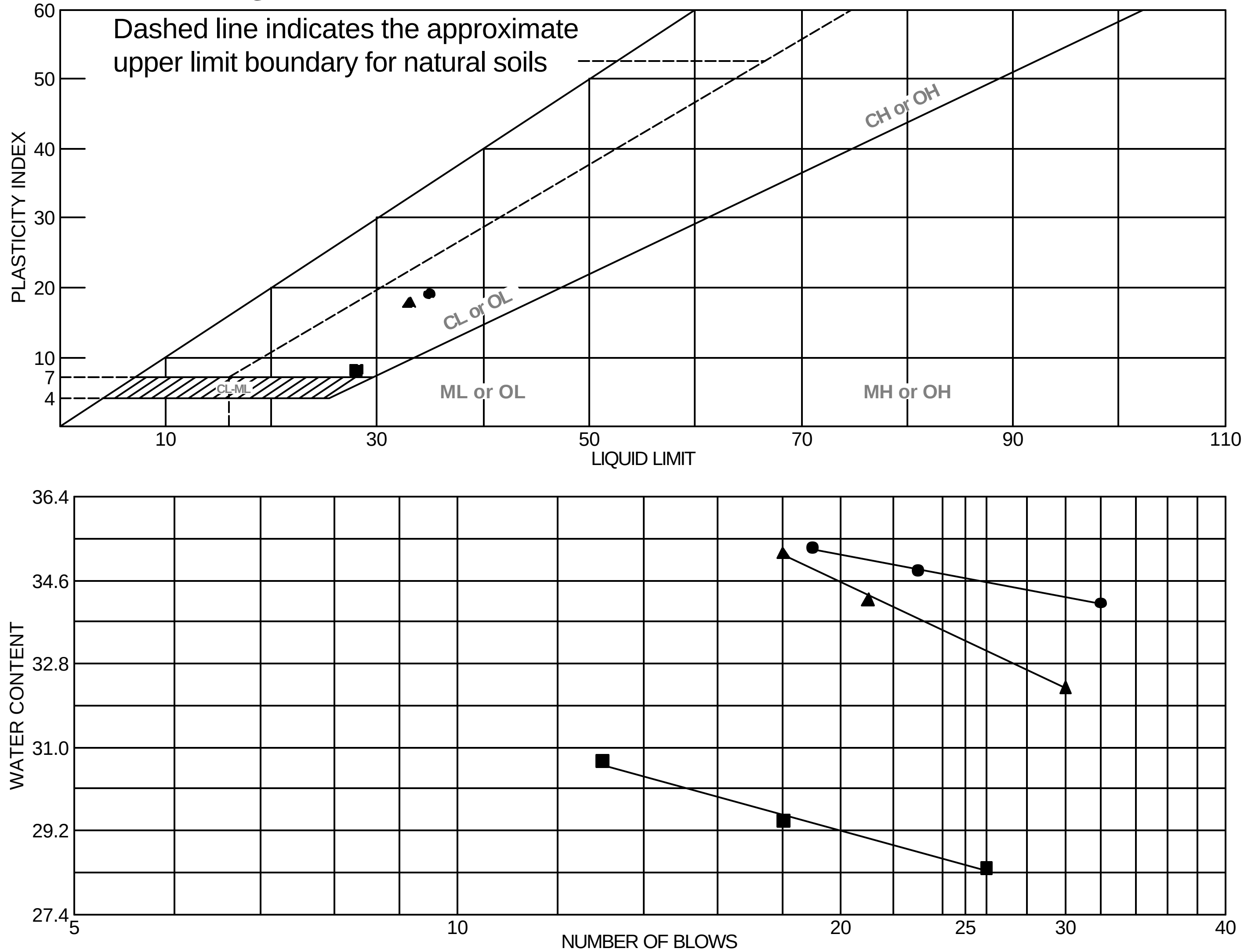
● **Source:** **Sample No.:** 2-B2@23'
■ **Source:** **Sample No.:** 2-B3@10.5'
▲ **Source:** **Sample No.:** 2-B4@6.5'
◆ **Source:** **Sample No.:** 2-B5@29'
▼ **Source:** **Sample No.:** 2-B7@21'

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Remarks:
● (2-B2@23')
■ (2-B3@10.5')
▲ (2-B4@6.5')
◆ (2-B5@29')
▼ (2-B7@21')

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Very dark grayish brown clayey SAND	35	16	19	66.1	39.8	SC
■	Dark grayish brown clayey SAND	28	20	8		41.3	SC
▲	Dark grayish brown clayey SAND with gravel	33	15	18	61.0	27.9	SC

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

● **Source:** **Sample No.:** 2-B1@5'

■ **Source:** **Sample No.:** 2-B9@6'

▲ **Source:** **Sample No.:** 2-B12@6'

ENGEO INCORPORATED — GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Remarks:

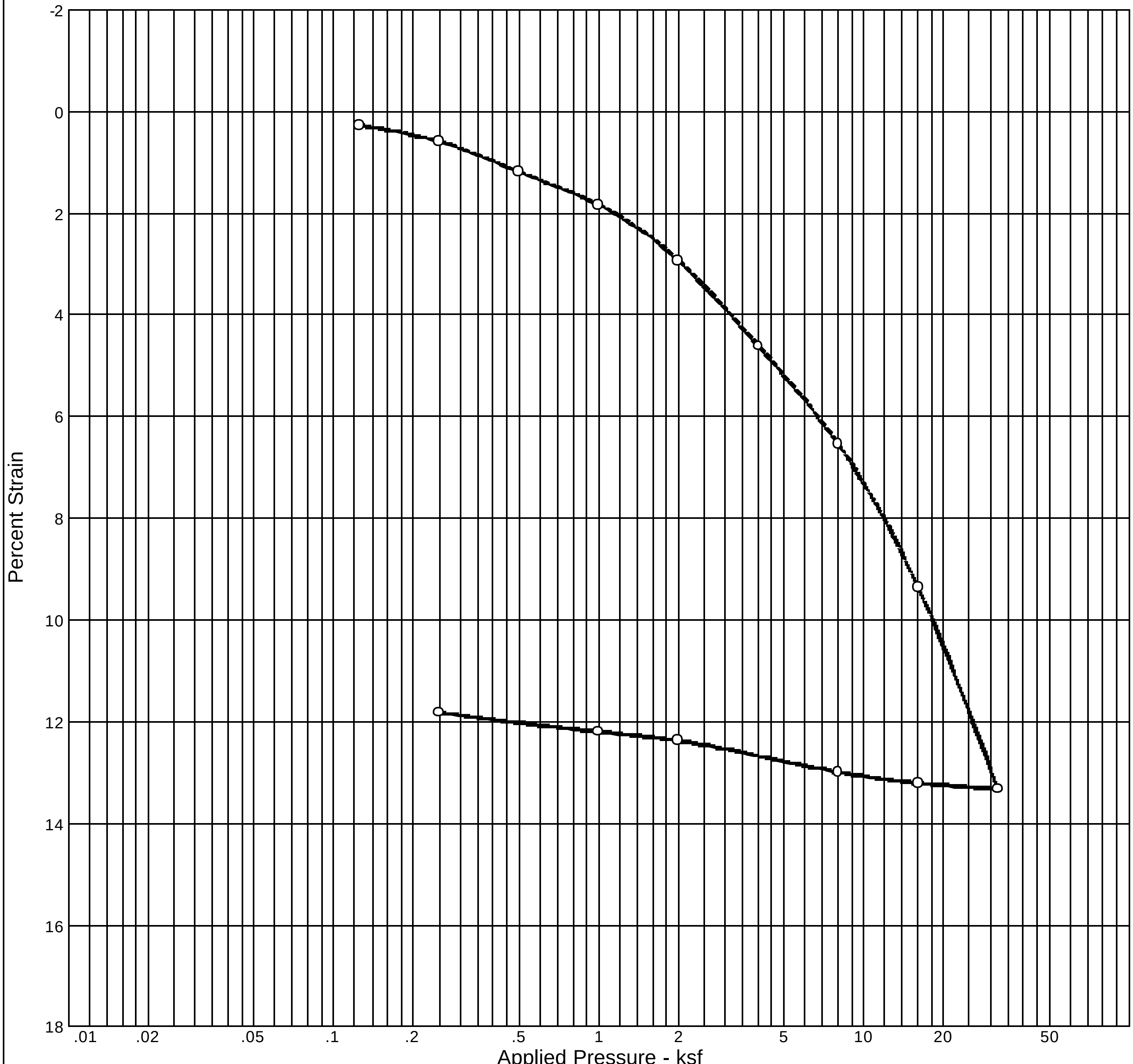
● (2-B1@5')

■ (2-B9@6')

▲ (2-B12@6')

Plate

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.9 %	42.0 %	71.0			2.20	SM		0.934

MATERIAL DESCRIPTION
Dark grayish brown silty Sand with clayey pockets

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: **Sample No.:** 2-B3 @ 21.5' **Elev./Depth:** 21.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

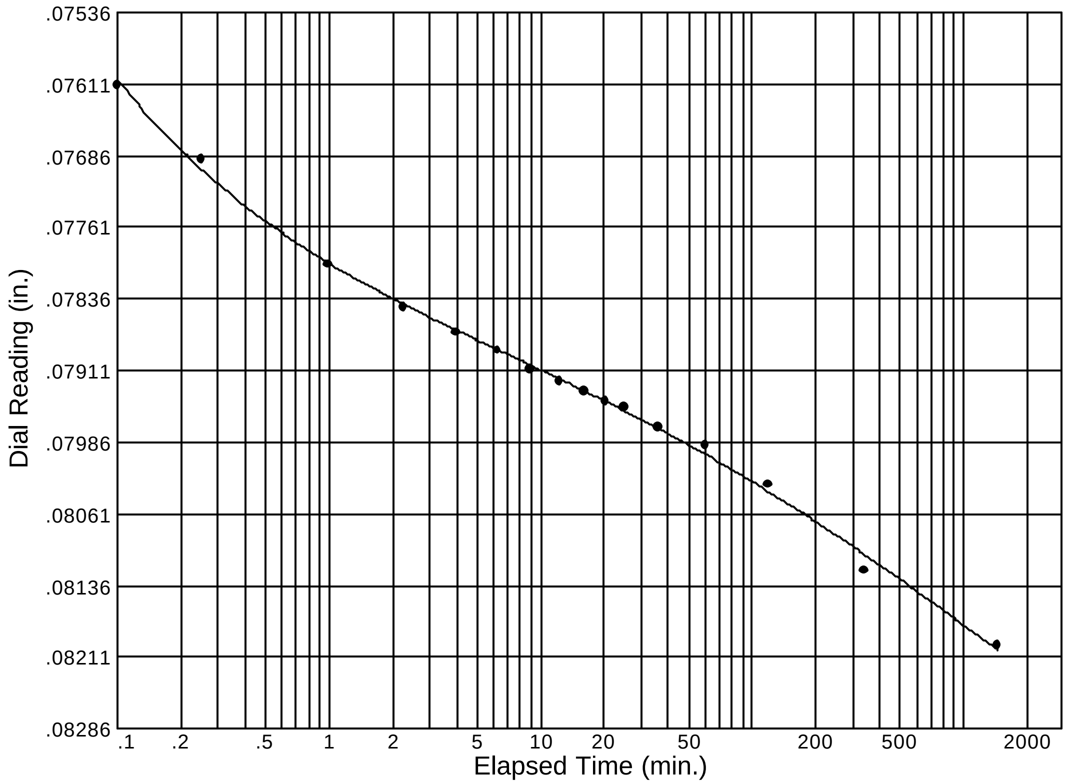
Remarks:

Plate

Dial Reading vs. Time

Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

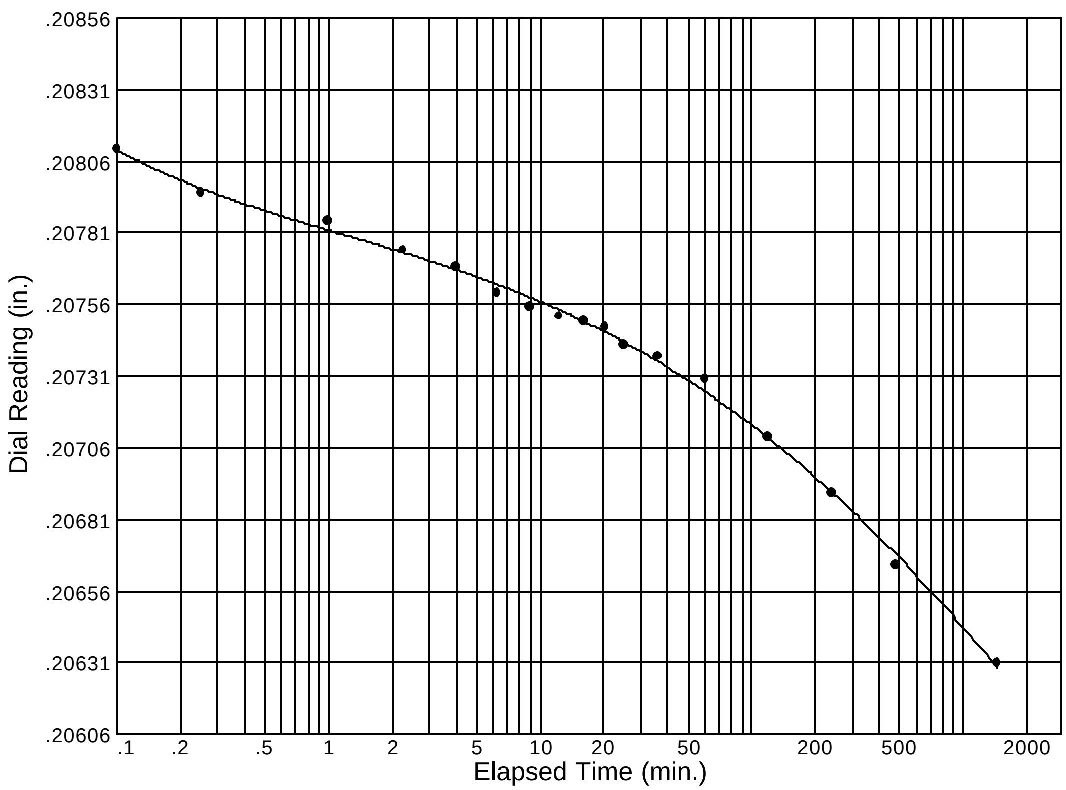
Source: Sample No.: 2-B3 @ 21.5' Elev./Depth: 21.5 ft.



Load No.= 4
Load= 1.00 ksf
D_0 = 0.07475
D_{50} = 0.07830
D_{100} = 0.08184
T_{50} = 1.77 min.

C_v @ T_{50}
0.39 ft.^{2}/day

C_α = 0.001



Load No.= 13
Load= 1.00 ksf
D_0 = 0.20822
D_{50} = 0.20784
D_{100} = 0.20747
T_{50} = 0.78 min.

C_v @ T_{50}
0.70 ft.^{2}/day

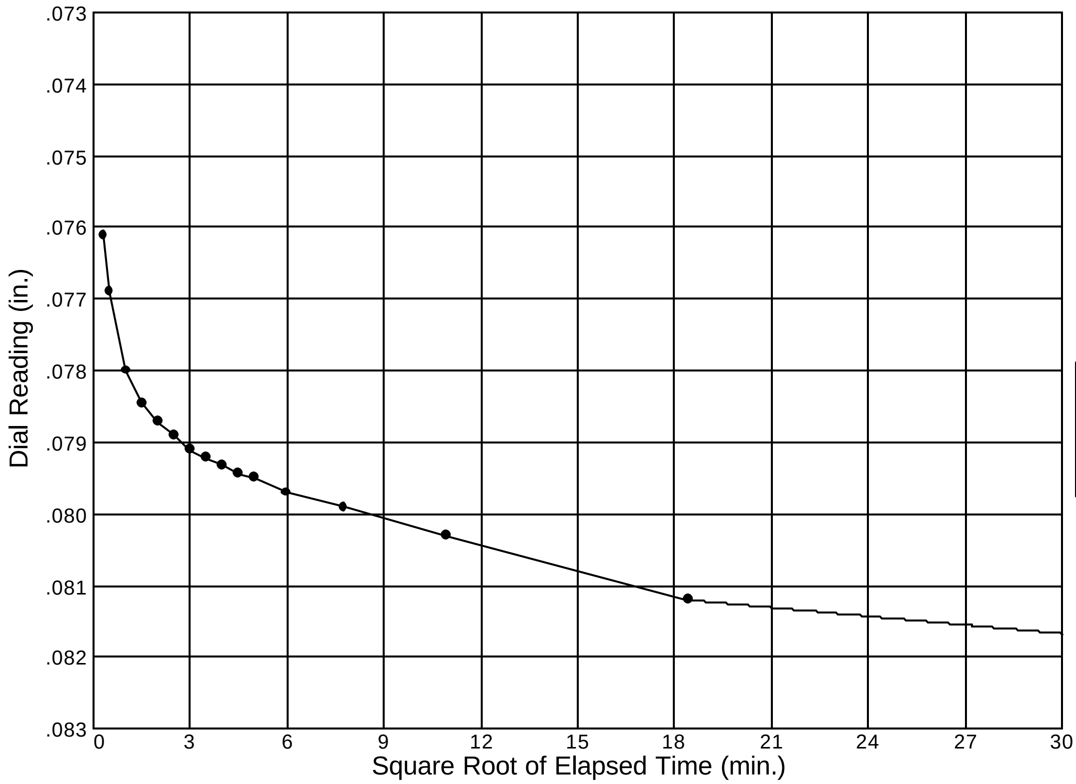
Plate

ENGEO, INC.

Dial Reading vs. Time

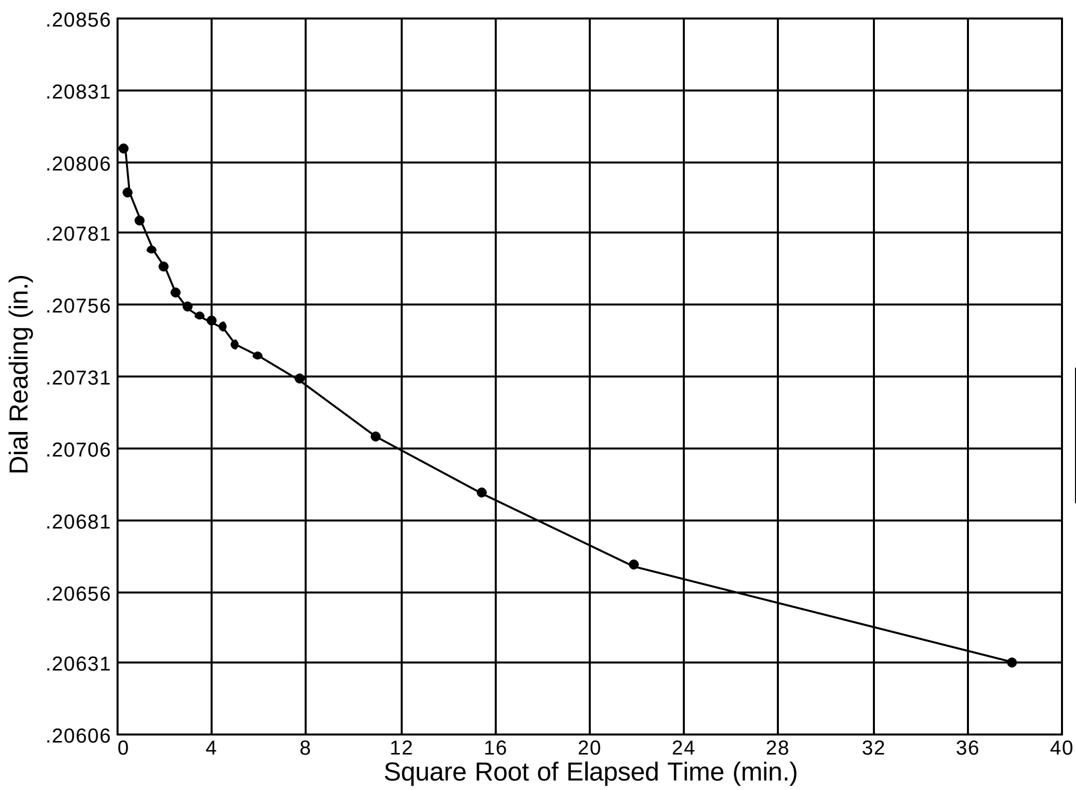
Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B3 @ 21.5' Elev./Depth: 21.5 ft.



Load No.= 4
Load= 1.00 ksf
D_0 = 0.07541
D_{90} = 0.07819
D_{100} = 0.07850
T_{90} = 1.47 min.

C_v @ T_{90}
2.01 ft.^{2}/day



Load No.= 13
Load= 1.00 ksf
D_0 = 0.20809
D_{90} = 0.20755
D_{100} = 0.20749
T_{90} = 9.18 min.

C_v @ T_{90}
0.26 ft.^{2}/day

Plate

ENGEO, INC.

CONSOLIDATION TEST REPORT

Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.8 %	29.3 %	90.0			2.5	CL		0.734

MATERIAL DESCRIPTION

Very dark grayish brown sandy Clay

Project No. 6486.2.003.01 **Client:**

Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: **Sample No.:** 2-B11@11' **Elev./Depth:** 11.0 ft.

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

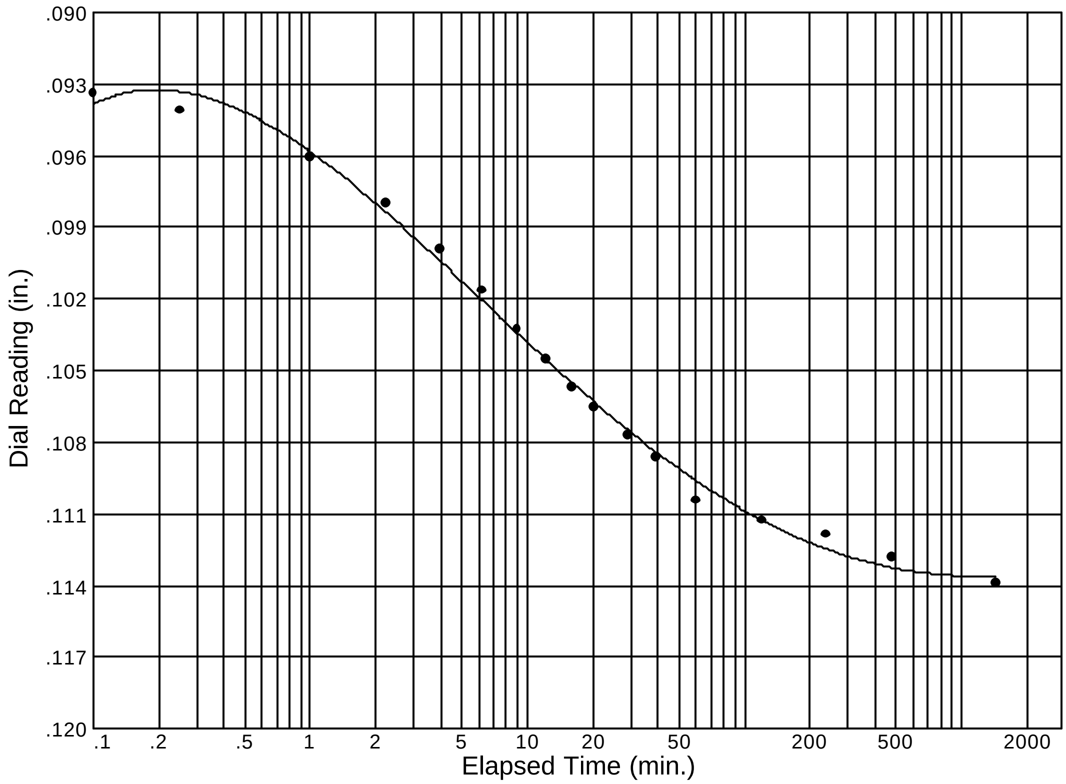
Remarks:

Plate

Dial Reading vs. Time

Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B11@11' Elev./Depth: 11.0 ft.



Load No.= 6

Load= 4.29 ksf

D_0 = 0.09038

D_{50} = 0.10058

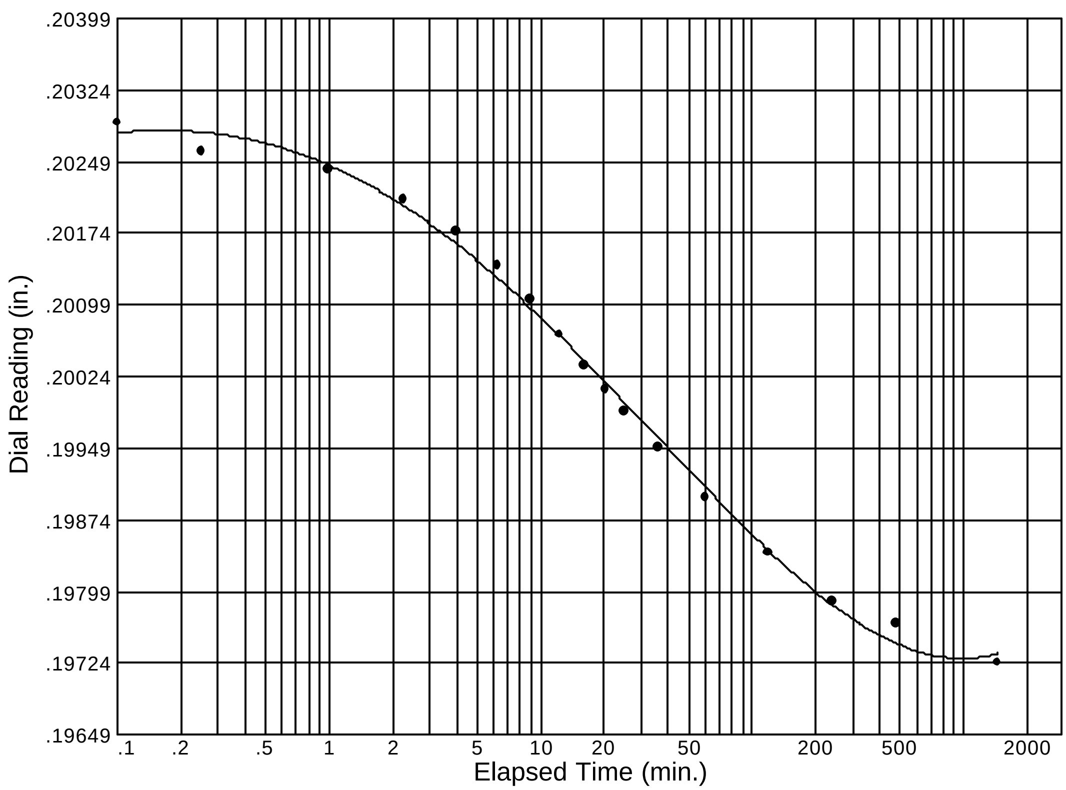
D_{100} = 0.11079

T_{50} = 4.14 min.

C_v @ T_{50}

0.11 ft.^{2}/day

C_α = 0.002



Load No.= 12

Load= 4.29 ksf

D_0 = 0.20328

D_{50} = 0.20066

D_{100} = 0.19804

T_{50} = 12.35 min.

C_v @ T_{50}

0.03 ft.^{2}/day

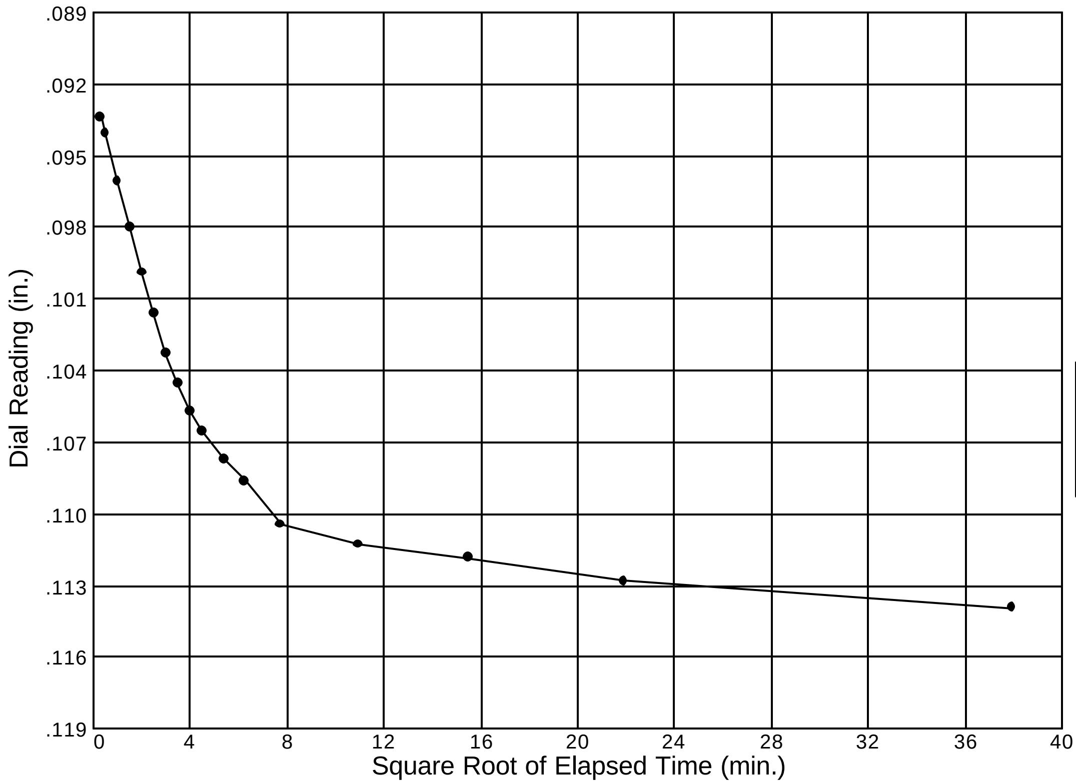
Plate

ENGEO, INC.

Dial Reading vs. Time

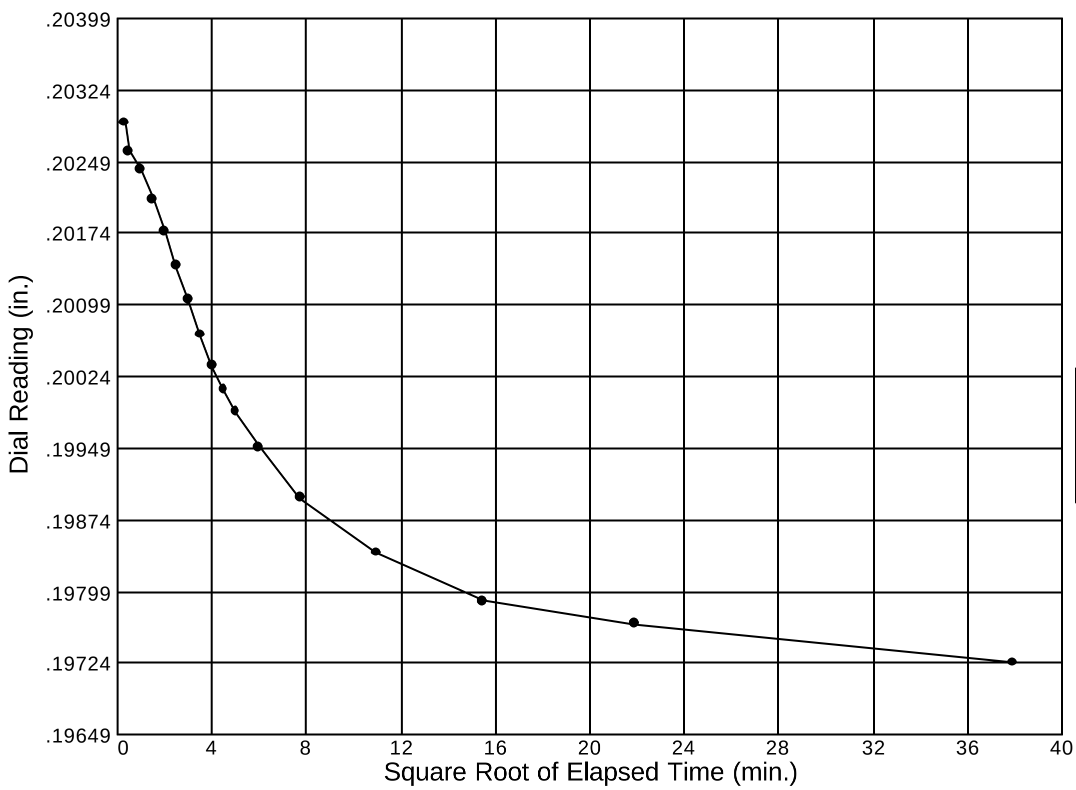
Project No.: 6486.2.003.01
Project: Sutter Medical Center, Santa Rosa, Sonoma County, CA

Source: Sample No.: 2-B11@11 Elev./Depth: 11.0 ft.



Load No.= 6
Load= 4.29 ksf
D_0 = 0.09248
D_{90} = 0.10659
D_{100} = 0.10816
T_{90} = 20.61 min.

C_v @ T_{90}
0.09 ft.^{2}/day



Load No.= 12
Load= 4.29 ksf
D_0 = 0.20297
D_{90} = 0.19919
D_{100} = 0.19877
T_{90} = 49.35 min.

C_v @ T_{90}
0.03 ft.^{2}/day

Plate

ENGEO, INC.

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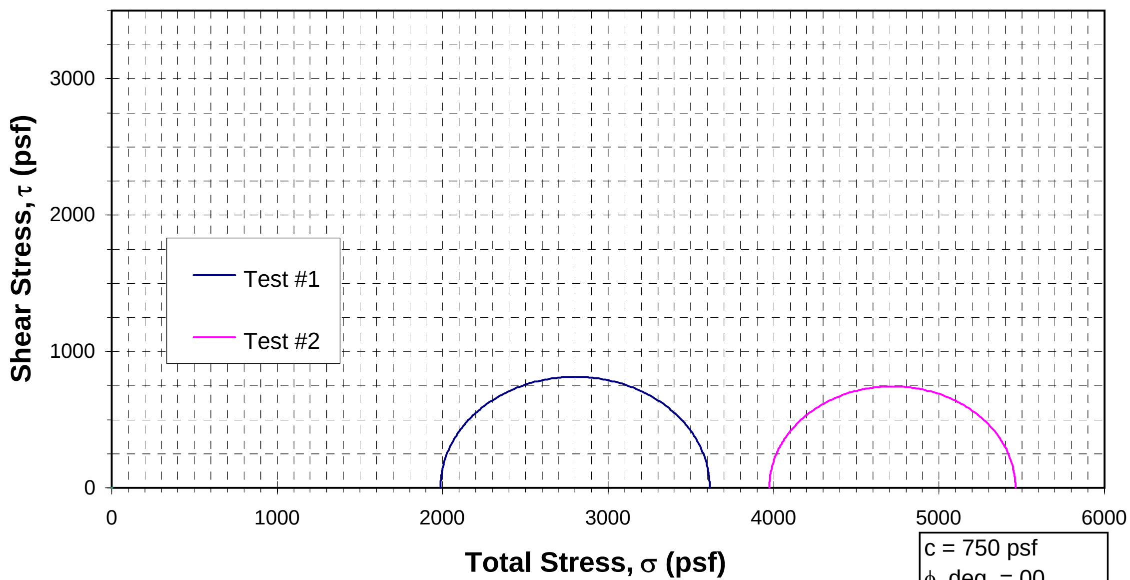
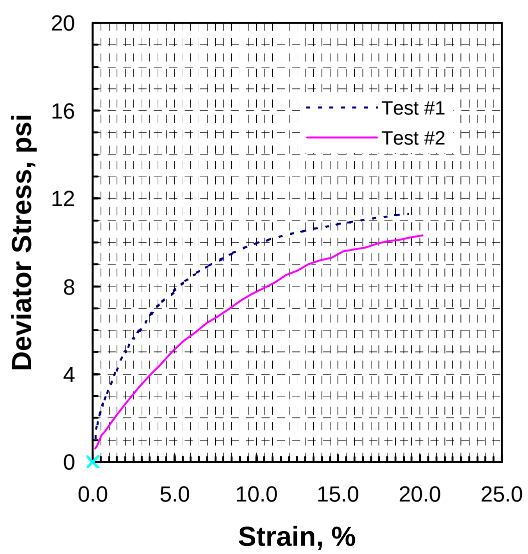
TRIAXIAL COMPRESSION TEST REPORT

TRIAXIAL TEST - UNCONSOLIDATED UNDRAINED (UU)



c = 750 psf
ϕ, deg. = 00
tan ϕ = --



Test Data

Test No.	1	2		
Initial				
Water Content, %	35%	44%		
Dry Density, pcf	87.2	79.5		
Saturation, %	99%	99%		
Void Ratio	0.97	1.32		
Minor Principal Stress, psf	1987.2	3974.4		
Maximum Deviator Stress, psf	1627.2	1487.5		
Time of Failure, min	120	120		
Rate of Strain Increments, %/min	1	1		
Initial Diameter, in	2.42	2.40		
Initial Height, in	3.50	3.60		
B- Value				

Test No.	Description of Specimens:	Sample No.	Sample Depth	LL	PI
1	Very dark gray silty sand	2-B4@18.5'	18.5 ft.		
2	Dark grayish brown sandy Silt	2-B1@17'	17 ft.		

Comments:

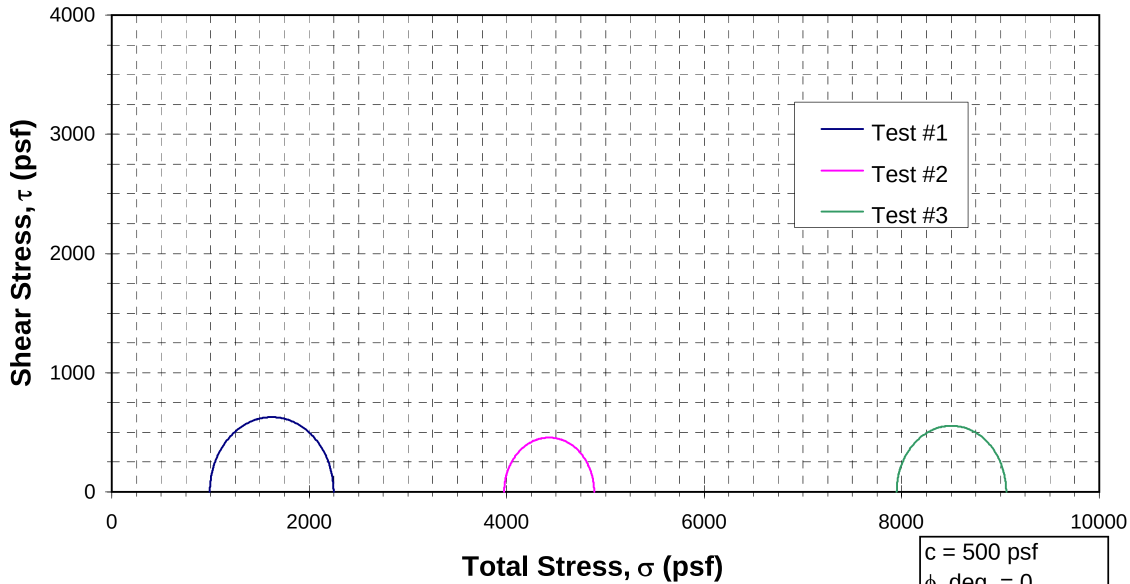
Sample are wet and soft.

Boring Number:	B4 & B1
Project Name:	Sutter Medical Center, Santa Rosa, Sonama C
Project Number:	6486.2.003.01
Technician:	Mohan
Date:	6/28/2005

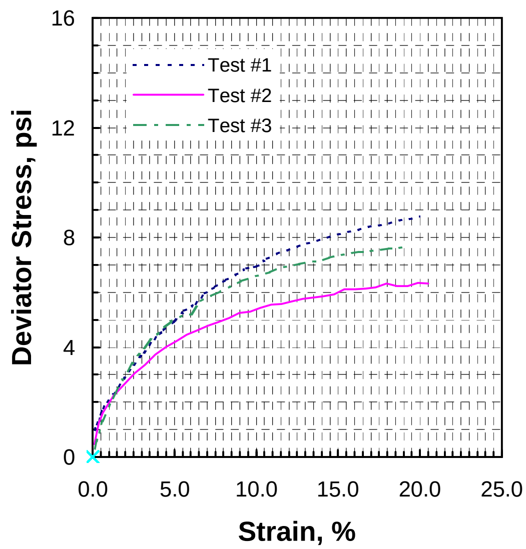
***EN*GEO Incorporated**

TRIAXIAL COMPRESSION TEST REPORT

TRIAXIAL TEST - UNCONSOLIDATED UNDRAINED (UU)



c = 500 psf
φ, deg. = 0
tan φ = --



Test Data

Test No.	1	2	3	4
Initial				
Water Content, %	38%	36%	36%	
Dry Density, pcf	84.1	85.2	87.4	
Saturation, %	99%	99%	100%	
Void Ratio	1.08	0.98	1.00	
Minor Principal Stress, psf	993.6	3974.4	7948.8	
Maximum Deviator Stress, psf	1252.8	910.1	1108.8	
Time of Failure, min	125	126	132	
Rate of Strain Increments, %/min	1	1	1	
Initial Diameter, in	2.42	2.42	2.42	
Initial Height, in	4.00	3.90	4.15	
B- Value				

Test No.	Description of Specimens:	Sample No.	Sample Depth	LL	PI
1	Dark grayish Clayey Sand	2-B5 @ 14'	14 ft.		
2	Very dark grayish brown Sandy Clay	2-B8 @ 15.5'	15.5 ft.		
3	Very dark grayish brown sandy Clay	2-B6 @ 16'	16 ft.		

Comments:		
Samples are wet and soft	Boring Number:	B5, B6 & B8
	Project Name:	Sutter Medical Center, Santa Rosa, Sonama C
	Project Number:	6486.2.003.01
	Technician:	Mohan
	Date:	6/28/2005

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B2@6'**
Sample Description:	**Dark grayish brown silty Clay with fine sand. Trace gravel**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.42 in.
Pre-test sample wt:	152.8 g	Sp.Gravity (est.):	
Tare Weight:	8.4 g		
Gross Wet Wt (g):	160.4 g	Net Wet Sample Wt.:	152.0 g
Gross Dry Wt. (g):	130.3 g	Net Dry Sample Wt.:	121.9 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**25.3%**	**24.7%**
Dry Density:	**101.0 pcf**	**102.8 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3933
Displacement:	-0.67% (Net Compression)

SWELL DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.3933
Final LVDT Reading:	0.3819
Displacement:	-1.14% (Net Swell)

TOTAL DISPLACEMENT: -1.81%

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B3@6'**
Sample Description:	**Very dark yellowish brown clayey Sand**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.42 in.
Pre-test sample wt:	140.0 g	Sp.Gravity (est.):	
Tare Weight:	9.6 g		
Gross Wet Wt (g):	148.5 g	Net Wet Sample Wt.:	138.9 g
Gross Dry Wt. (g):	119.0 g	Net Dry Sample Wt.:	109.4 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**28.0%**	**27.0%**
Dry Density:	**90.6 pcf**	**94.4 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3876
Displacement:	-1.24% (Net Compression)

SWELL DATA

Load :	0.5797 kg
Surcharge Pressure:	800 psf
Initial LVDT Reading:	0.3876
Final LVDT Reading:	0.3601
Displacement:	-2.75% (Net Swell)

TOTAL DISPLACEMENT: -3.99%

ENGEO INC.
ASTM SWELL POTENTIAL
D4546 METHOD "B"

File Number:	**6486.2.003.01**	**Date:**	**06/24/05**
File Name:	**Sutter Medical Group**	**Sample Number:**	**2-B5@4'**
Sample Description:	**Dark grayish brown silty Clay**		

Initial Sample Ht.:	1.00 in.	Sample Diameter:	2.375 in.
Pre-test sample wt:	136.0 g	Sp.Gravity (est.):	
Tare Weight:	9.3 g		
Gross Wet Wt (g):	143.5 g	Net Wet Sample Wt.:	134.2 g
Gross Dry Wt. (g):	112.5 g	Net Dry Sample Wt.:	103.2 g

	** PRE-TEST CONDITIONS **	** POST-TEST CONDITIONS **
Moisture content:	**31.8%**	**30.0%**
Dry Density:	**88.7 pcf**	**90.7 pcf**

Initial LVDT Reading: 0.4000

COMPRESSION DATA

Load :	0.3488 kg
Surcharge Pressure:	500 psf
Initial LVDT Reading:	0.4000
Final LVDT Reading:	0.3932
Displacement:	-0.68% (Net Compression)

SWELL DATA

Load :	0.3488 kg
Surcharge Pressure:	500 psf
Initial LVDT Reading:	0.3932
Final LVDT Reading:	0.3782
Displacement:	-1.50% (Net Swell)

TOTAL DISPLACEMENT: -2.18%

EN GEO Incorporated

SULFATE TEST RESULTS

CALTRANS Test Method 417

Project Name: Sutter Medical Center

Project Number: 6486.2.003.01

Tested By: Marco Herrera

Date: June 23, 2005

Measurements less than 15 mg/kg are reported as Not Detectable (ND)

Sample Number	Sample Location	Matrix	Water Soluble Sulfate (SO_4) in Soil	
			mg/kg	% by Weight
1	2-B4 @ 23'	Soil	6	0.001
2	2-B4 @ 39'	Soil	33	0.003
3	2-B5 @ 14'	Soil	14	0.001
4	2-B6 @ 6'	Soil	6	0.001
5	2-B8 @ 31'	Soil	6	0.001
6	2-B1 @ 21'	Soil	30	0.003
7	2-B7 @ 6'	Soil	12	0.001
8	2-B7 @ 36'	Soil	33	0.003

EN GEO Incorporated

SULFATE TEST RESULTS

CALTRANS Test Method 417

Project Name: Sutter Medical Center　　Project Number: 6486.2.003.01

Tested By: Marco Herrera　　Date: June 25, 2005

Measurements less than 15 mg/kg are reported as Not Detectable (ND)

Sample Number	Sample Location	Matrix	Water Soluble Sulfate (SO_4) in Soil	
			mg/kg	% by Weight
1	2-B12@16'	Soil	36	0.004

Office: 2010 Crow Canyon Place, Suite 250, San Ramon, CA 94583
Laboratory: 2057 San Ramon Valley Boulevard, San Ramon, CA 94583

APPENDIX C

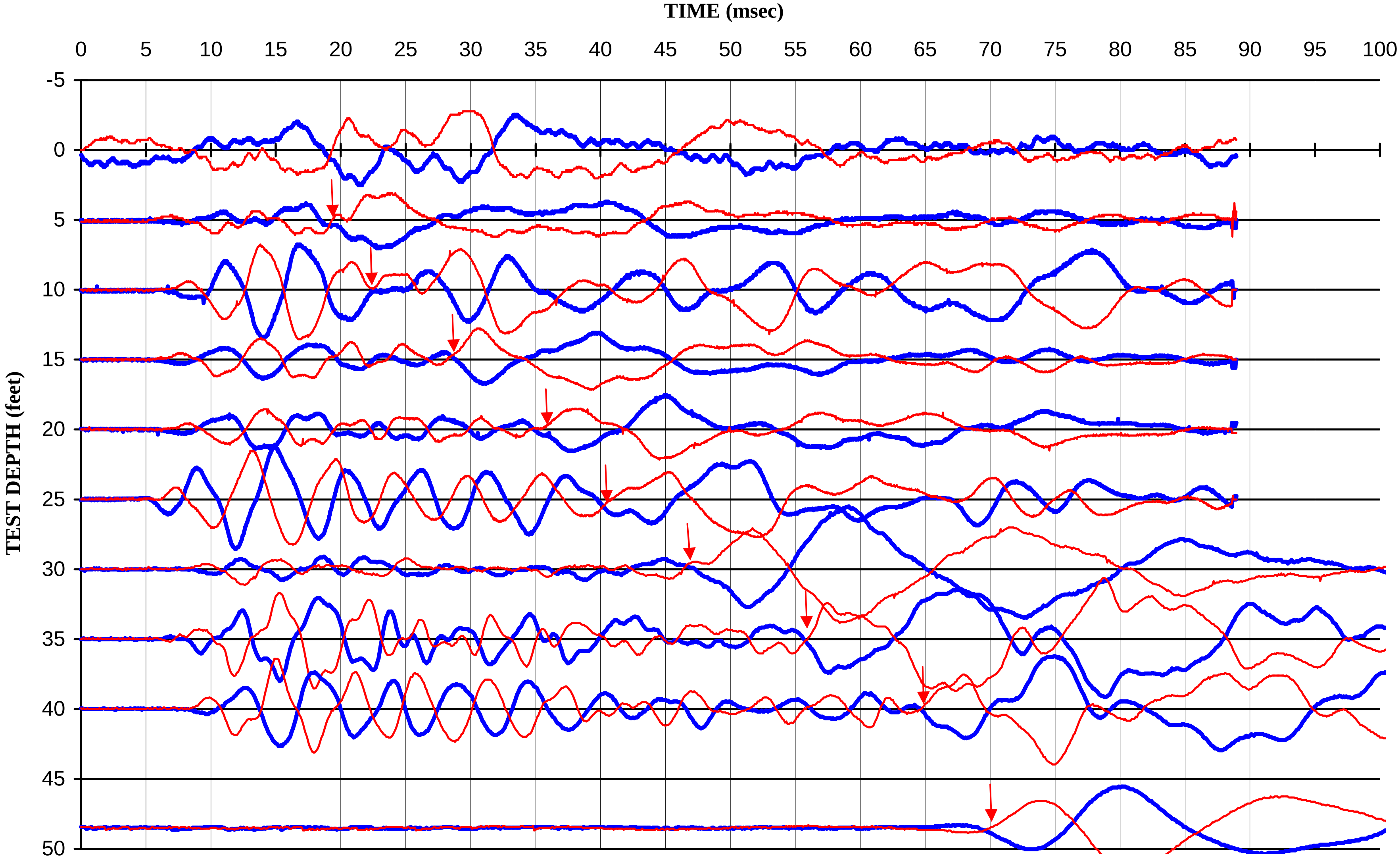
JOHN SARMIENTO AND ASSOCIATES (2005)

Downhole Shear Wave Velocity Survey

2-CPT27 and 2-CPT8

6486.200.601
November 24, 2008

Shear Wave Propogation Profile at CPT-8
Sutter Hospital, Santa Rosa

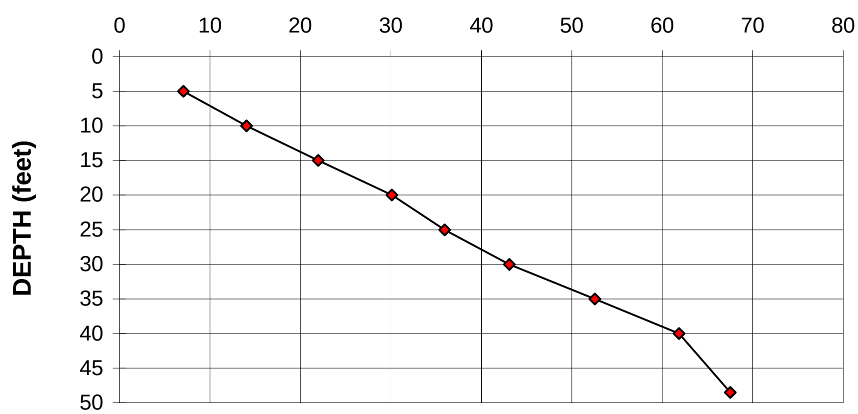


John Sarmiento & Associates

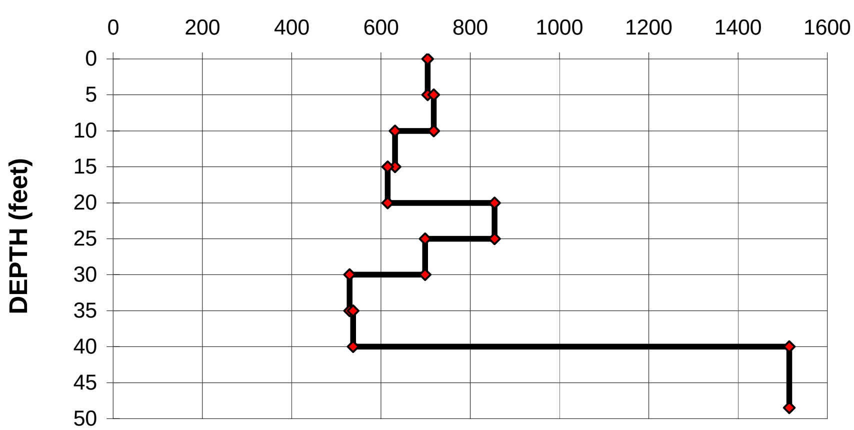
Downhole Geophysical Survey at CPT-8
Sutter Hospital Site, Santa Rosa, Ca

test depth (ft)	horiz. distance (ft)	incidence angle (deg)	arrival time (msec)	corrected vertical time (msec)	Shear wave wave velocity for depth interval (ft/sec)	(m/sec)
0			0.0	0.0		
5	12.5	68.2	19.1	7.09	705	215
10	12.5	51.3	22.5	14.06	718	219
15	12.5	39.8	28.6	21.97	632	193
20	12.5	32.0	35.5	30.10	615	187
25	12.5	26.6	40.2	35.96	854	260
30	12.5	22.6	46.7	43.11	699	213
35	12.5	19.7	55.8	52.55	530	161
40	12.5	17.4	64.8	61.85	538	164
48.5	12.5	14.5	69.7	67.49	1515	462

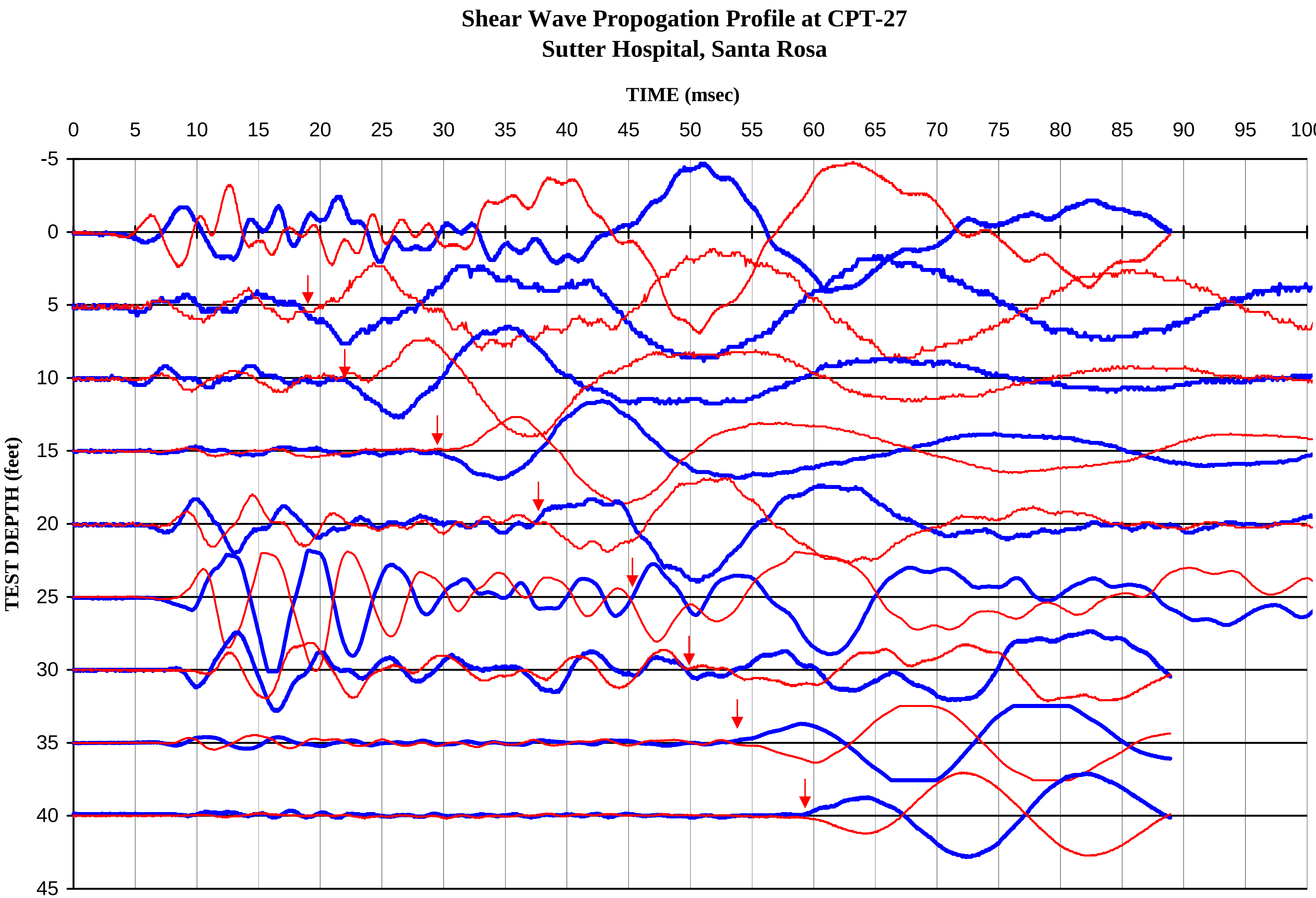
SHEAR WAVE ARRIVAL TIMES
Corrected Time (msec)



SHEAR WAVE VELOCITIES (ft./sec.)



John Sarmiento & Associates
Menlo Park, CA

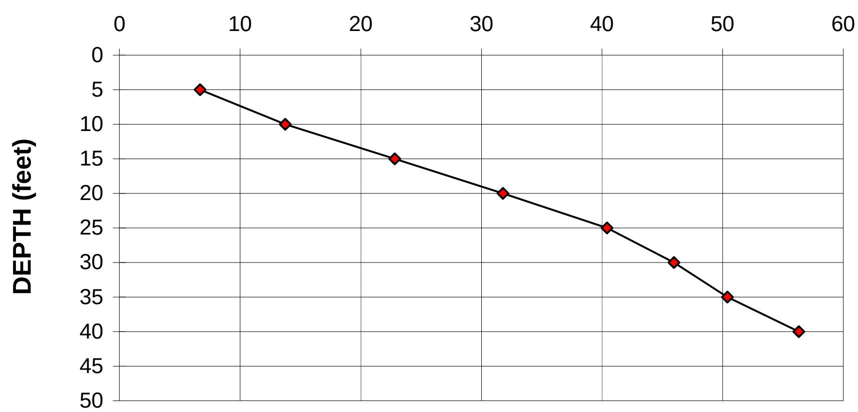


John Sarmiento & Associates

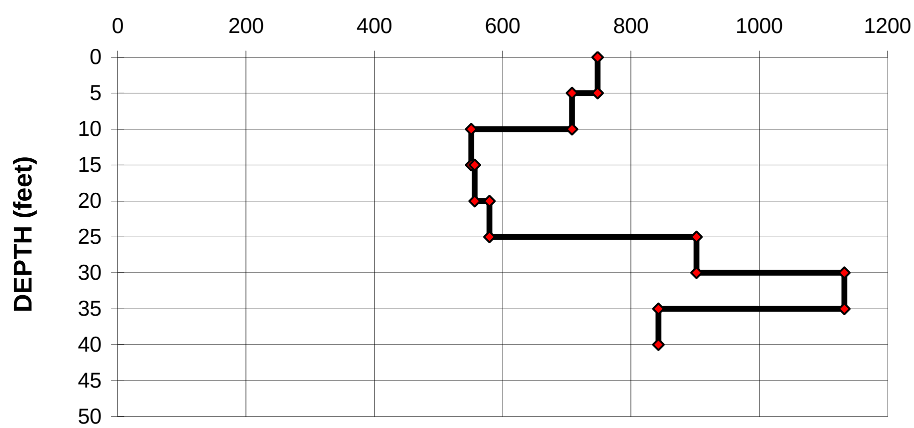
Downhole Geophysical Survey at CPT-27
Sutter Hospital Site, Santa Rosa, Ca

test depth (ft)	horiz. distance (ft)	incidence angle (deg)	arrival time (msec)	corrected vertical time (msec)	Shear wave wave velocity for depth interval (ft/sec)	(m/sec)
0			0.0	0.0		
5	12.5	68.2	18.0	6.69	748	228
10	12.5	51.3	22.0	13.74	708	216
15	12.5	39.8	29.7	22.82	551	168
20	12.5	32.0	37.5	31.80	557	170
25	12.5	26.6	45.2	40.43	579	177
30	12.5	22.6	49.8	45.97	902	275
35	12.5	19.7	53.5	50.38	1133	345
40	12.5	17.4	59.0	56.31	843	257

SHEAR WAVE ARRIVAL TIMES
Corrected Time (msec)



SHEAR WAVE VELOCITIES (ft./sec.)



John Sarmiento & Associates
Menlo Park, CA

APPENDIX D

Seismic Susceptibility Analysis
Methodology and Calculation

Figure D1 Susceptibility Criteria Chart

Figure D2 Liquefaction Potential Index and Settlement Chart

Cliq Output Files

3-CPT-11 Calculation Packet

6486.200.601
November 24, 2008

Susceptibility of the on-site soil to seismic deformation was evaluated. Classic liquefaction of sands, as well as the susceptibility of silts and clays under seismic loading were evaluated based on papers by, Bray and Sancio (2006), Idriss and Boulanger, 2004 and Seed et al, 2003 and others. The literature suggests that "transition" material that are classified as low-plasticity silts and clays may be susceptible to seismic softening. As a result, we have divided our evaluation of liquefaction into soils exhibiting "sand-like" behavior and those exhibiting "clay-like" behavior. We have assessed the seismic susceptibility and deformation potential at the site based on material properties from laboratory testing and in-situ CPT data as discussed in the following section.

Analyses Based on Material Properties. We have evaluated the susceptibility of silts and clays using the methods described in Bray and Sancio (2006) and criteria proposed by Idriss and Boulanger (2004). Utilizing laboratory test data of soil collected during our exploration, the seismic susceptibility of the on site soil is evaluated and presented on D 1. Chart B presents the project data and criteria proposed by Bray and Sancio. In general, the in-situ water content and plasticity of the subsurface material are classified as "moderately susceptible" or "not susceptible" with the exception of the sandy material encountered directly below the waste water treatment pond which is classified as potentially liquefiable. This sandy deposit is approximately 11-feet thick and is localized within the immediate area of the wastewater treatment pond. Also provided on D 1- Chart A is a plot of plasticity indices and Liquid limits of on site soil with "Transition Zone" between sand-like and clay-like behavior during seismic loading as proposed by Idriss and Boulanger. As shown, the material properties of the on-site soil lies above the transition zone and will exhibit a clay-like behavior and susceptible to seismic softening during seismic loading. The water contents used to evaluate susceptibility are based on existing water contents as measured from samples from the borings.

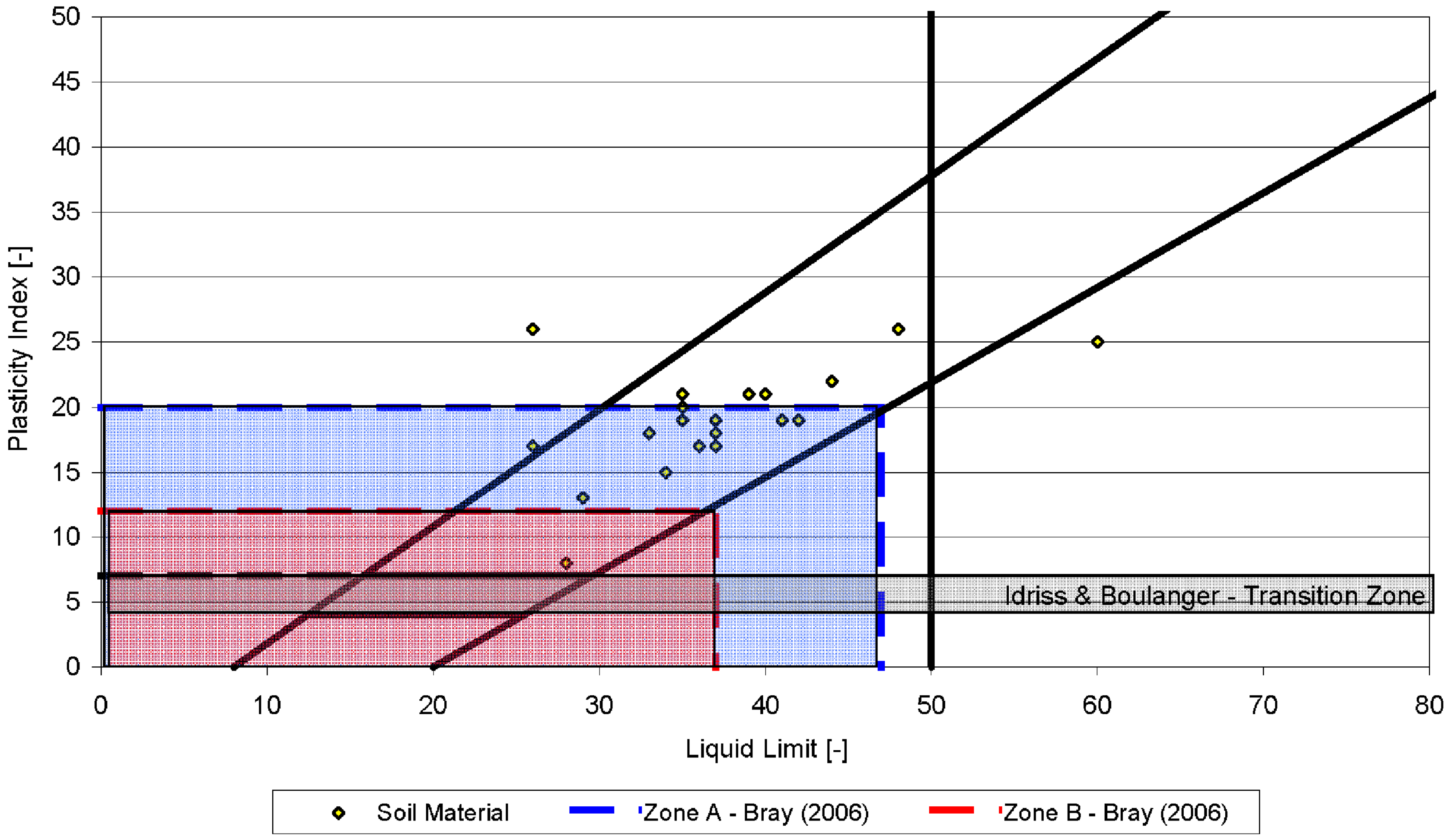
As discussed in this report, surcharging is proposed to mitigate potential static consolidation settlements at the site. Surcharging will reduce in-situ water contents and consequently reduce the water contents as a percentage of the liquid limit. As a result, following surcharging the clayey soils will have properties that plot outside of the susceptible range.

Analyses of In-situ CPT Data. We have evaluated liquefaction resistance and related settlement of the CPT data was performed in accordance procedures developed by Robertson & Wride (1998) using the computer software Cliq. The procedure used in the software is largely based on procedures originally published in NCEER-97-002. The software employs methodology discussed by Youd and Idriss, (2001) to assess seismically induced deformation for sand-like behavior and Boulanger and Idriss, (2008) for clay-like behavior. For our analysis we have used a design surface acceleration PGA of 0.484 (S_{DS}/2.5) in accordance with Chapter 16 of the California Building Code and CGS Note 48. A moment magnitude of 7.26 was selected based on controlling events at the Rodgers Creek fault.

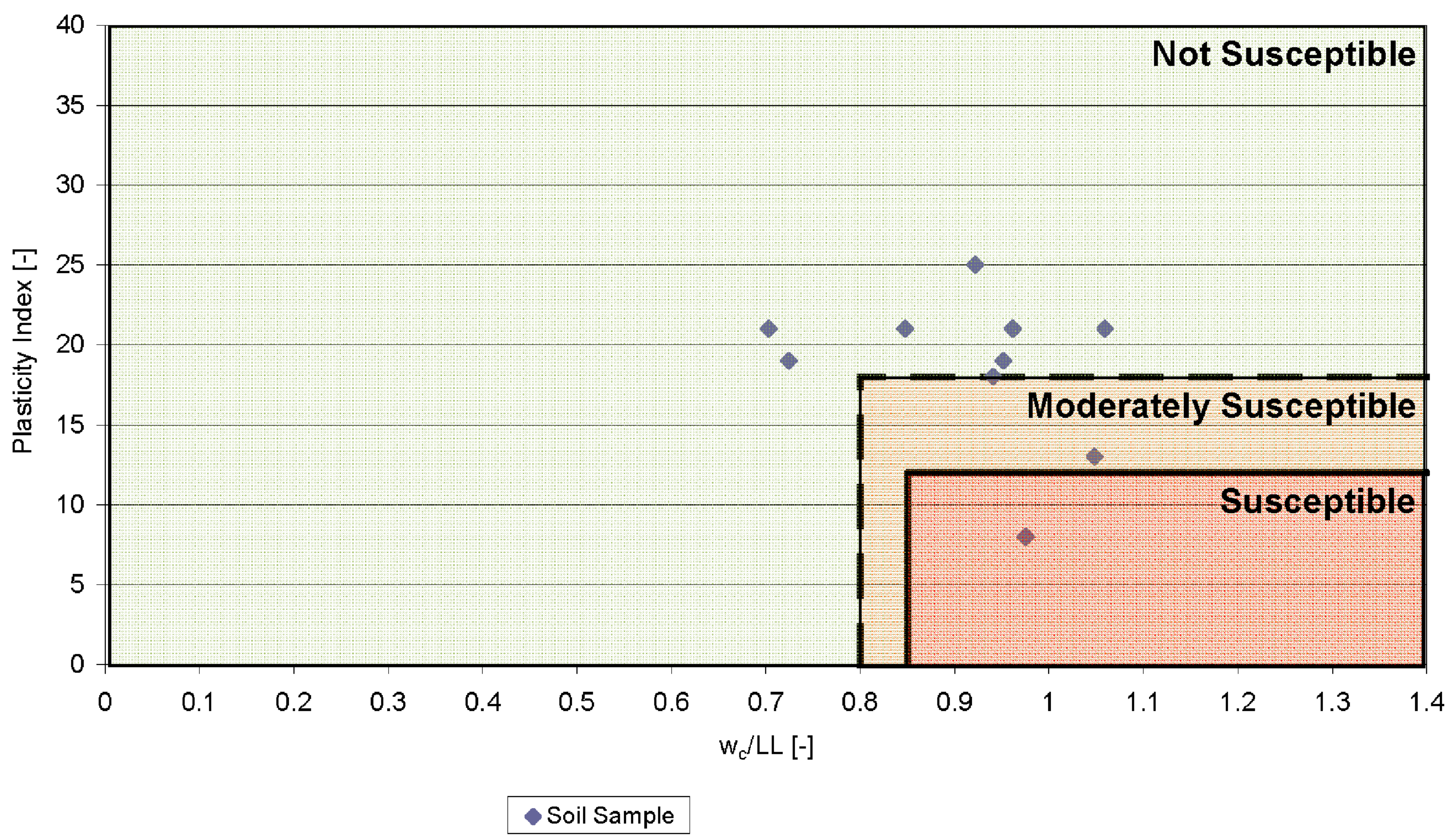
To assess liquefaction hazard, we have expressed using the Liquefaction Potential Index (LPI) for each CPT, as defined by Iwasaki (1982). LPI is a relative hazard index, calculated on a point-by-point basis using the factor of safety against liquefaction, as a function of depth. LPI has been correlated to observed damage in existing liquefaction case studies and is a more appropriate indicator of risk than factor of safety alone. The computed discrete factors of safety with depth, from which the LPI values for each CPT are derived, are summarized on the attached Cliq Output File. Also included in the summary are output files of all CPTs presenting Cyclic Stress Ratio (CSR), Cyclic Resistance Ratio (CRR) and conservative estimates of post liquefaction settlement both considering “sand-like” and “clay-like” soil behavior. Figure D 2 shows a graphic depiction LPI and potential seismic settlement considering combination of both sand-like and clay-like behavior (Chart A & C) and for sand-like behavior alone (Chart B& D). We have provided detail calculation performed by Cliq for assessing seismic susceptibility utilizing CPT data for 3-CPT11 (maximum settlement calculated) in the attached Calculation Packet Section of this report.

Assuming that the site is surcharged to mitigate static consolidation settlement, the contribution of the clayey soil to LPI and seismic settlement will be mitigated as well. As discussed by Boulanger and Idriss the susceptibility of clayey soils is a function of the undrained shear strength. Since undrained shear strength of the clayey soil will be increased by surcharging, the potential for seismic softening and the consequential volumetric strains will be reduced, As a result, the post-construction liquefaction and seismic settlement risk is best characterized by the charts which present sand-like behavior alone. As discussed in this report, generally following surcharging, seismically induced liquefaction settlements within the surcharged areas are expected to be very minimal across the site, with localized areas within the site that may observe settlements of up to 1½ inch during a seismic event. In area that are not surcharged liquefaction settlements could be on the order of 1½ to 2 inches.

Plasticity Chart
Sutter Medical Center
CHART A



Susceptibility Criteria (Bray and Sancio, 2006)
Sutter Medical Center Atterberg Limits Testing
CHART B



ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

LIQUEFACTION SUSCEPTIBILITY CHART
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.601	FIGURE NO.
DATE: NOVEMBER 2008	D1
DRAWN BY: LC	CHECKED BY: TPB

ORIGINAL FIGURE PRINTED IN COLOR

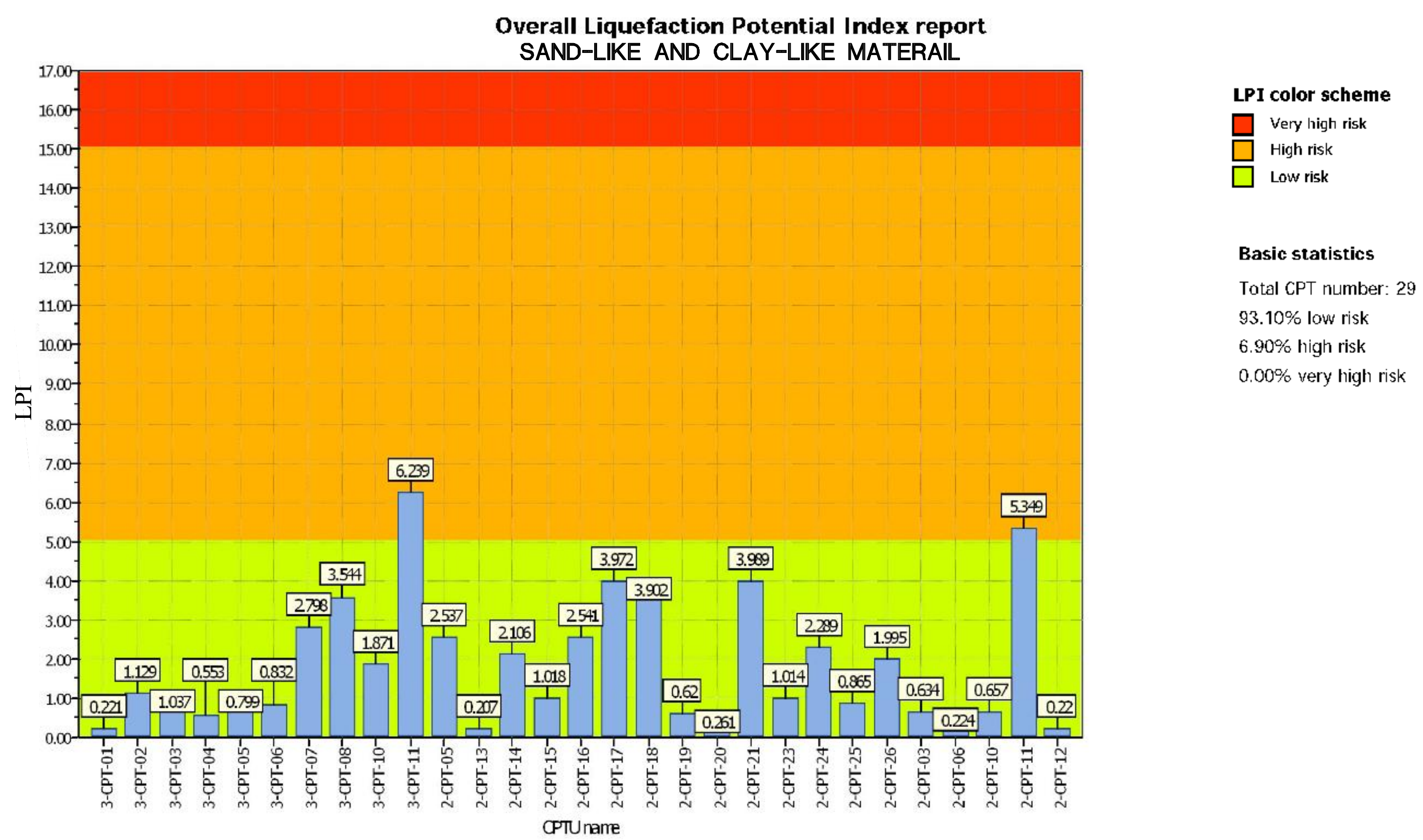


CHART A

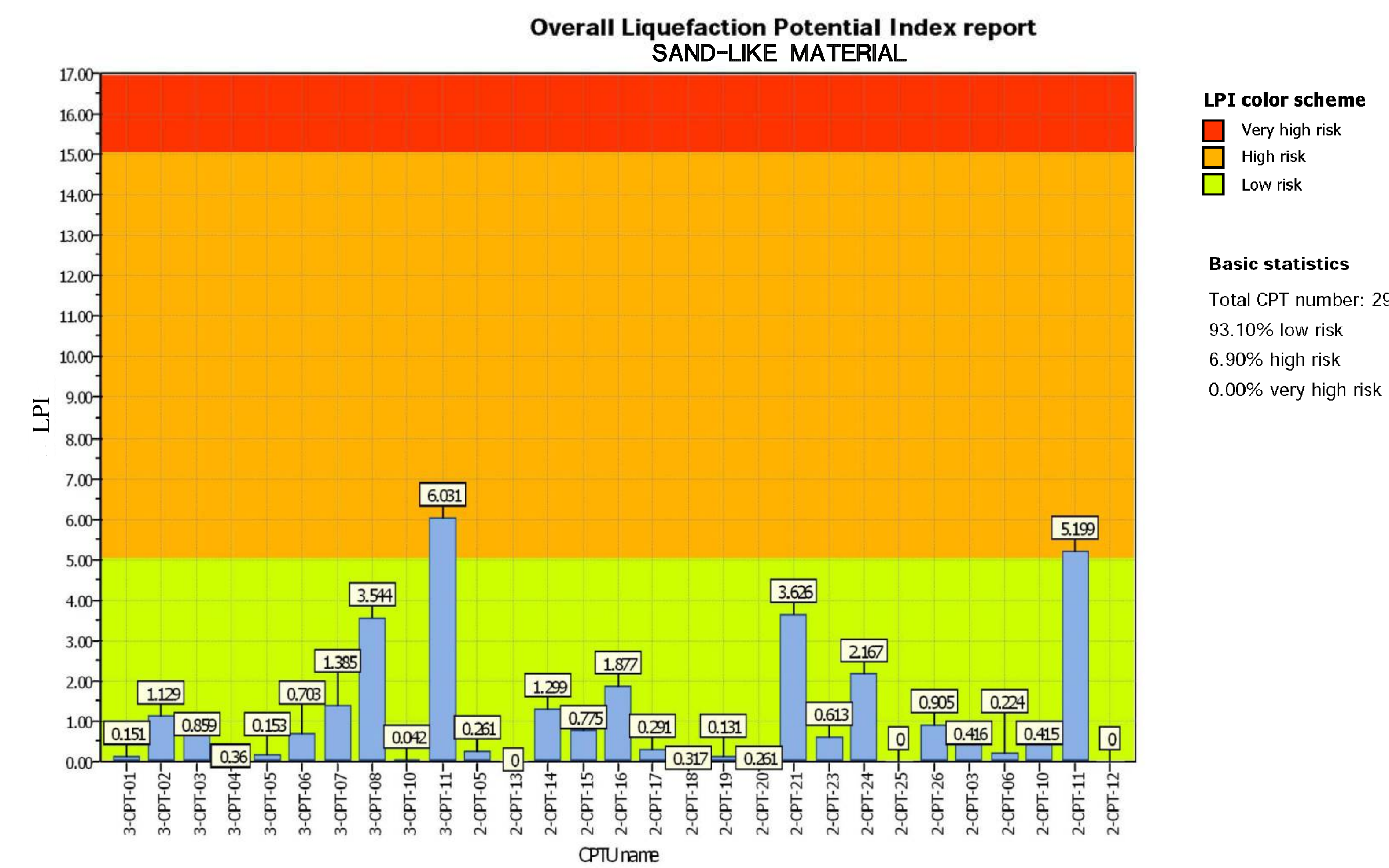


CHART B

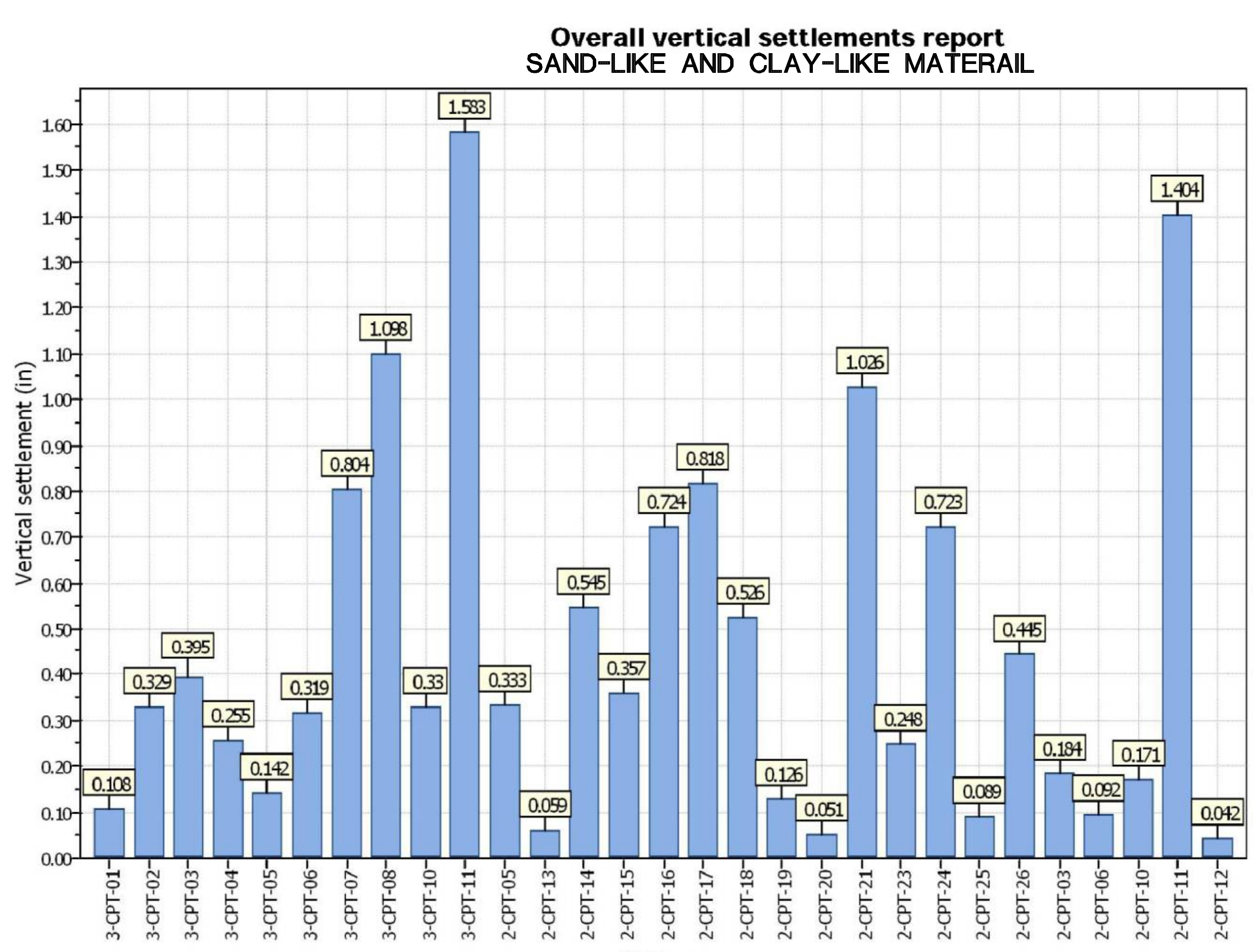


CHART C

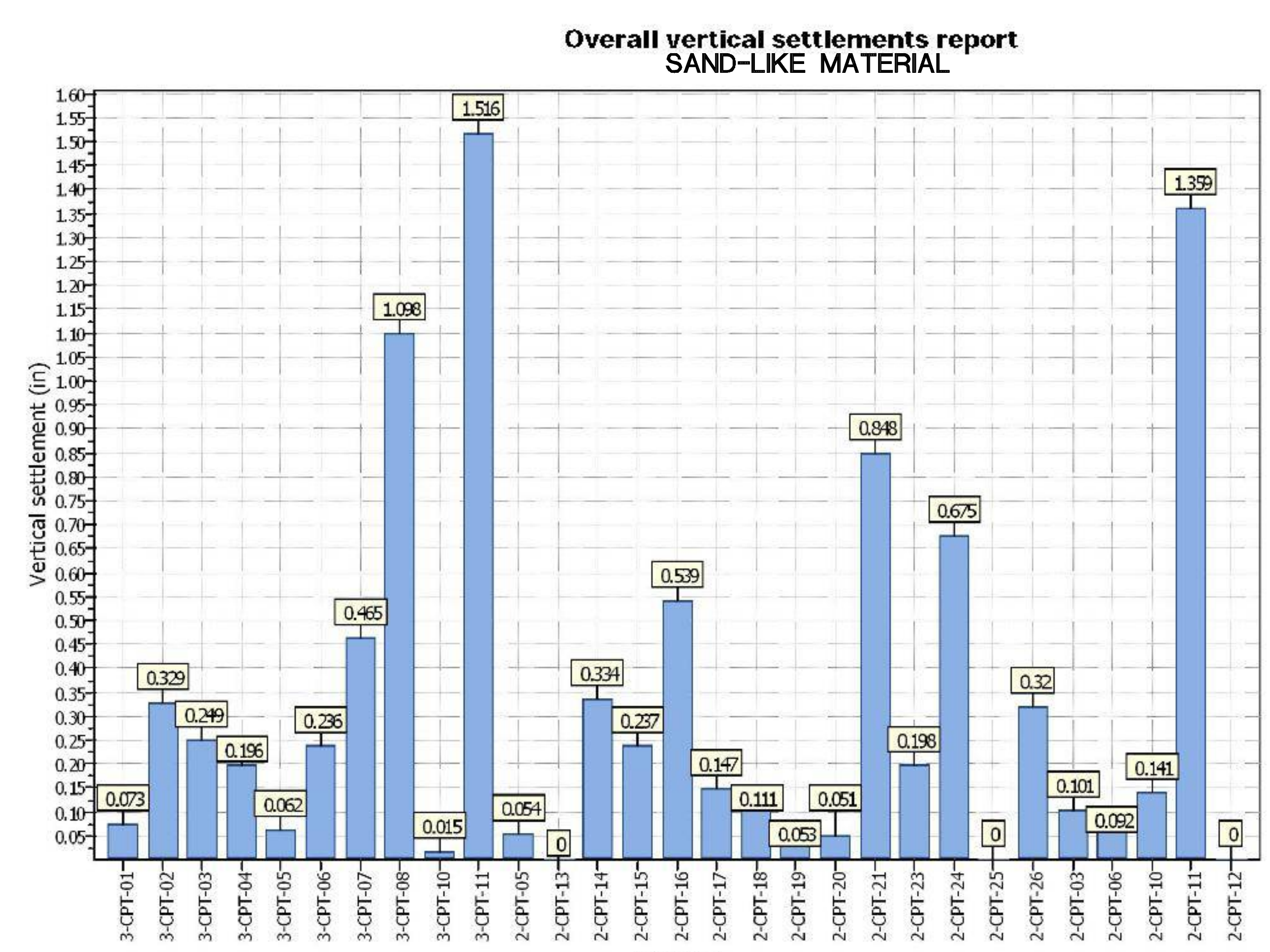


CHART D

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

LIQUEFACTION POTENTIAL INDEX AND SETTLEMENT CHART
SUTTER MEDICAL CENTER
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.200.601
DATE: NOVEMBER 2008
DRAWN BY: SRP
CHECKED BY: TPB
FIGURE NO. D2

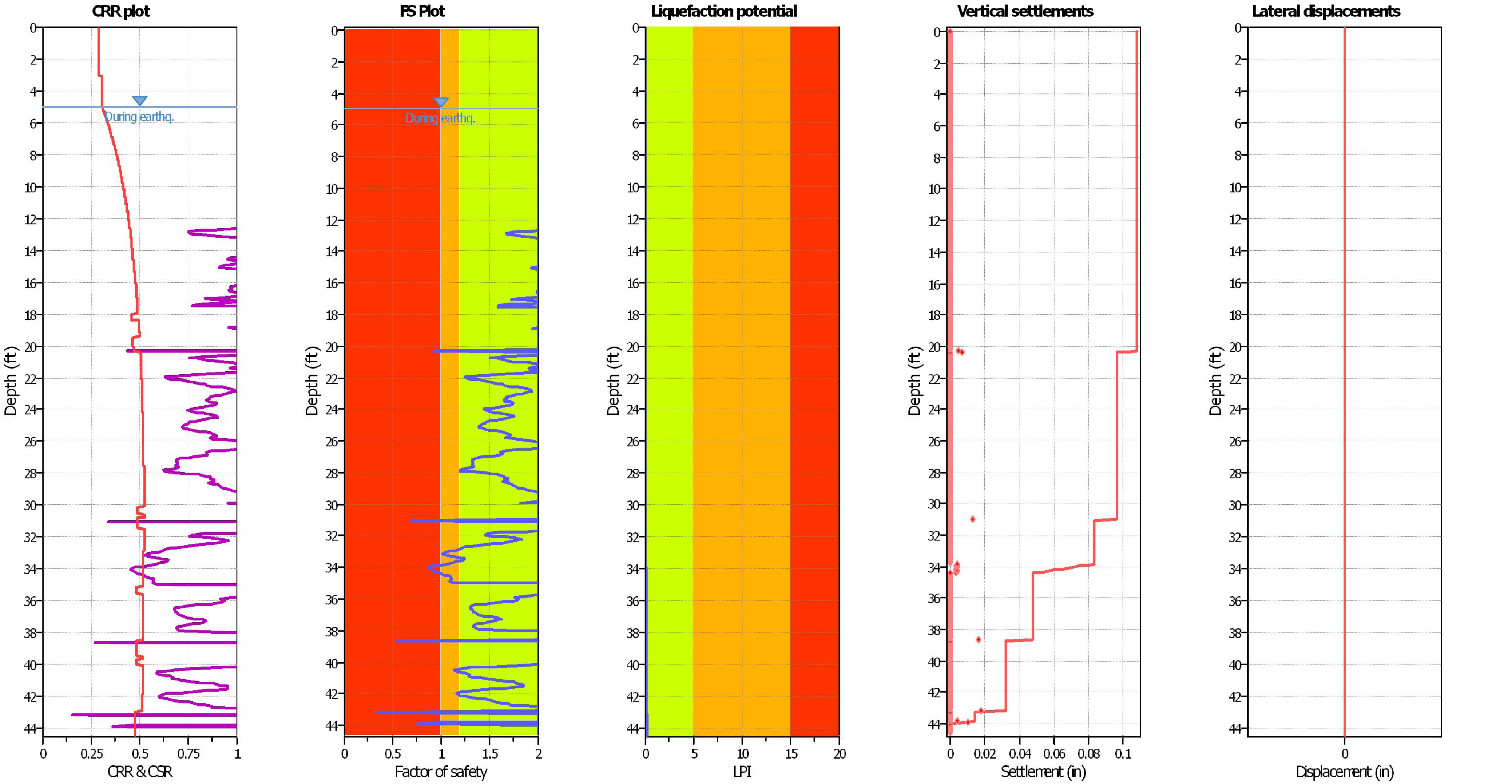
ORIGINAL FIGURE PRINTED IN COLOR

Cliq Output File

3-CPT 1 to 3-CPT8
3-CPT 10 to 3-CPT11
2-CPT-3, 2-CPT-5 to 2-CPT 6
2-CPT 10 to 2-CPT 21
2-CPT 23 to 2-CPT 26

6486.200.601
November 24, 2008

Liquefaction analysis overall plots



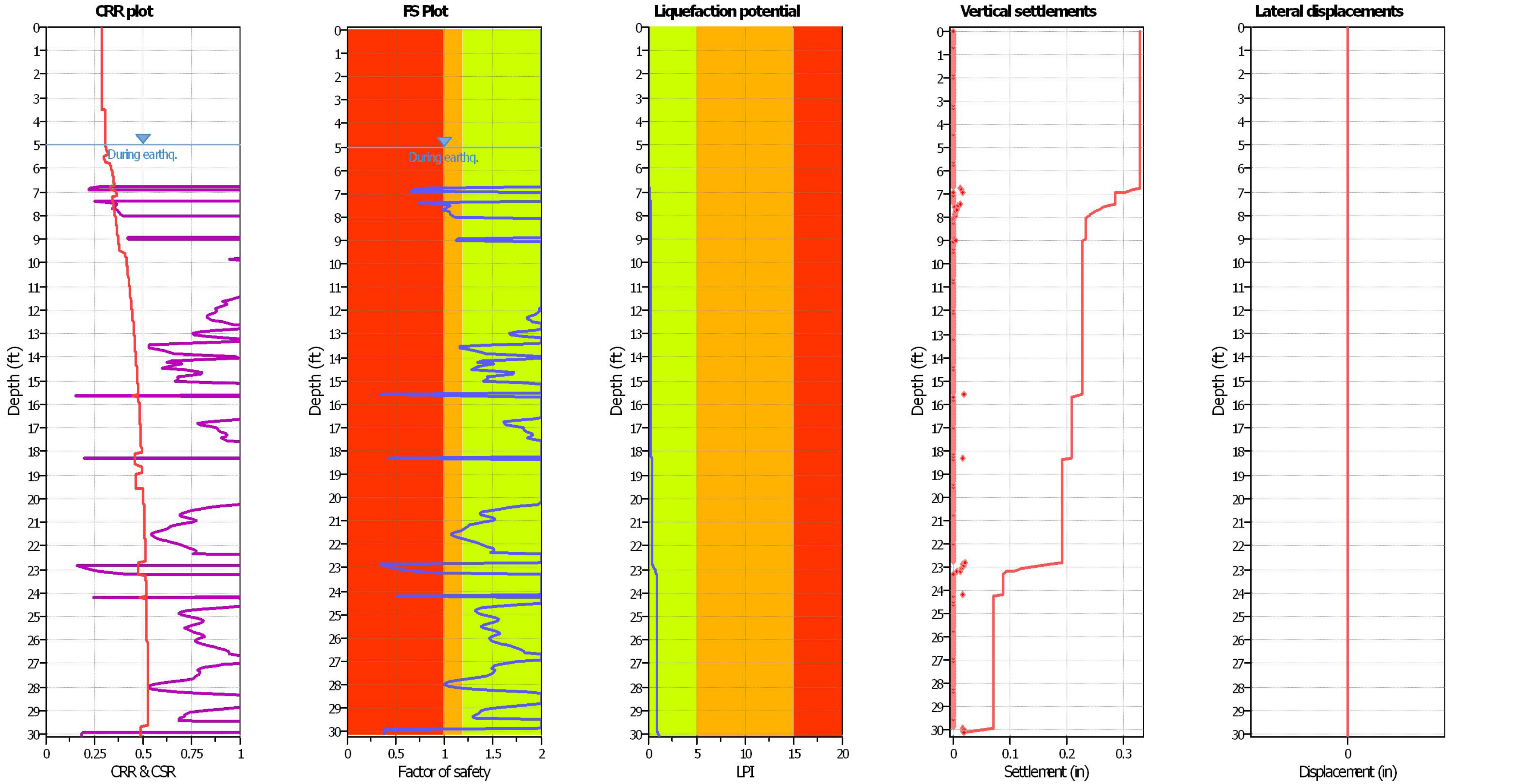
Input parameters and analysis data

Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme
- Liquefied
- Marginally liquefied
- Non-liquefied

LPI color scheme
- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



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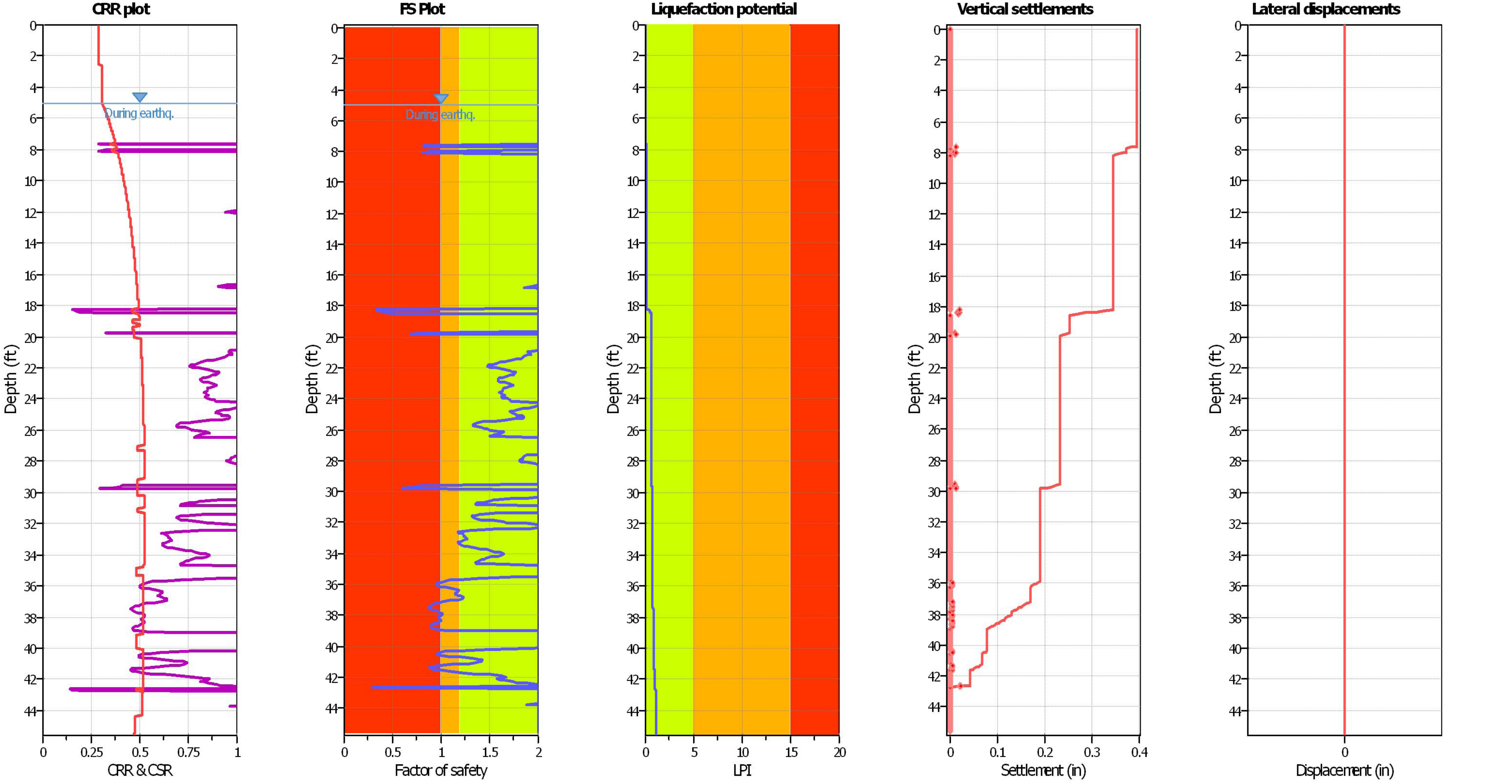

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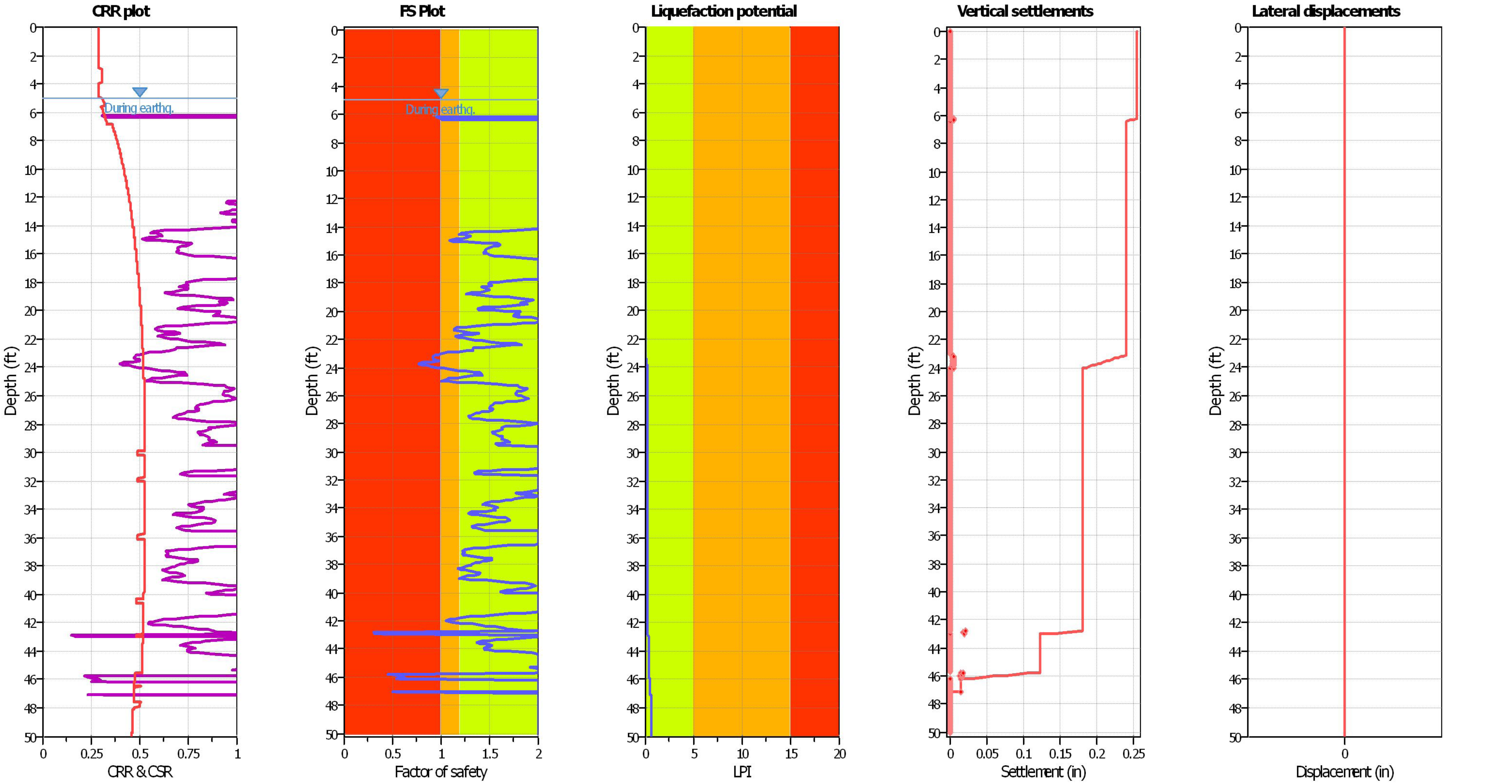

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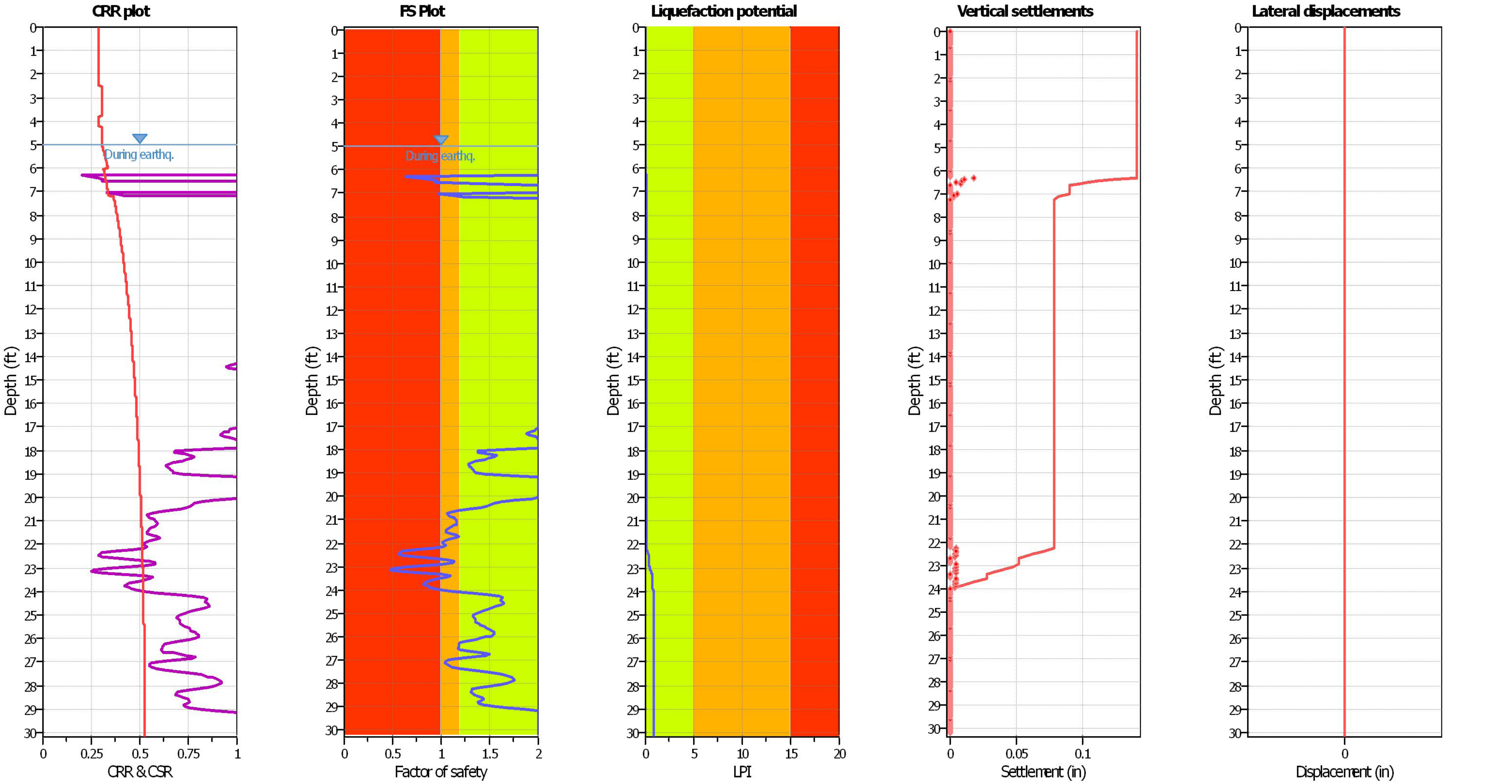

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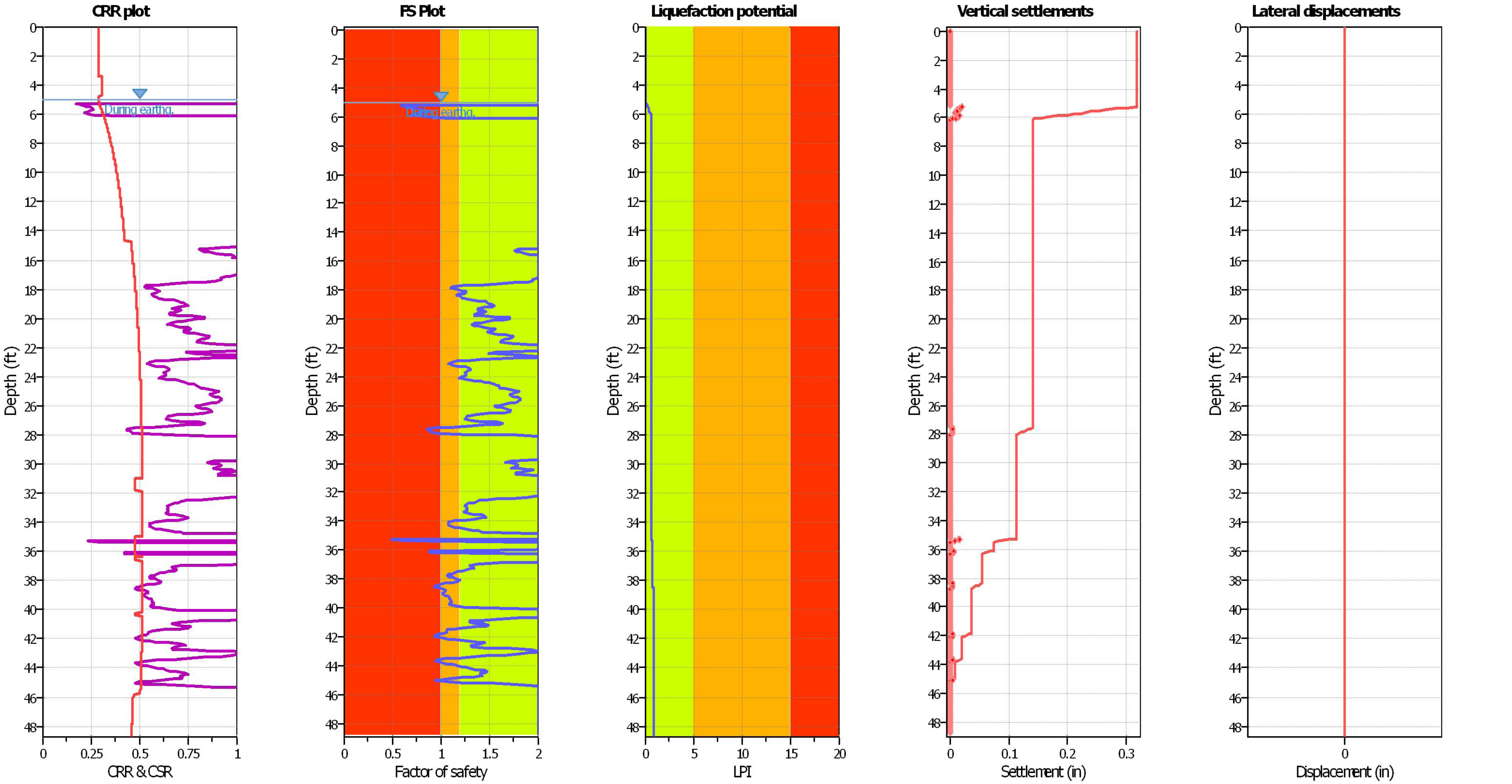

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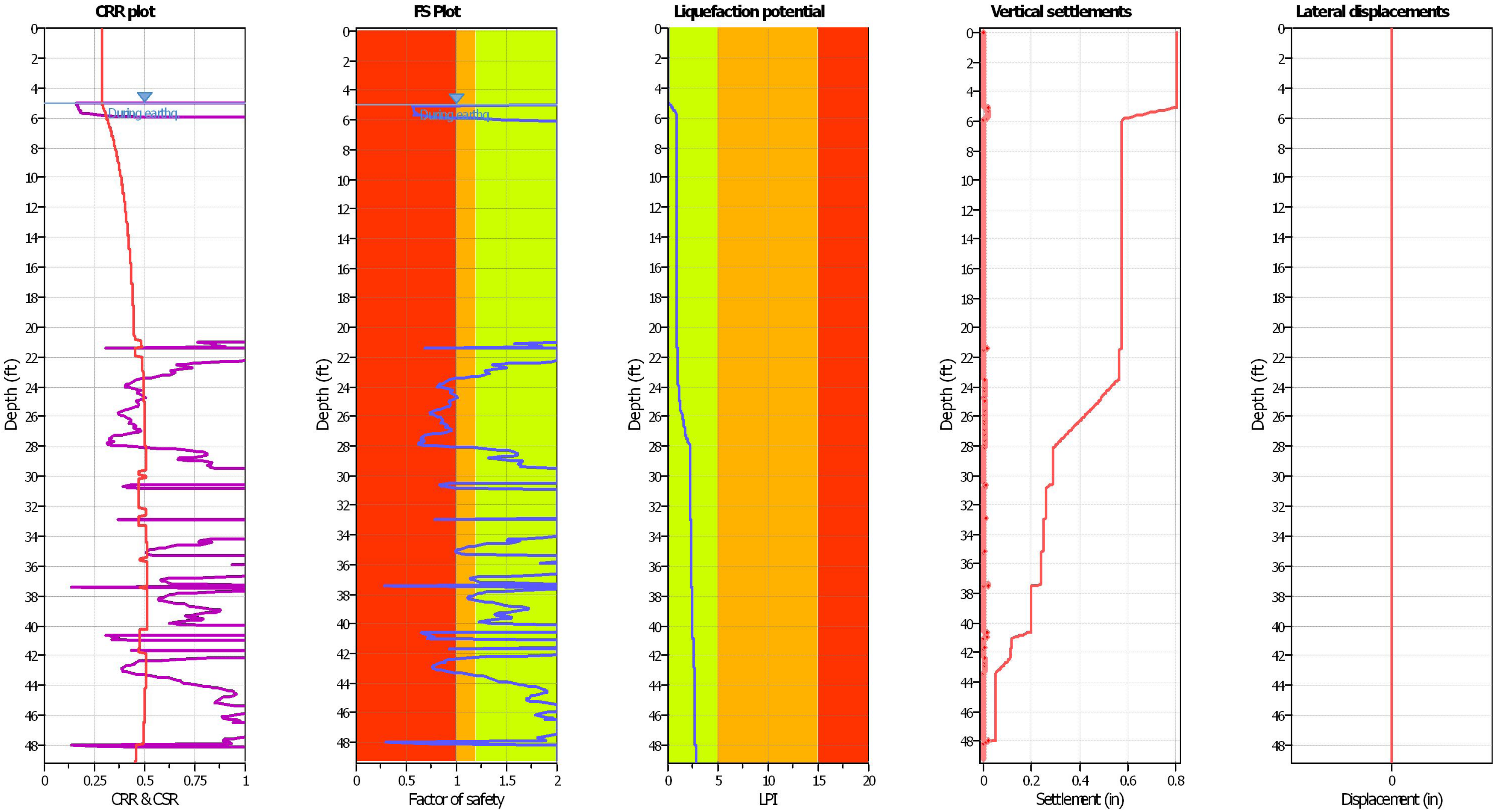

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Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
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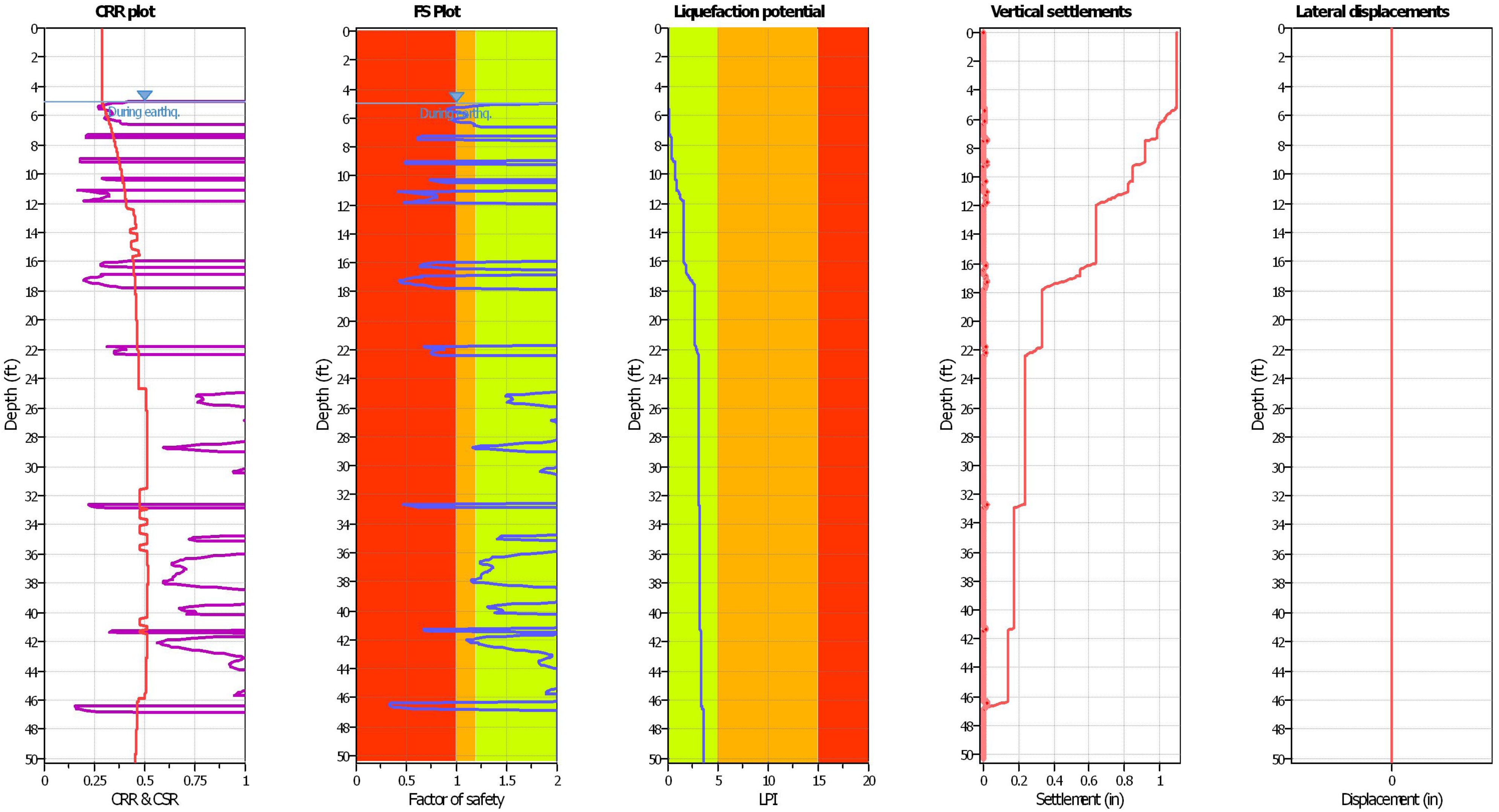

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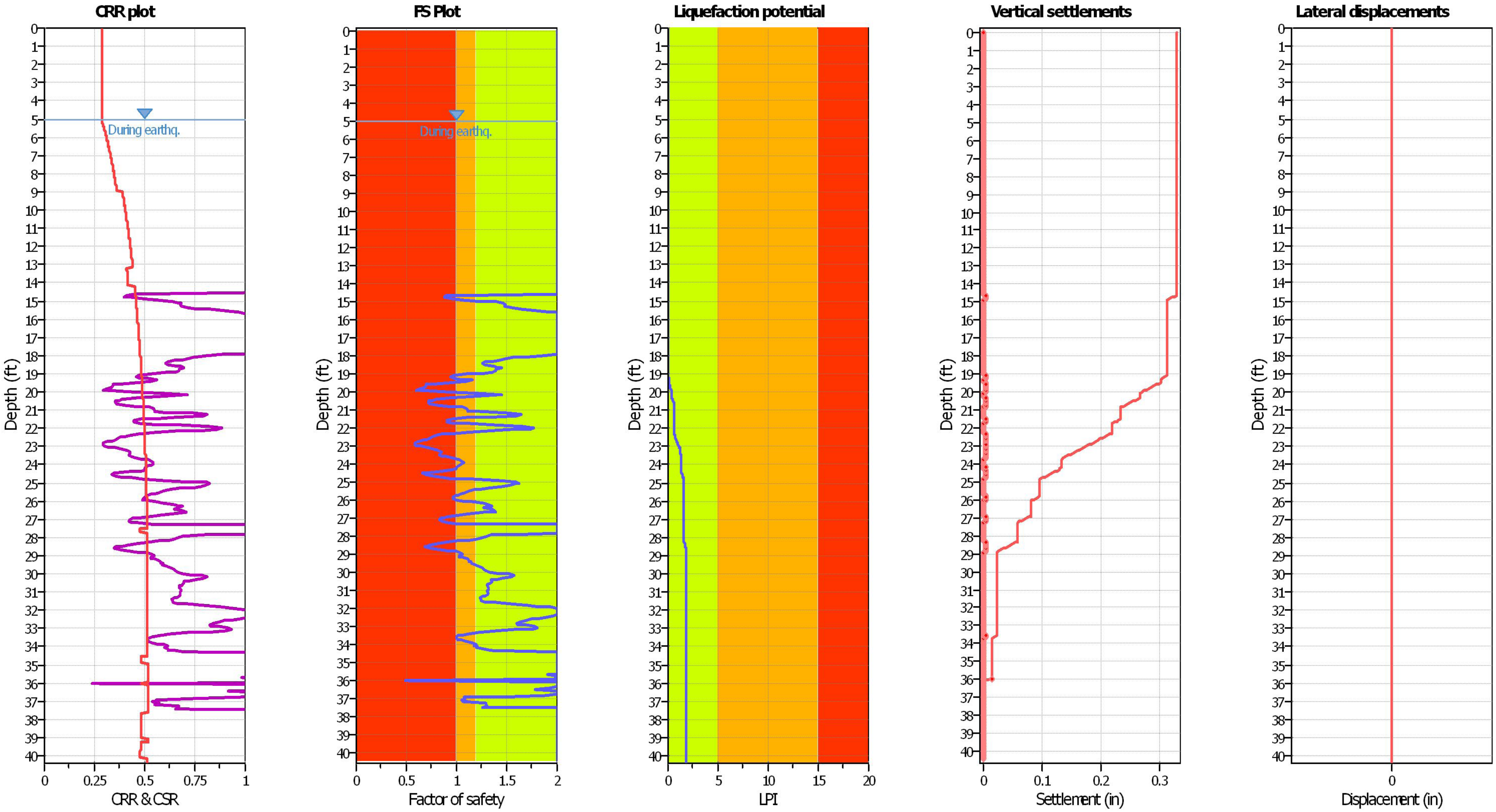

Input parameters and analysis data

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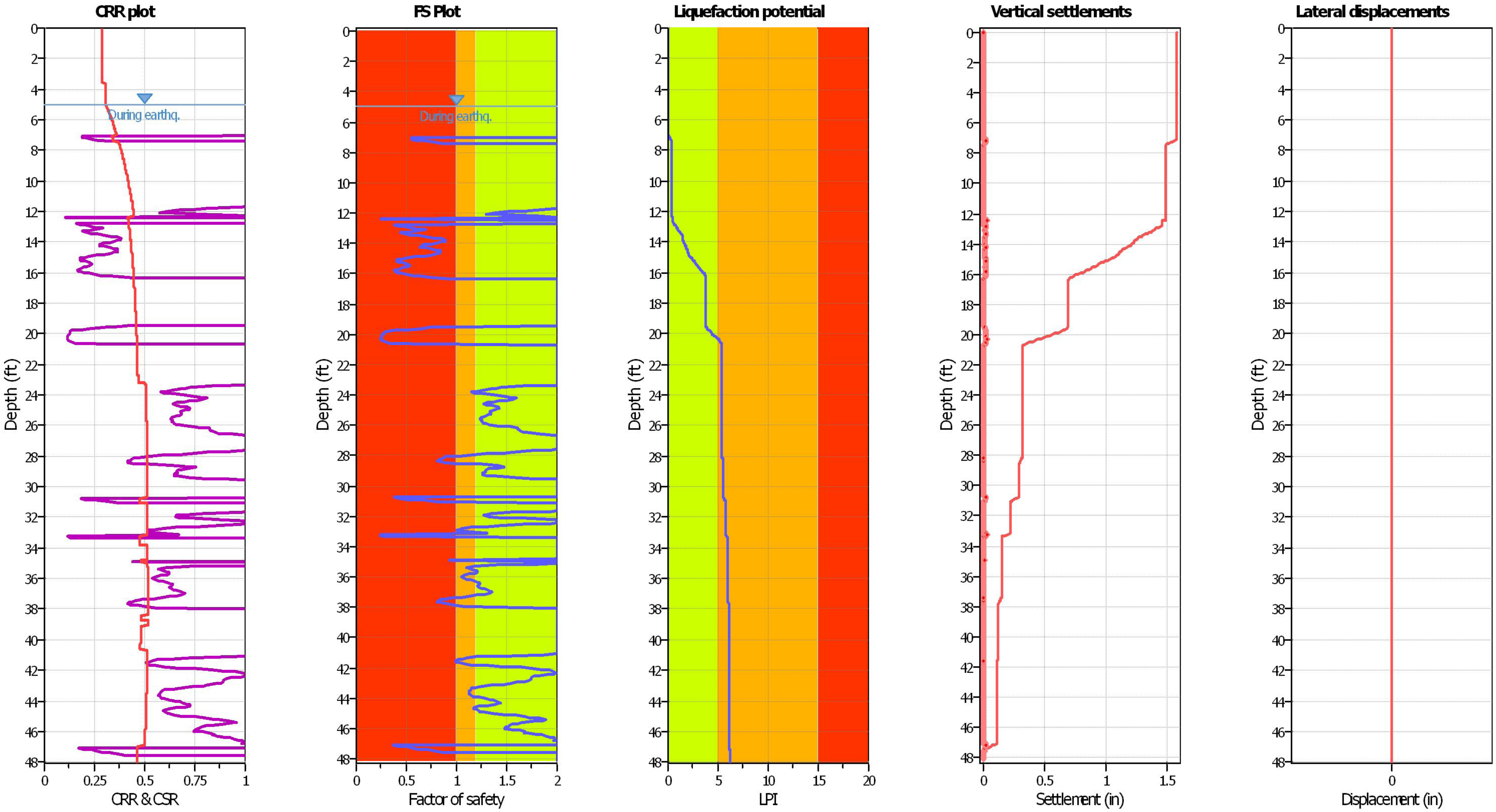

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Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

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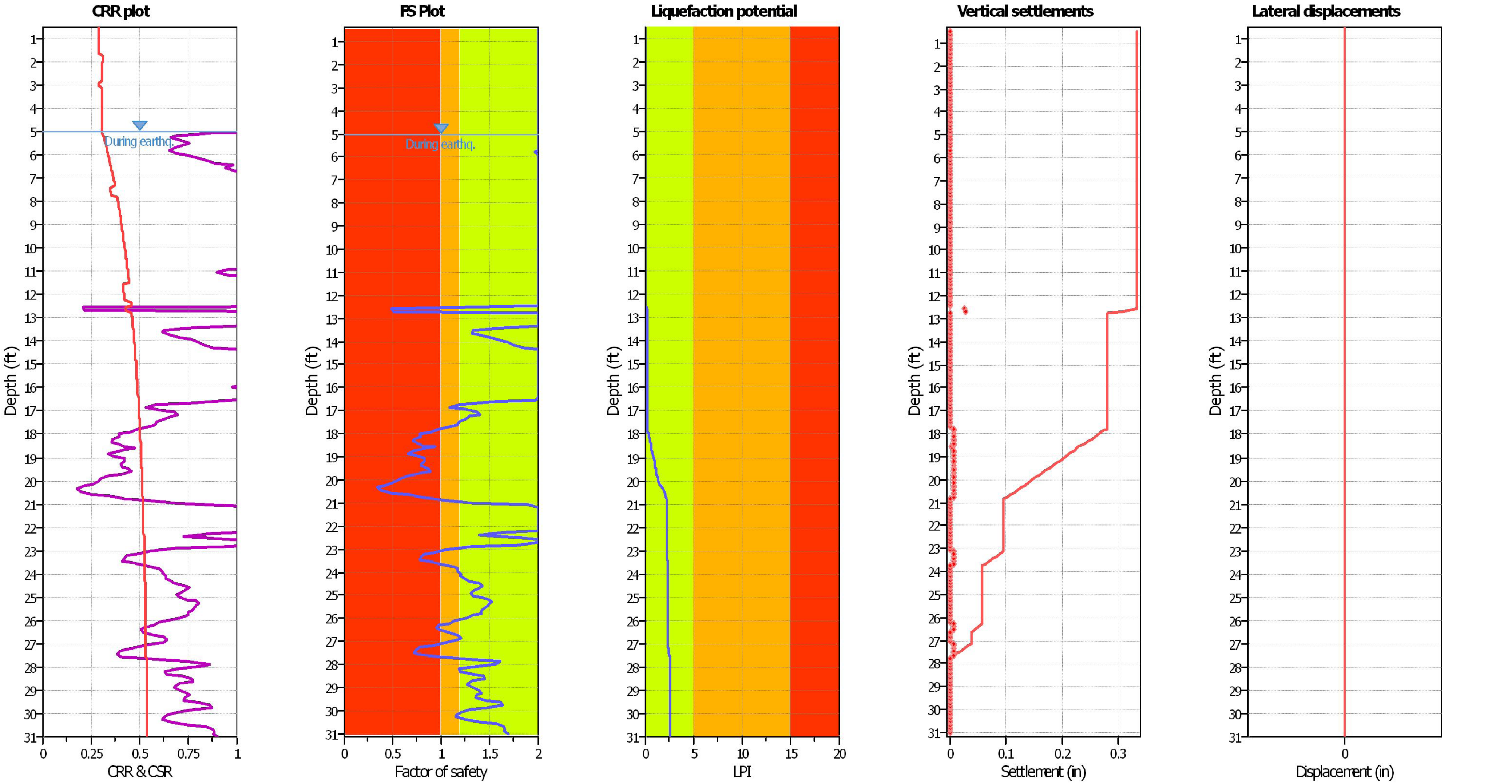
- Low risk

Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

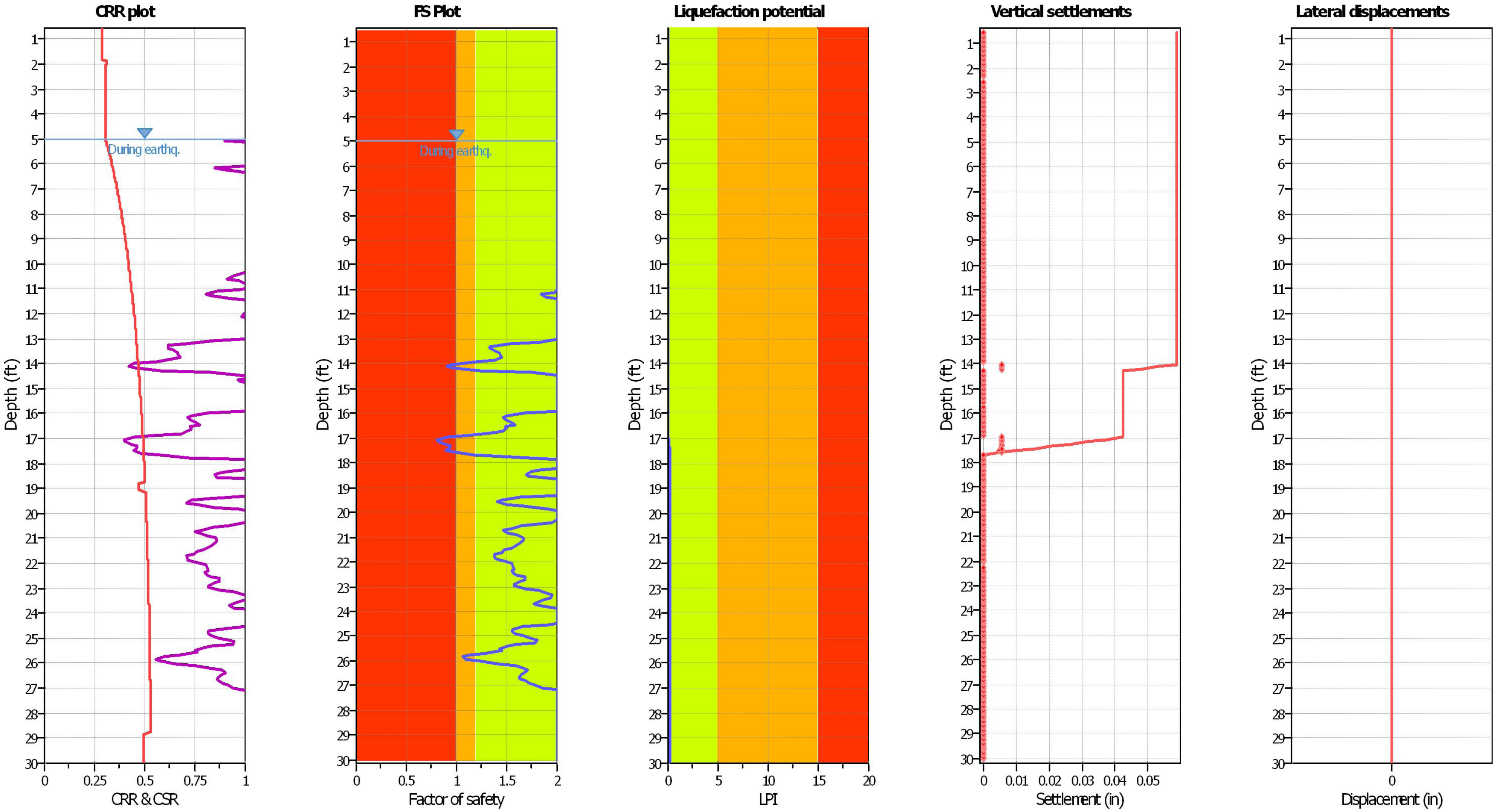
F.S. color scheme

- Liquefied
- Marginally liquefied
- Non-liquefied

LPI color scheme

- Very high risk
- High risk
- Low risk

Liquefaction analysis overall plots



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Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
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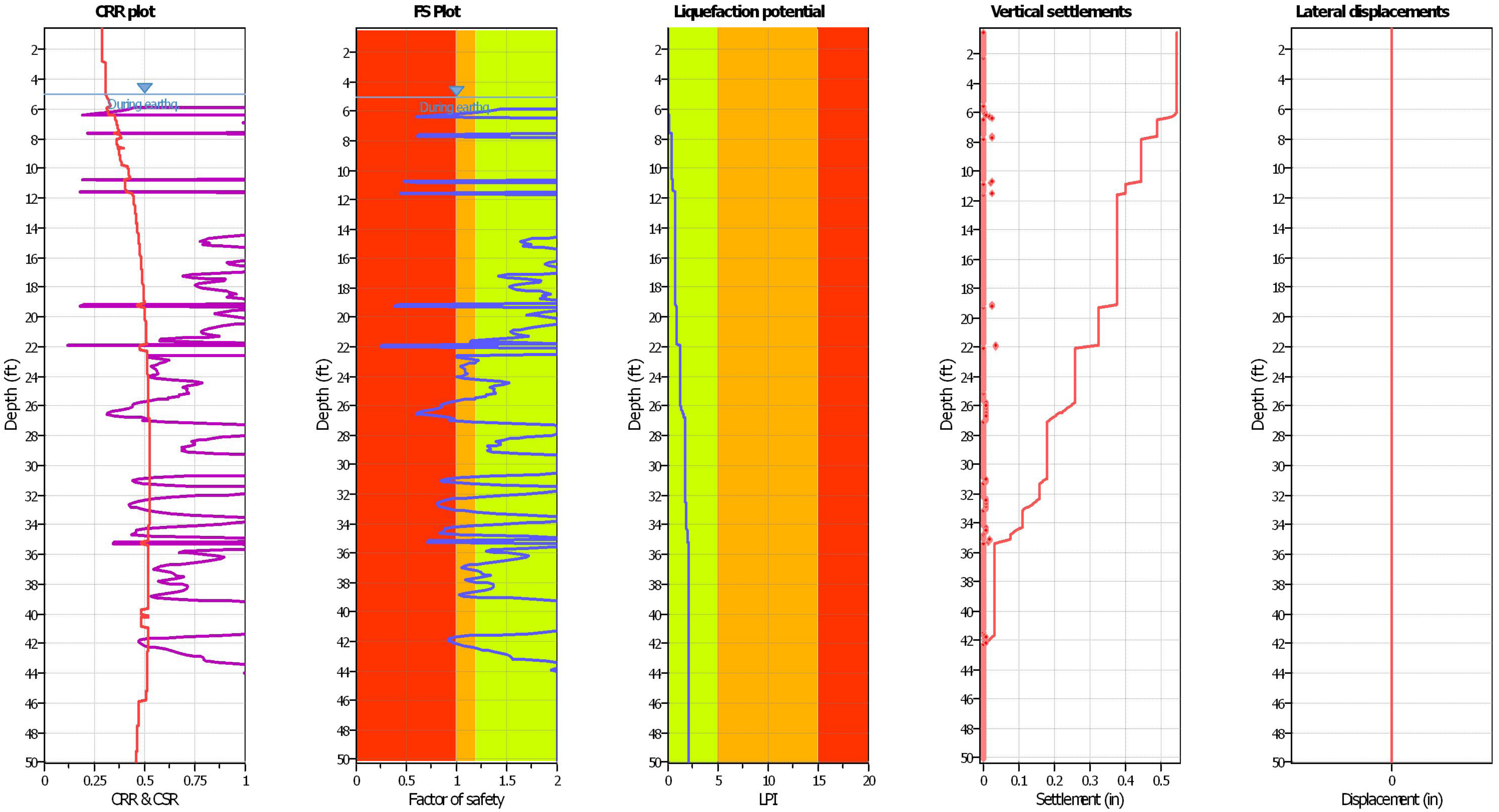

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Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
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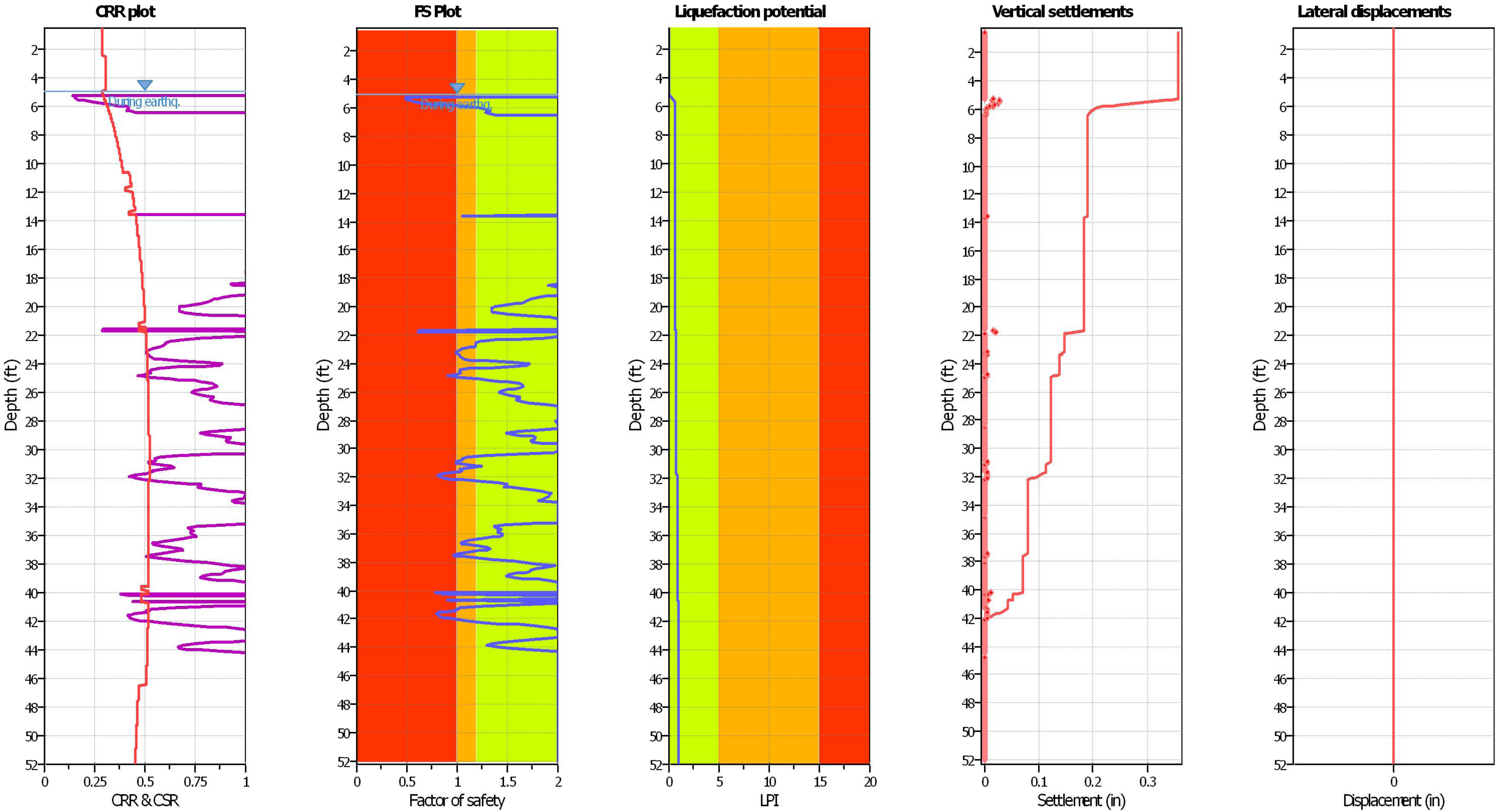

Input parameters and analysis data

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Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
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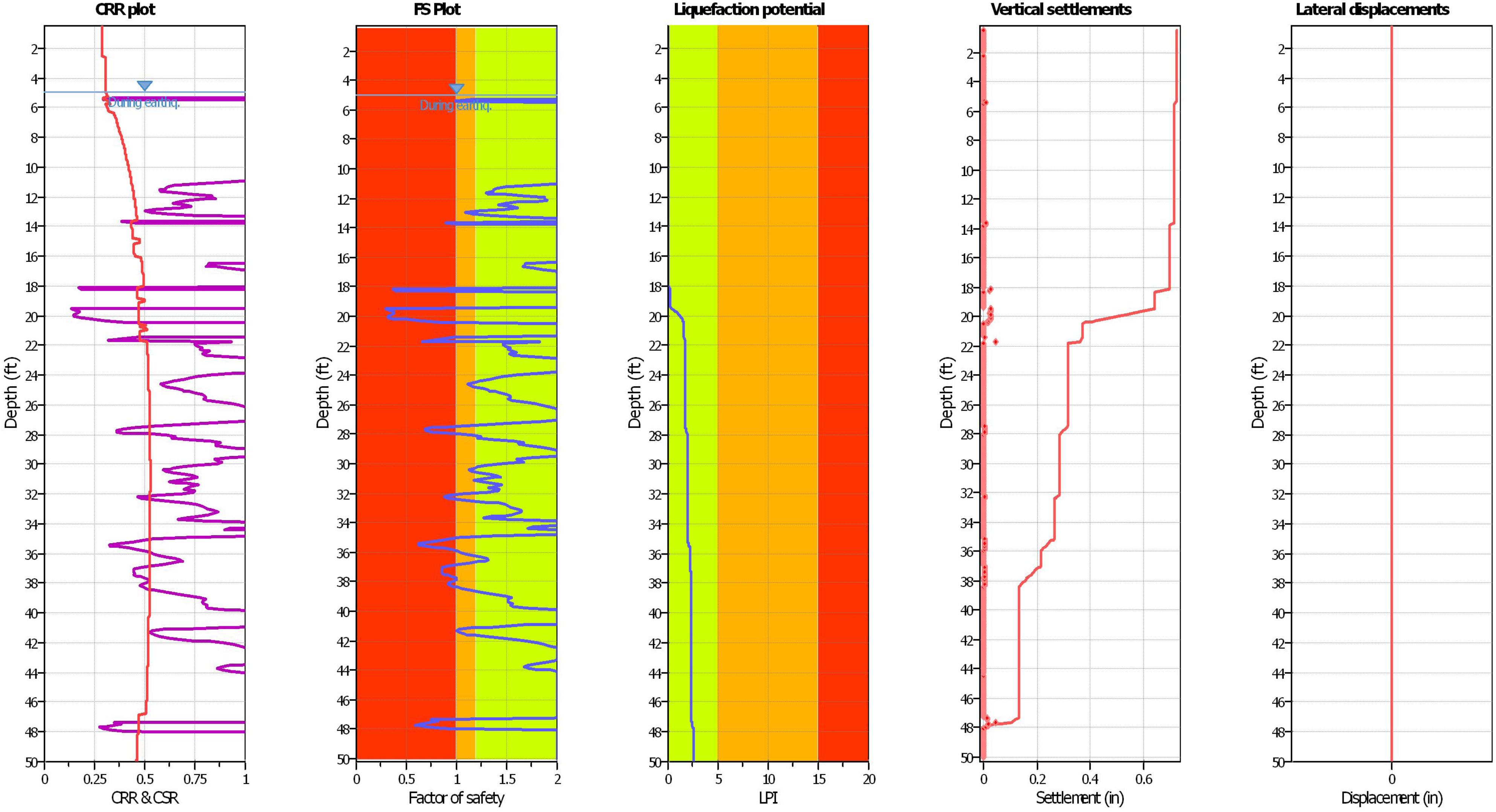
Liquefaction analysis overall plots



Input parameters and analysis data

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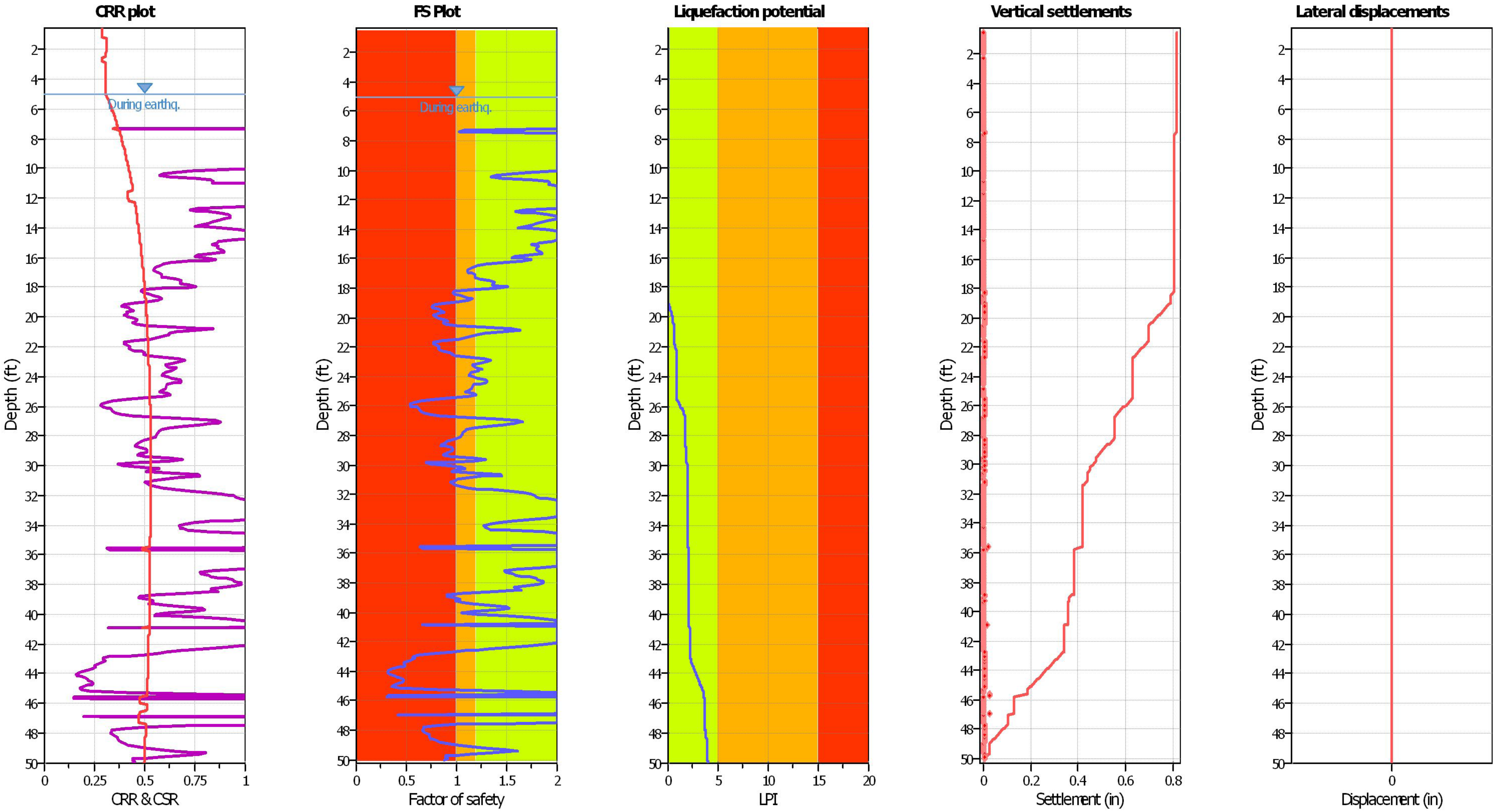
Liquefaction analysis overall plots



Input parameters and analysis data

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Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
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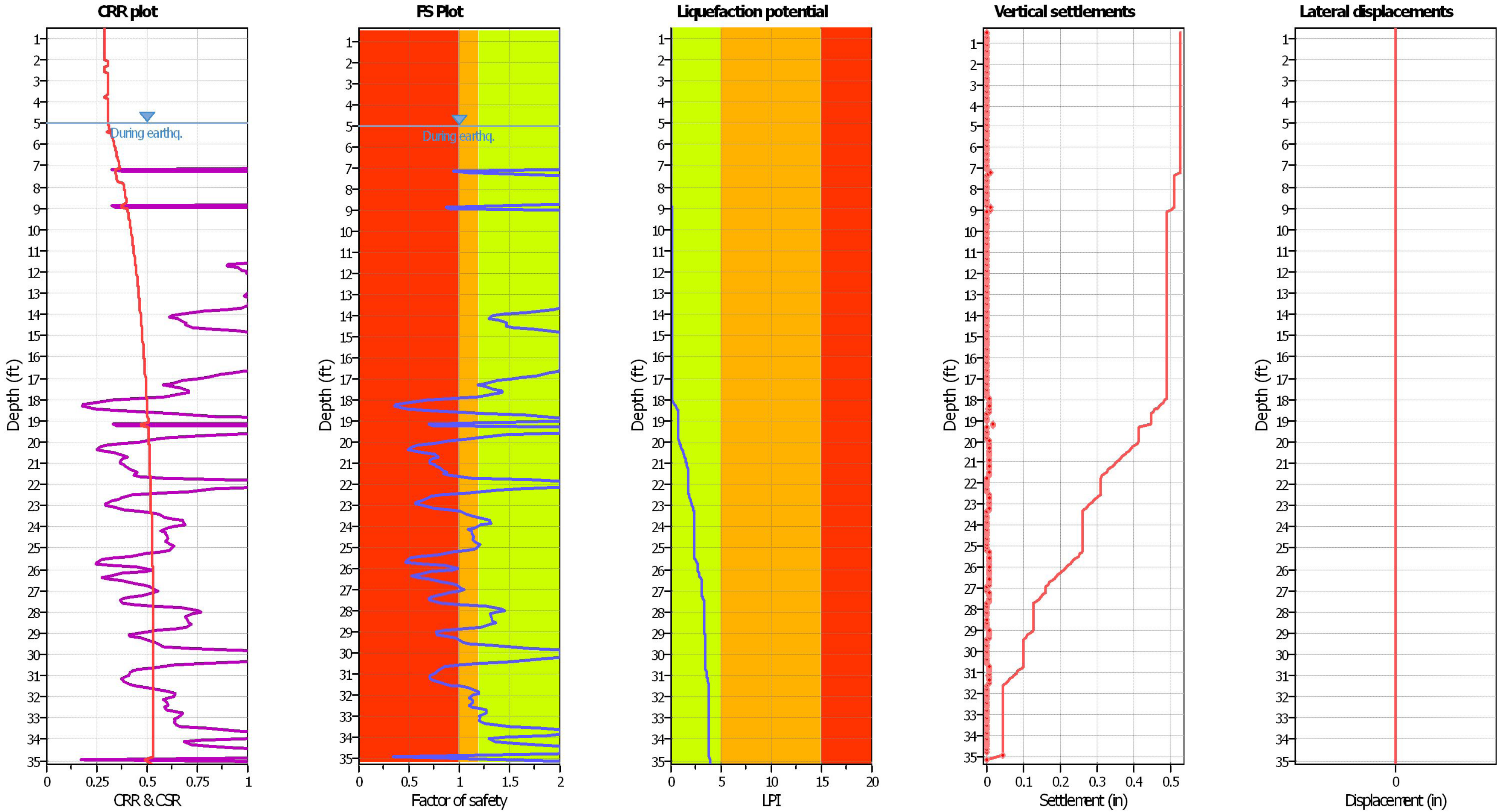
Liquefaction analysis overall plots



Input parameters and analysis data

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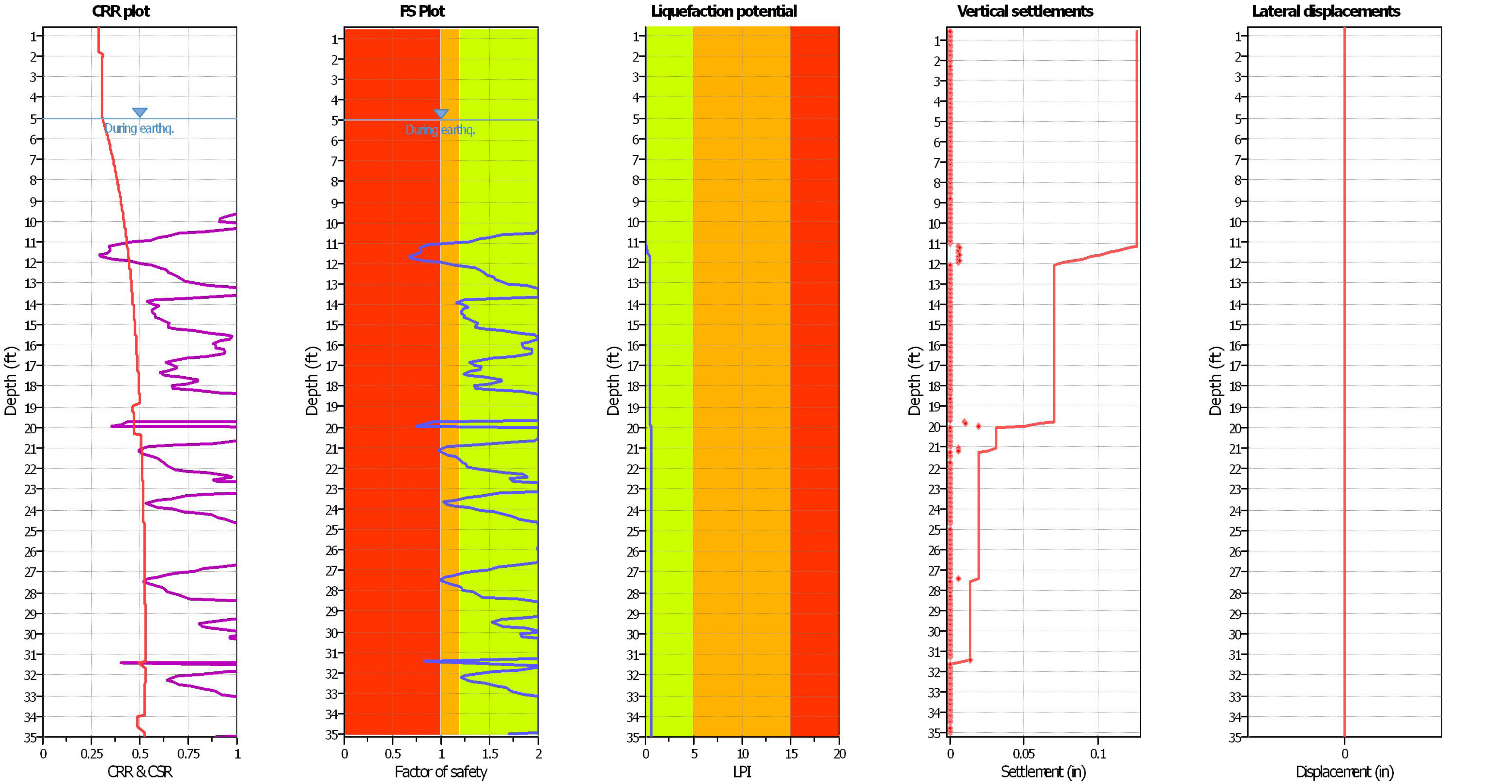

Input parameters and analysis data

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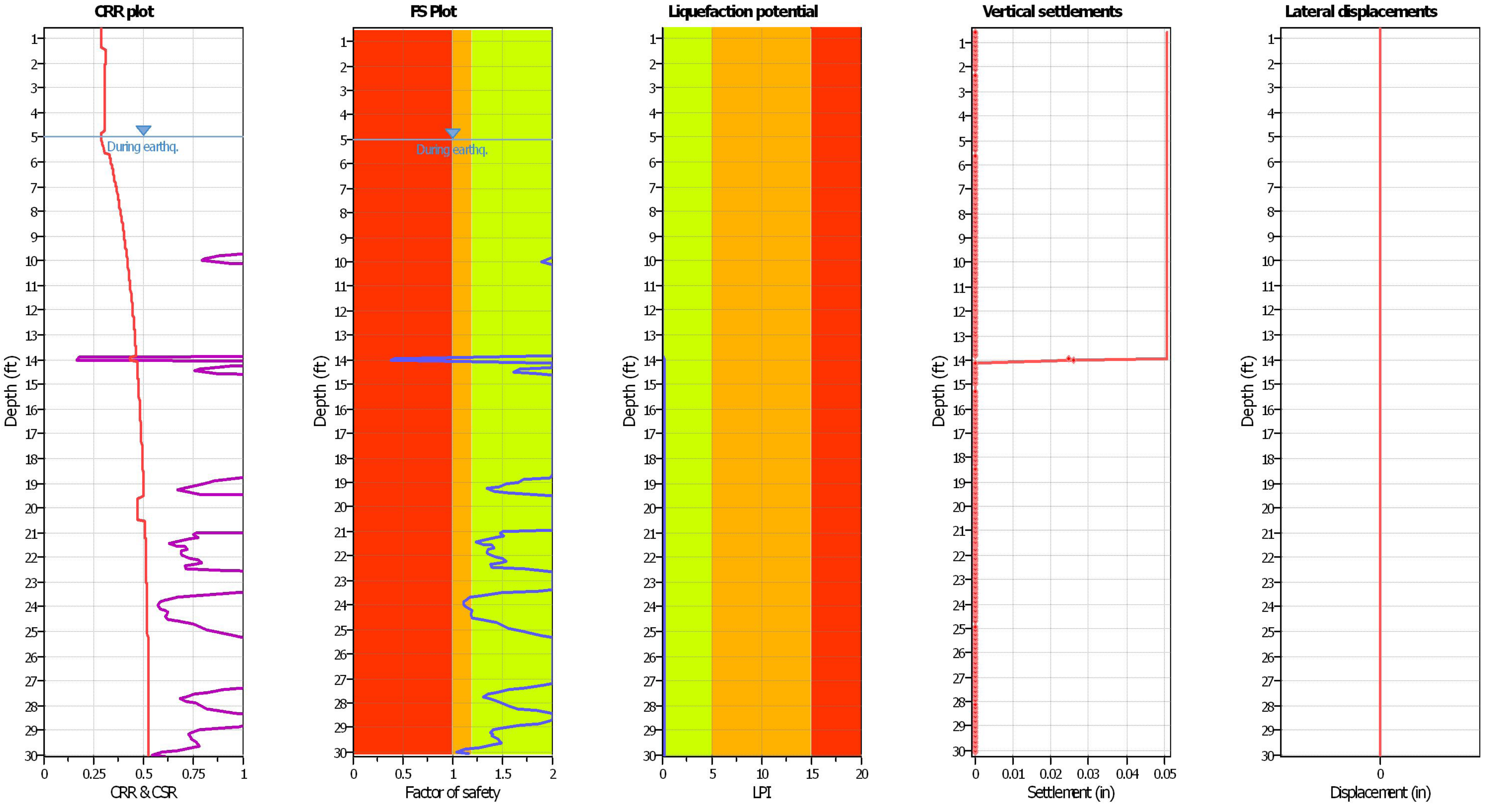

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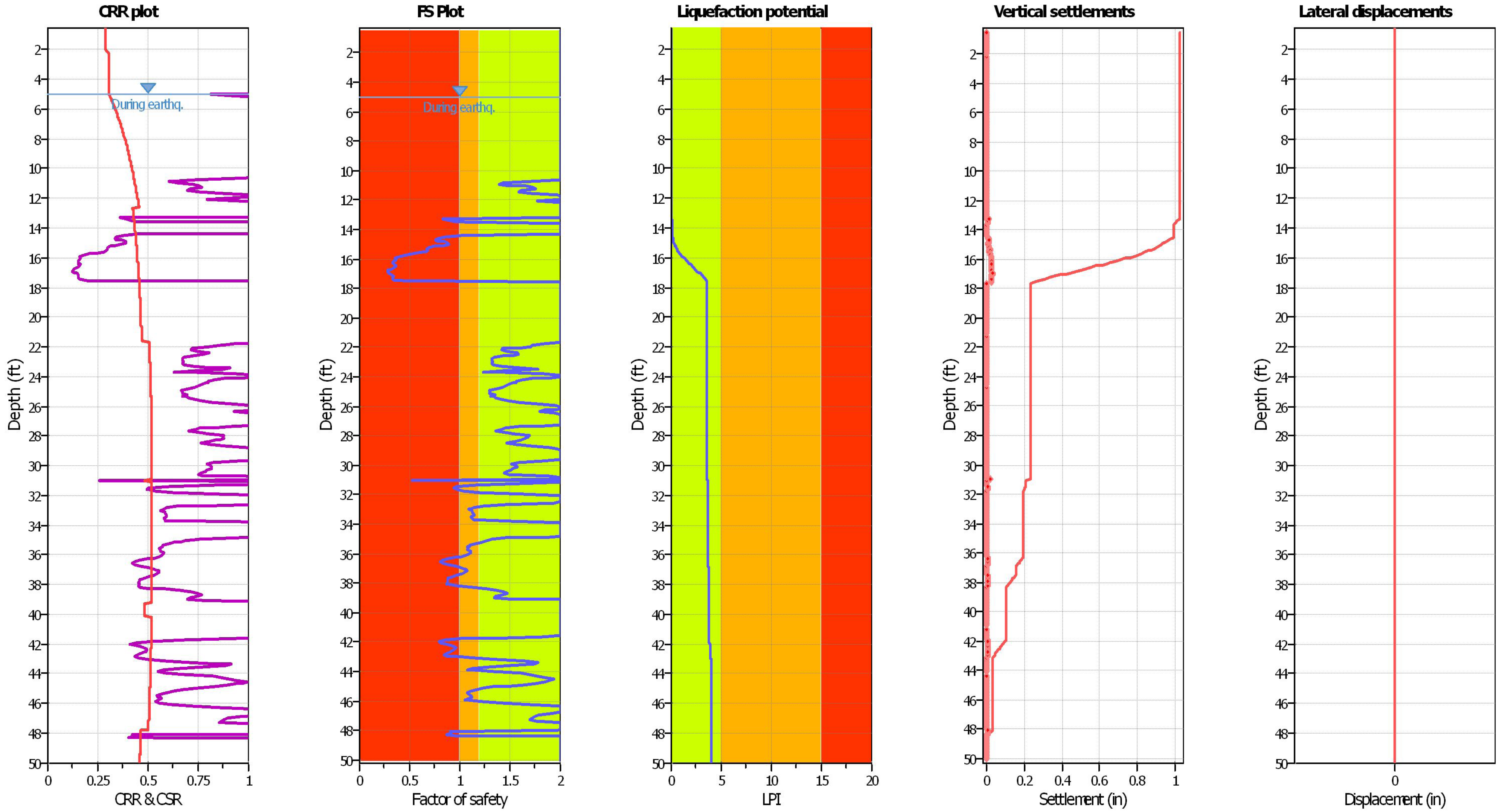

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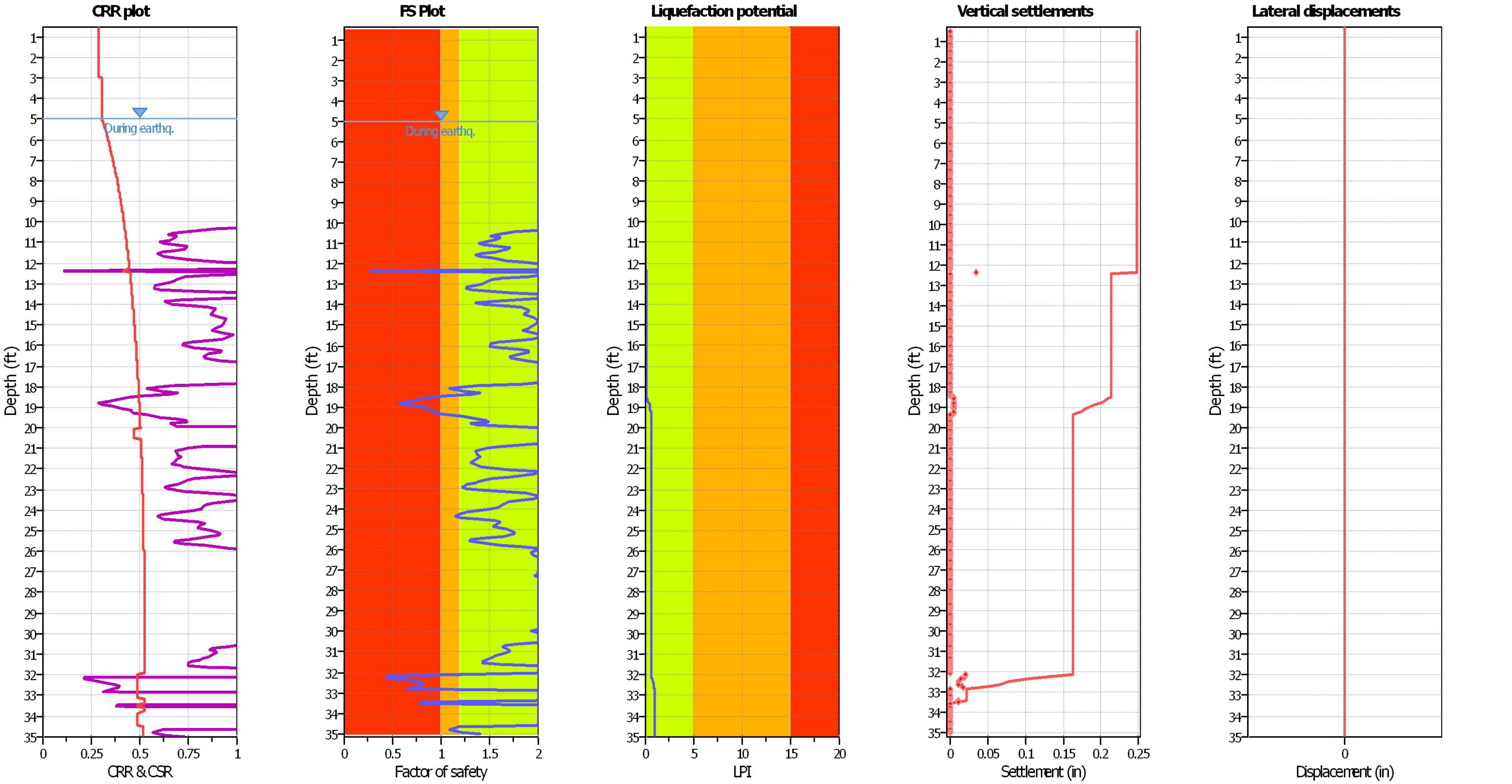

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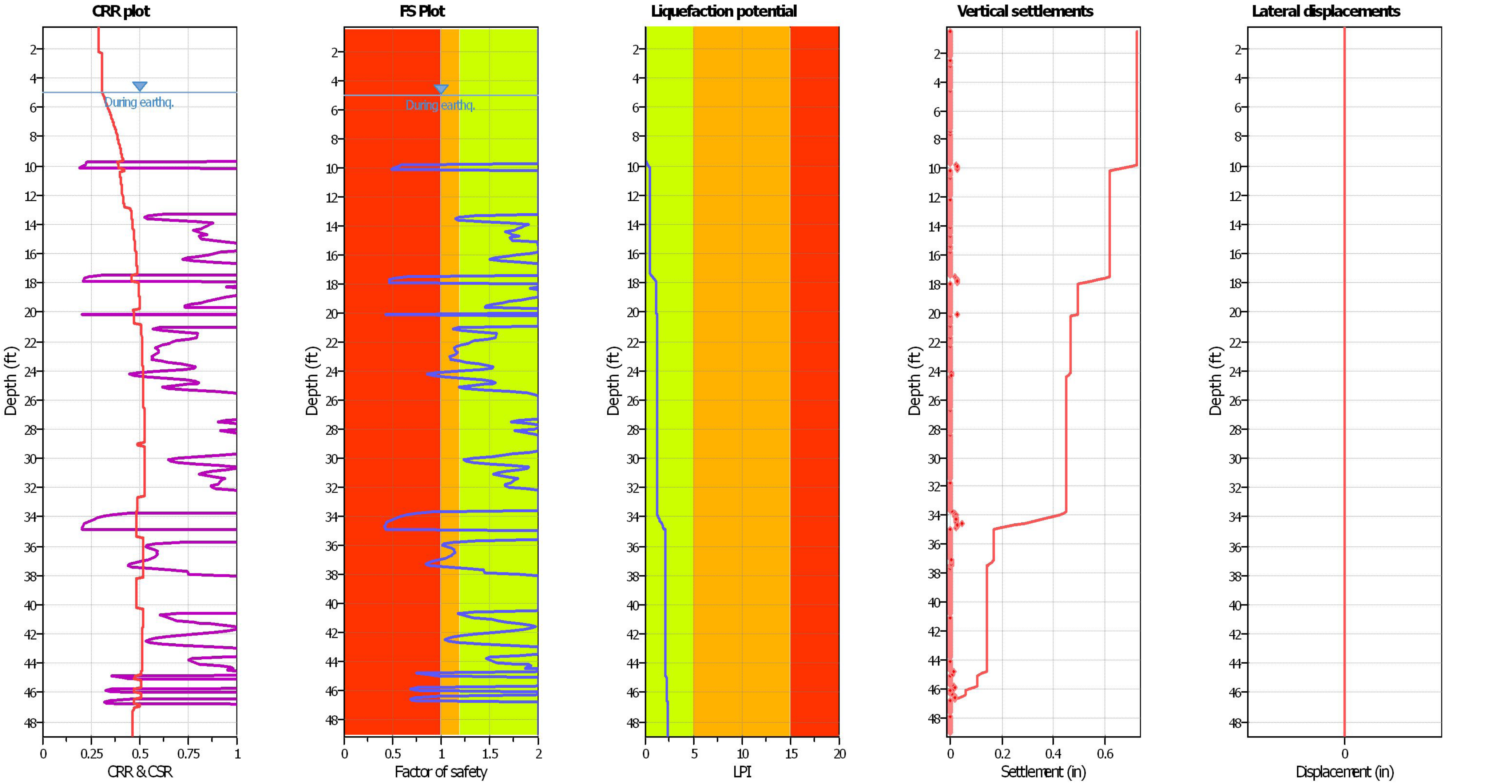

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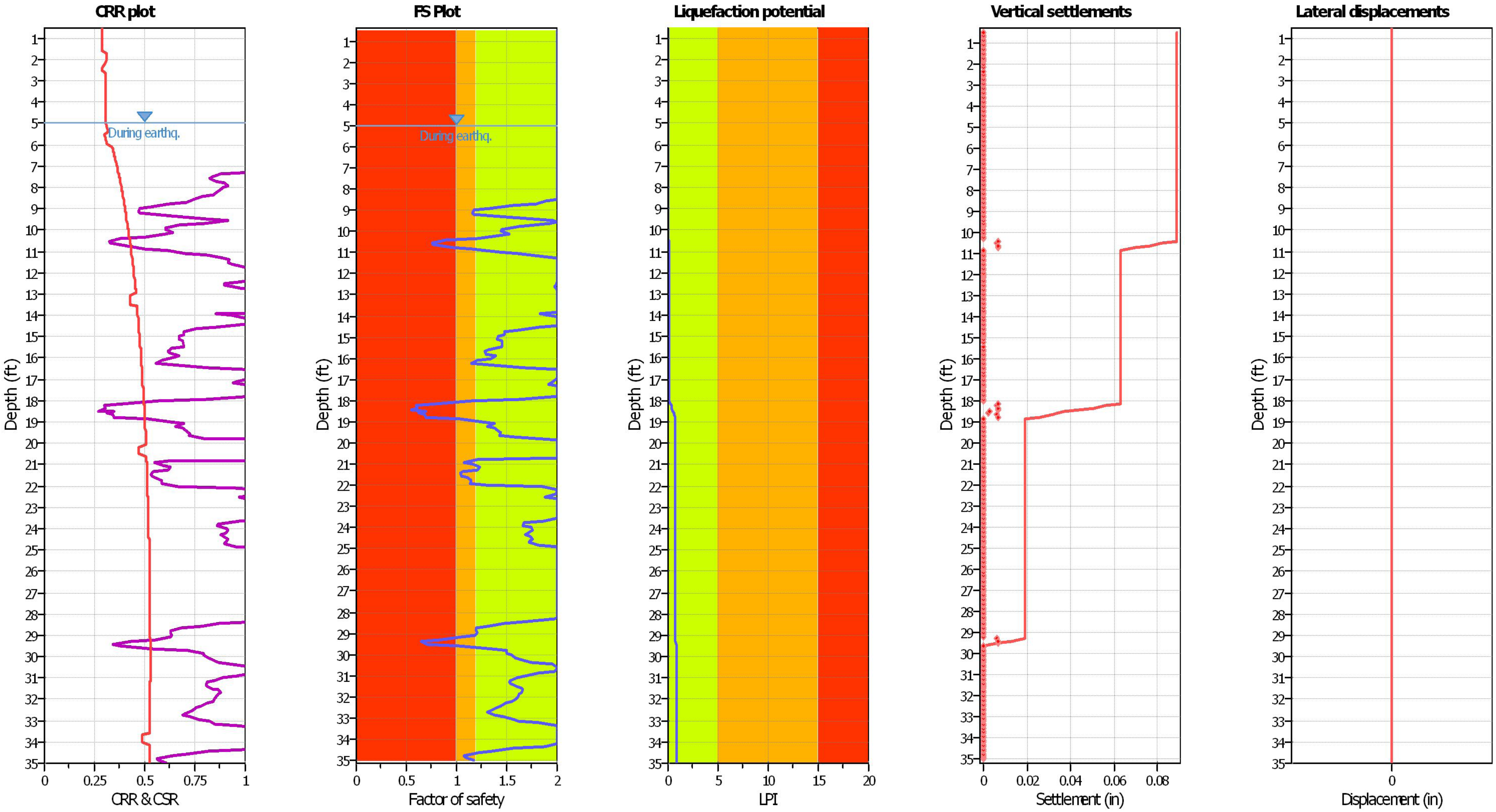

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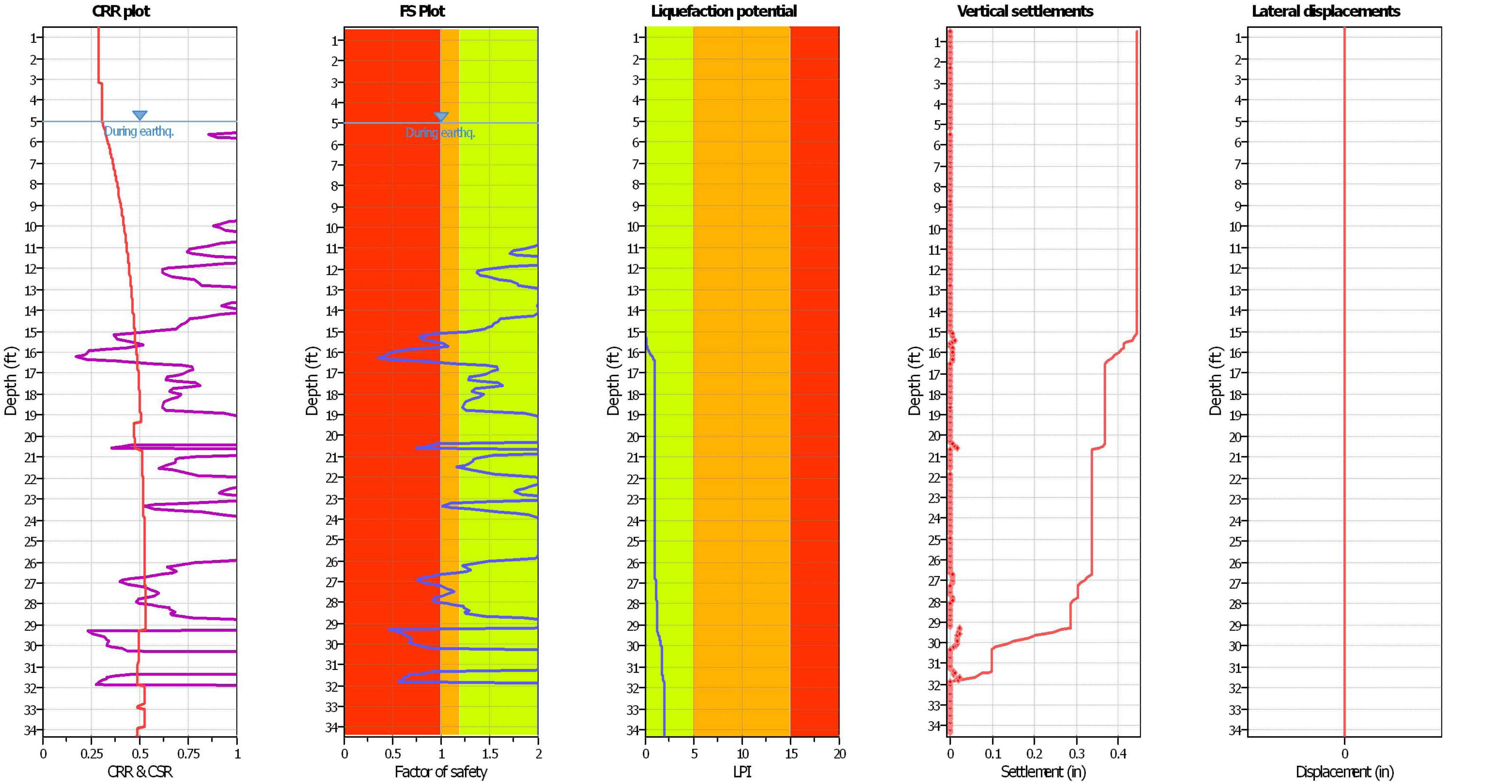
Liquefaction analysis overall plots



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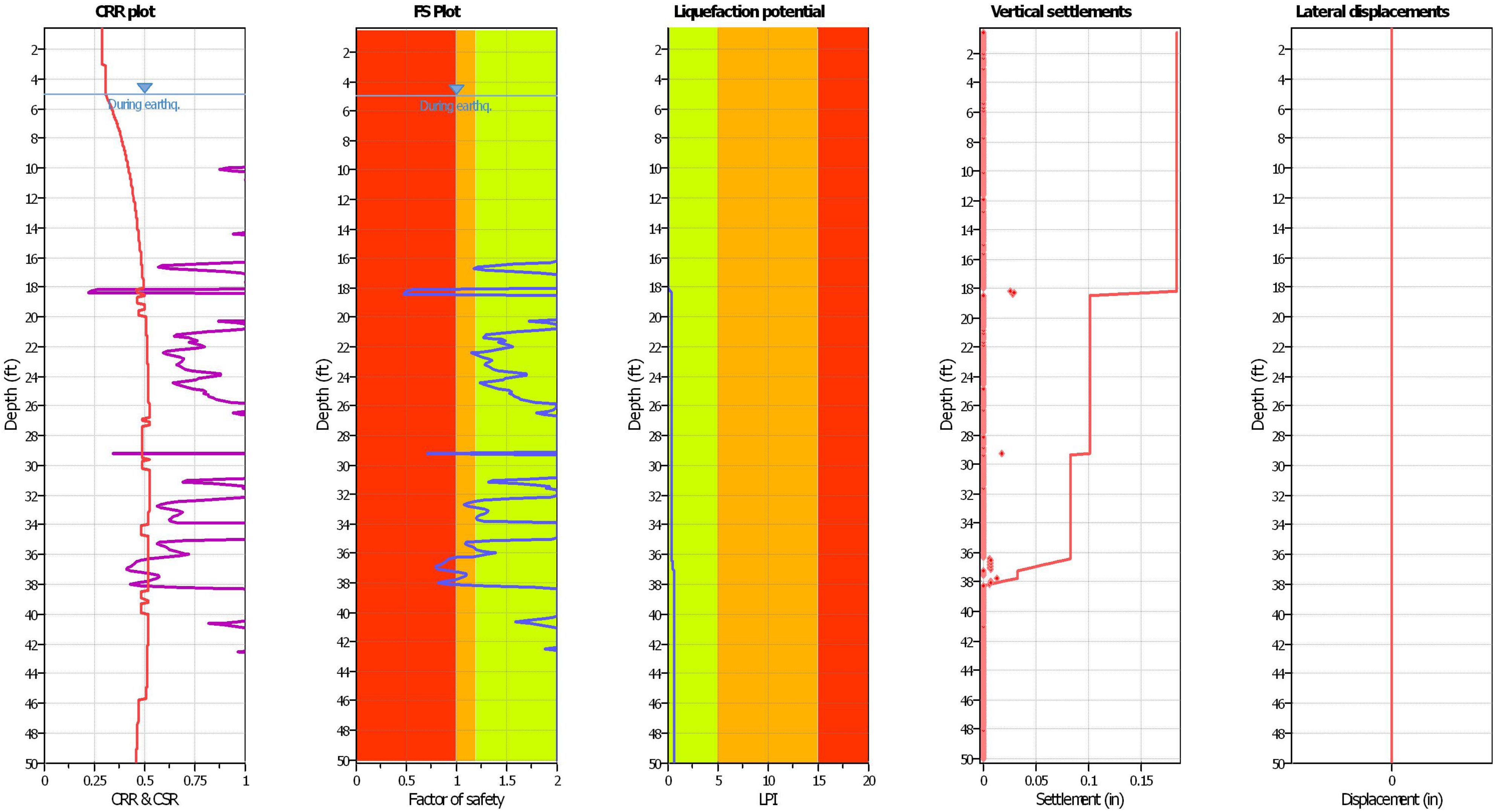

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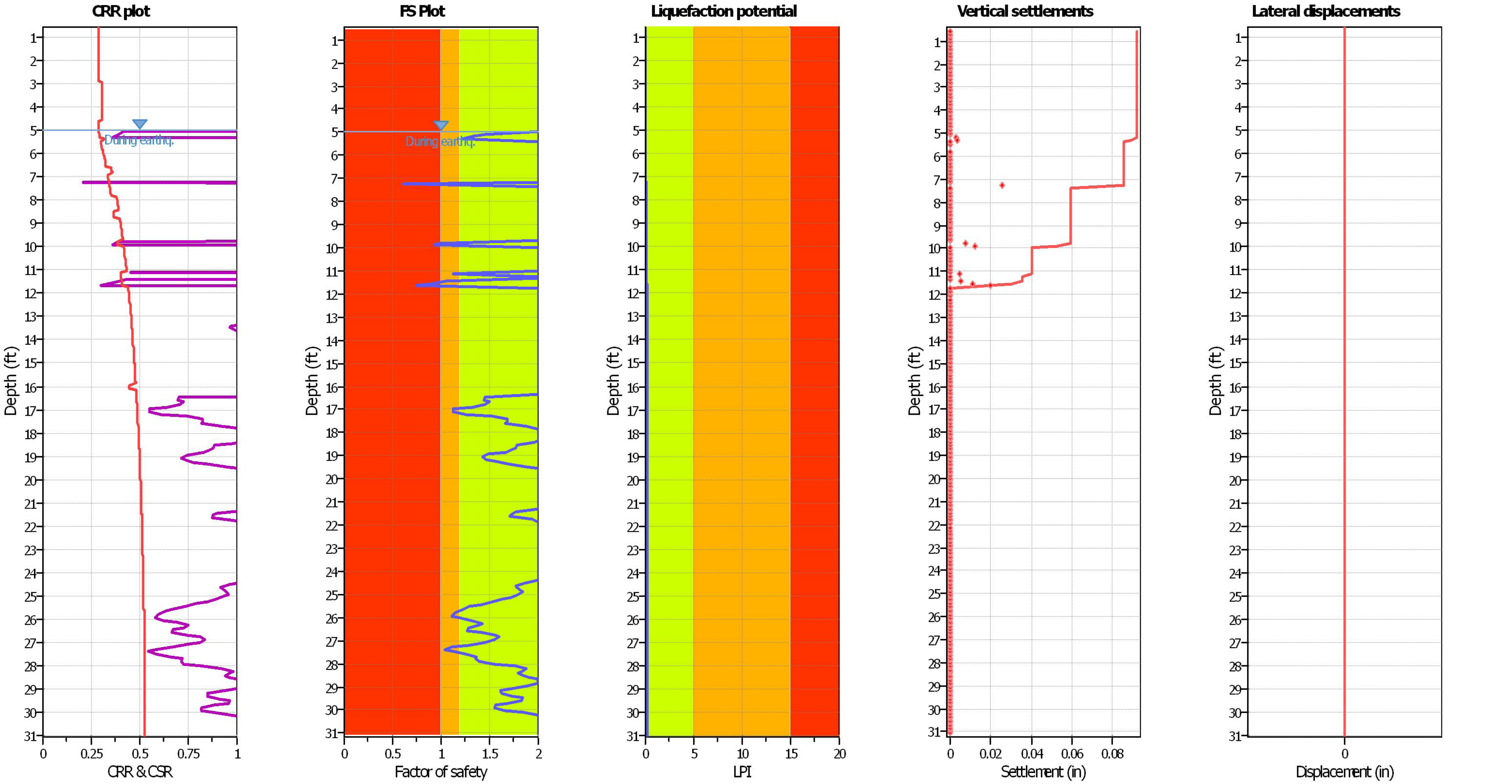

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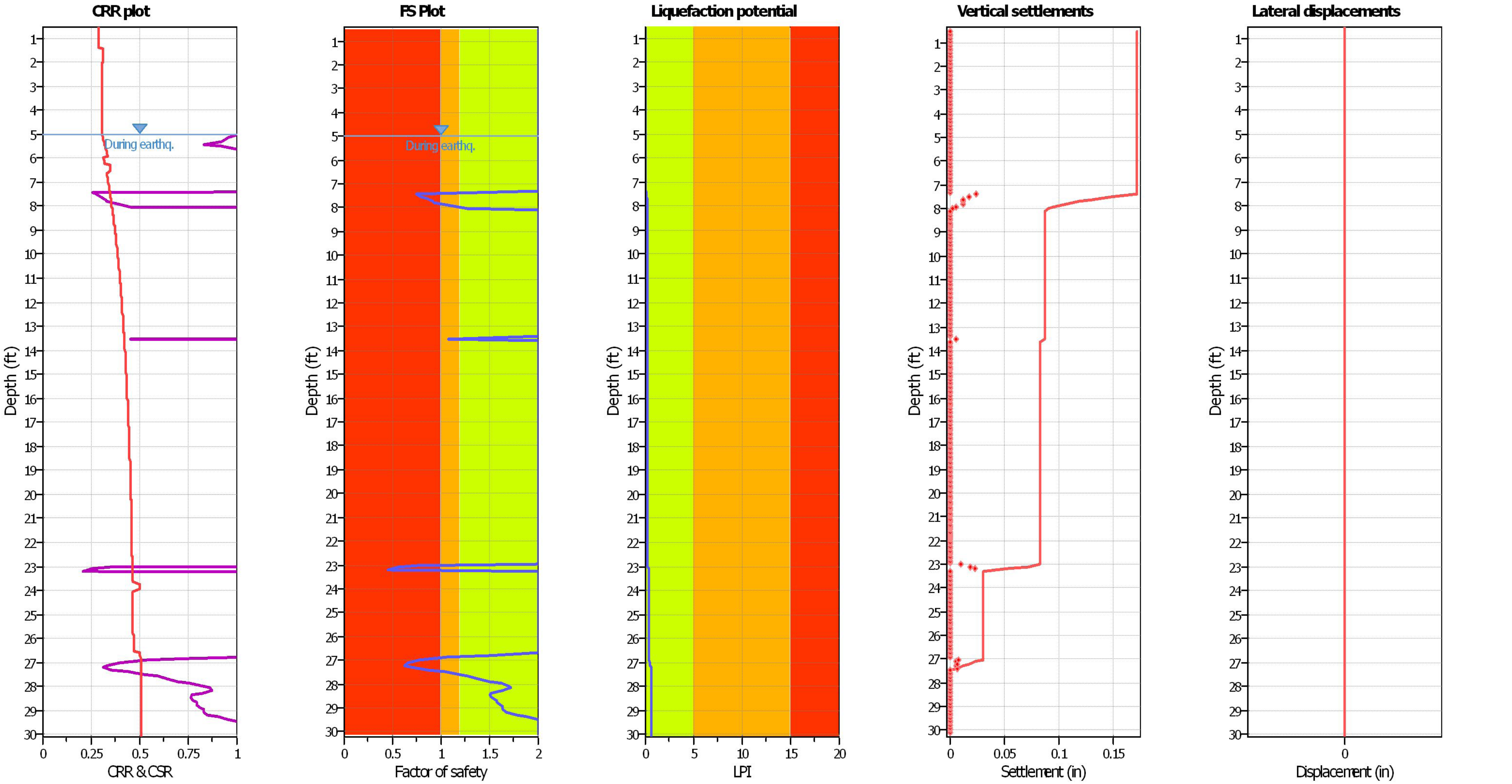

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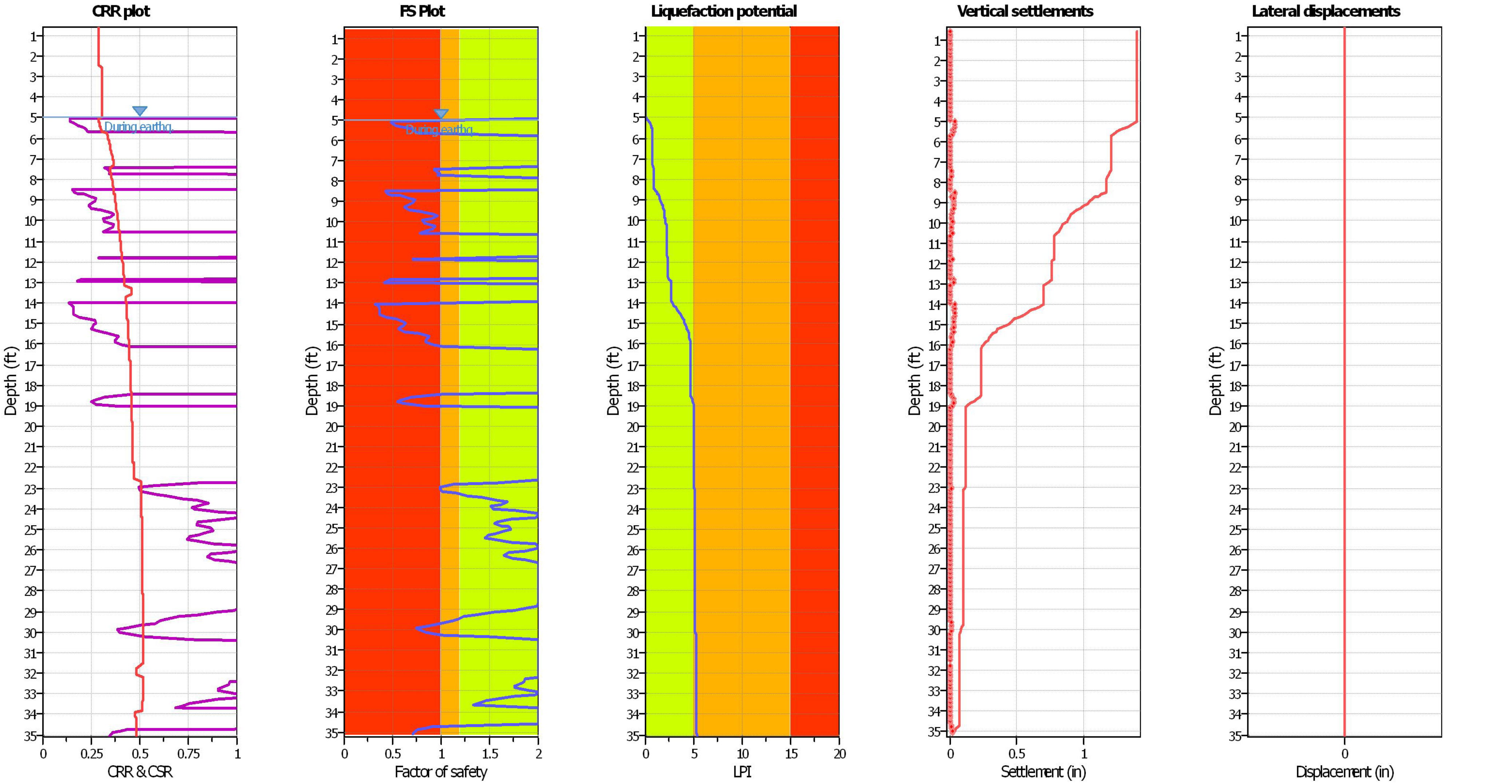

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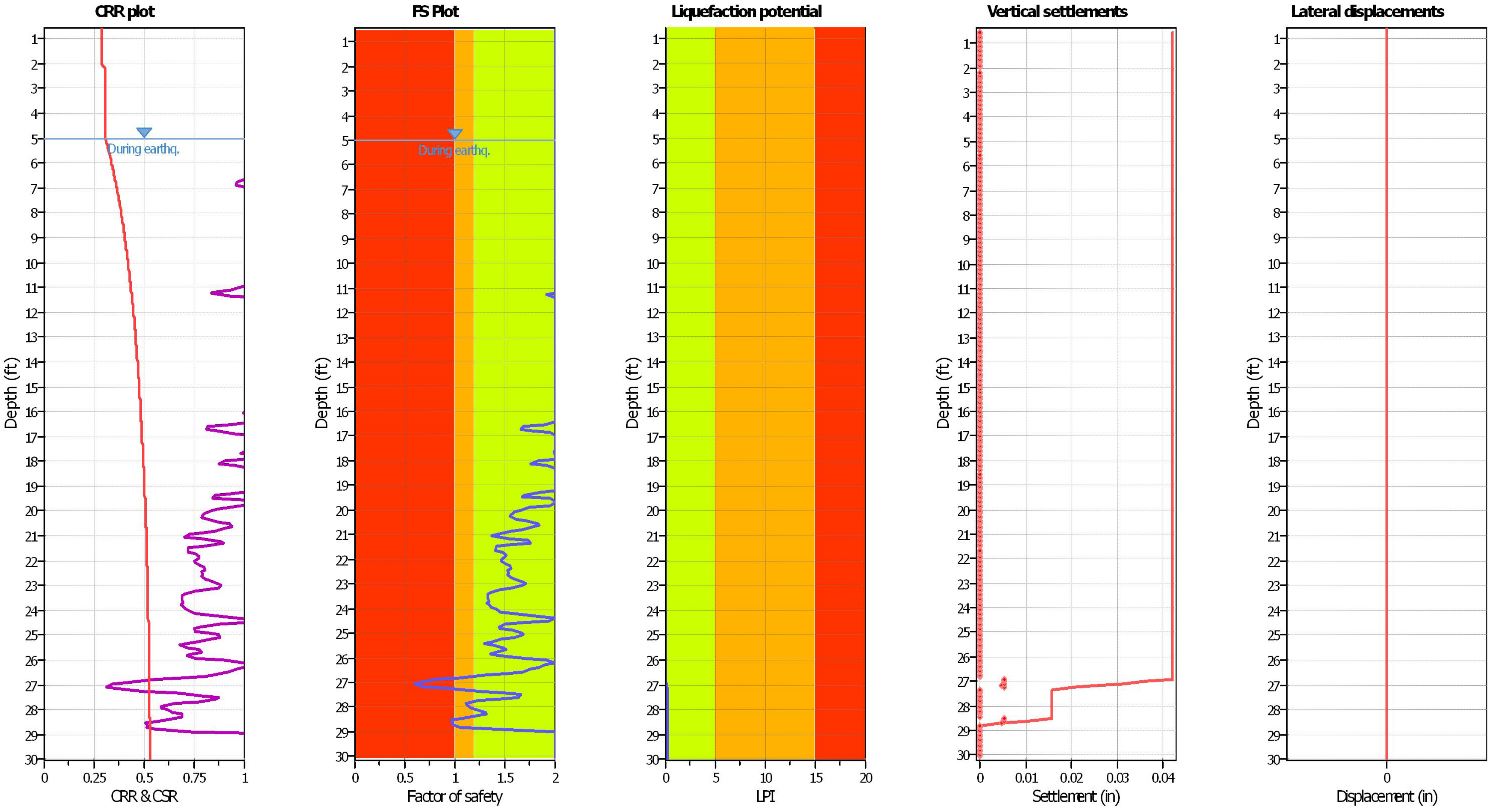

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ENGEO
INCORPORATED

Calculation Packet

3-CPT-11

6486.200.601
November 24, 2008

T A B L E   O F   C O N T E N T S

3-CPT-11 results

Summary data report	1
Input field data	7
Cyclic stress resistance results	24
Cyclic resistance ratio results	41
Liquefaction potential index data	58
Vertical settlements summary report	66
Vertical settlements data report	67

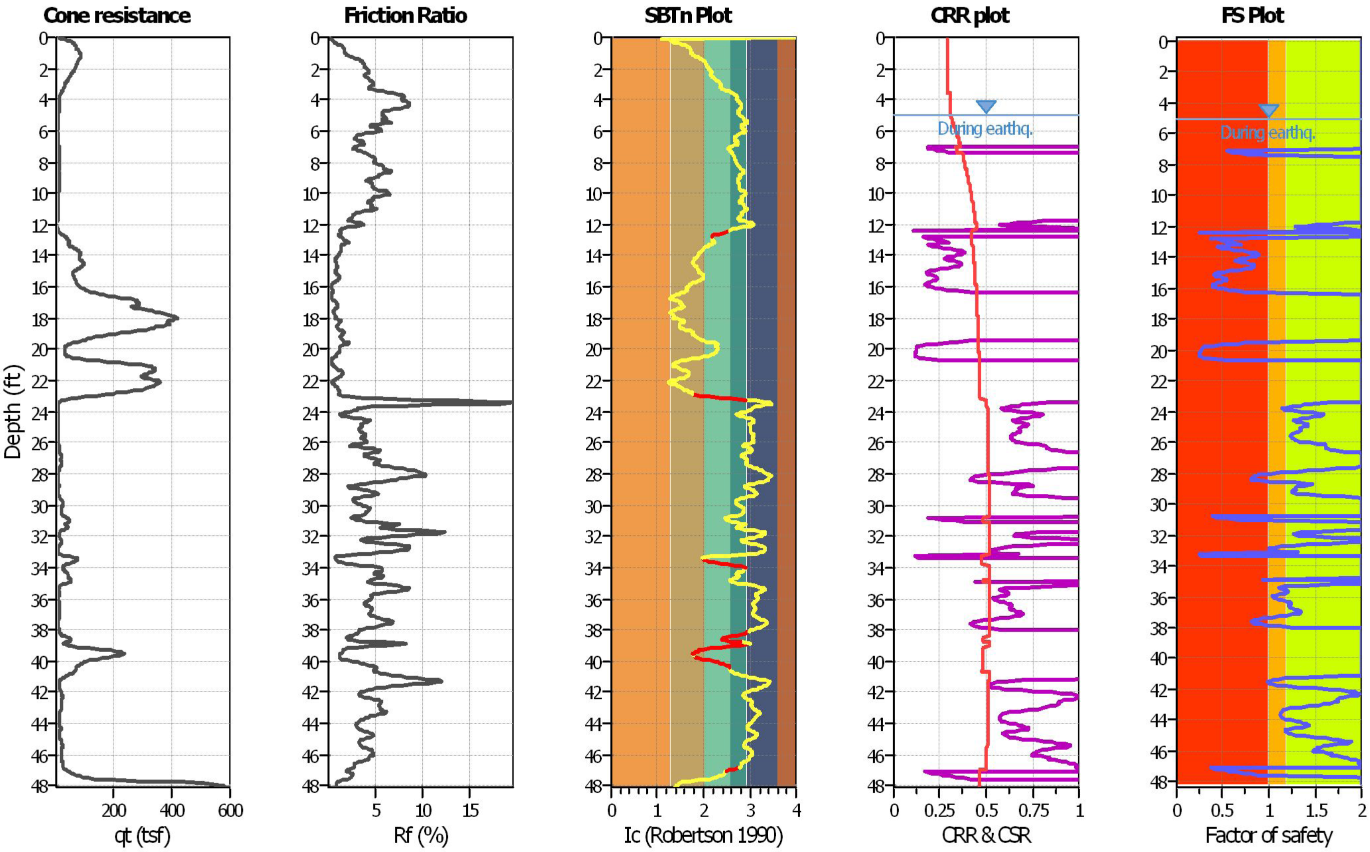
LIQUEFACTION ANALYSIS REPORT

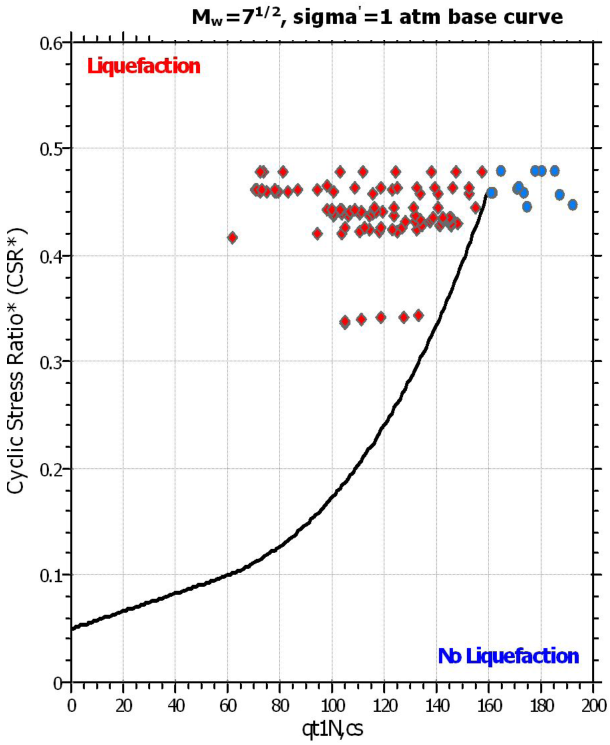
Project title : Sutter Medical Center Santa Rosa **Location : Santa Rosa**

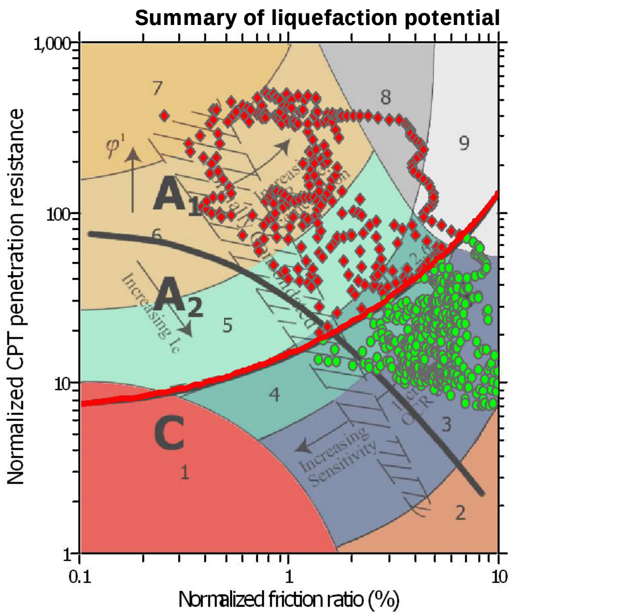
CPT file : 3-CPT-11

Input parameters and analysis data

Analysis method:	NCEER 1998	G.W.T. (in-situ):	5.00 ft	Use fill:	No	Clay like behavior applied:	Yes
Fines correction method:	Robertson & Wride	G.W.T. (earthq.):	5.00 ft	Fill height:	N/A	Limit depth applied:	No
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth:	N/A
Earthquake magnitude M_w:	7.26	Ic cut-off value:	2.60	Trans. detect. applied:	Yes		
Peak ground acceleration:	0.48	Unit weight calculation:	Based on SBT	K_σ applied:	Yes		

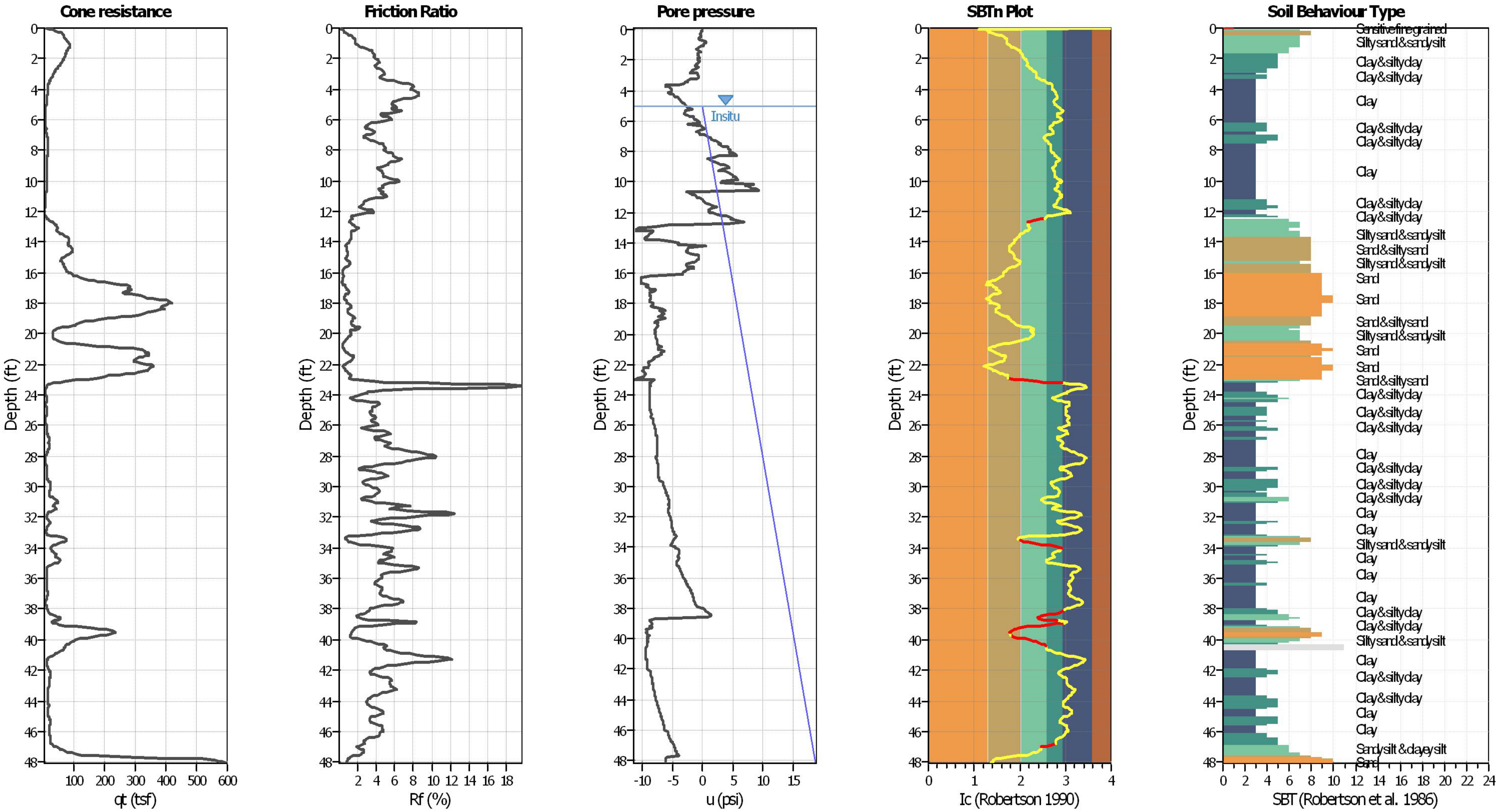






Zone A_1: Cyclic liquefaction likely depending on size and duration of cyclic loading
Zone A_2: Cyclic liquefaction and strength loss likely depending on loading and ground geometry
Zone B: Liquefaction and post-earthquake strength loss unlikely, check cyclic softening
Zone C: Cyclic liquefaction and strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry

CPT basic interpretation plots



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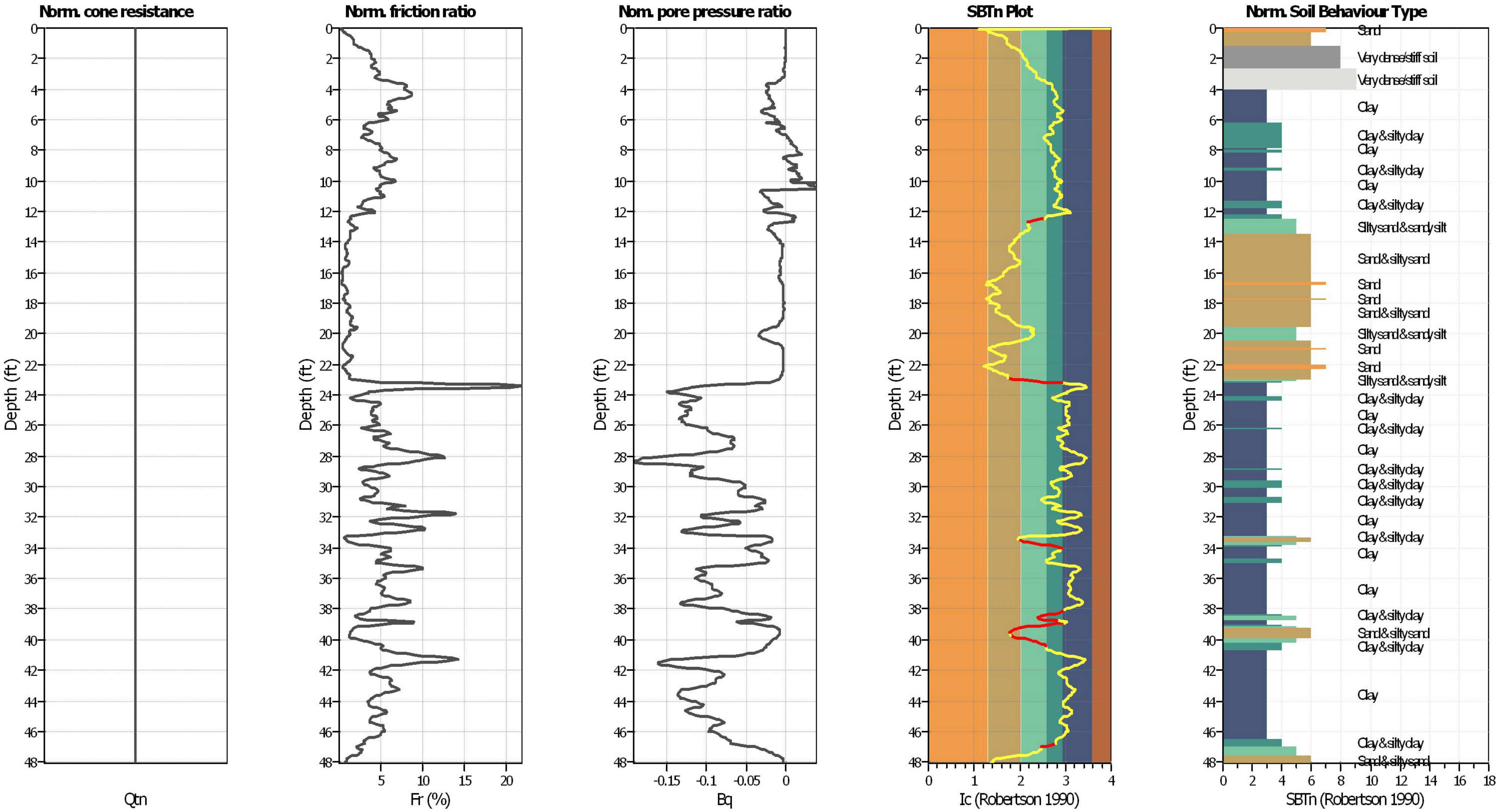
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBT legend

- 1. Sensitive fine grained
- 2. Organic material
- 3. Clay
- 4. Clay & silty clay
- 5. Clay & silty clay
- 6. Sandy silt & clayey silt
- 7. Silty sand & sandy
- 8. Sand & silty sand
- 9. Sand
- 10. Sand
- 11. Very dense/stiff soil
- 12. Very dense/stiff soil

CPT basic interpretation plots (normalized)



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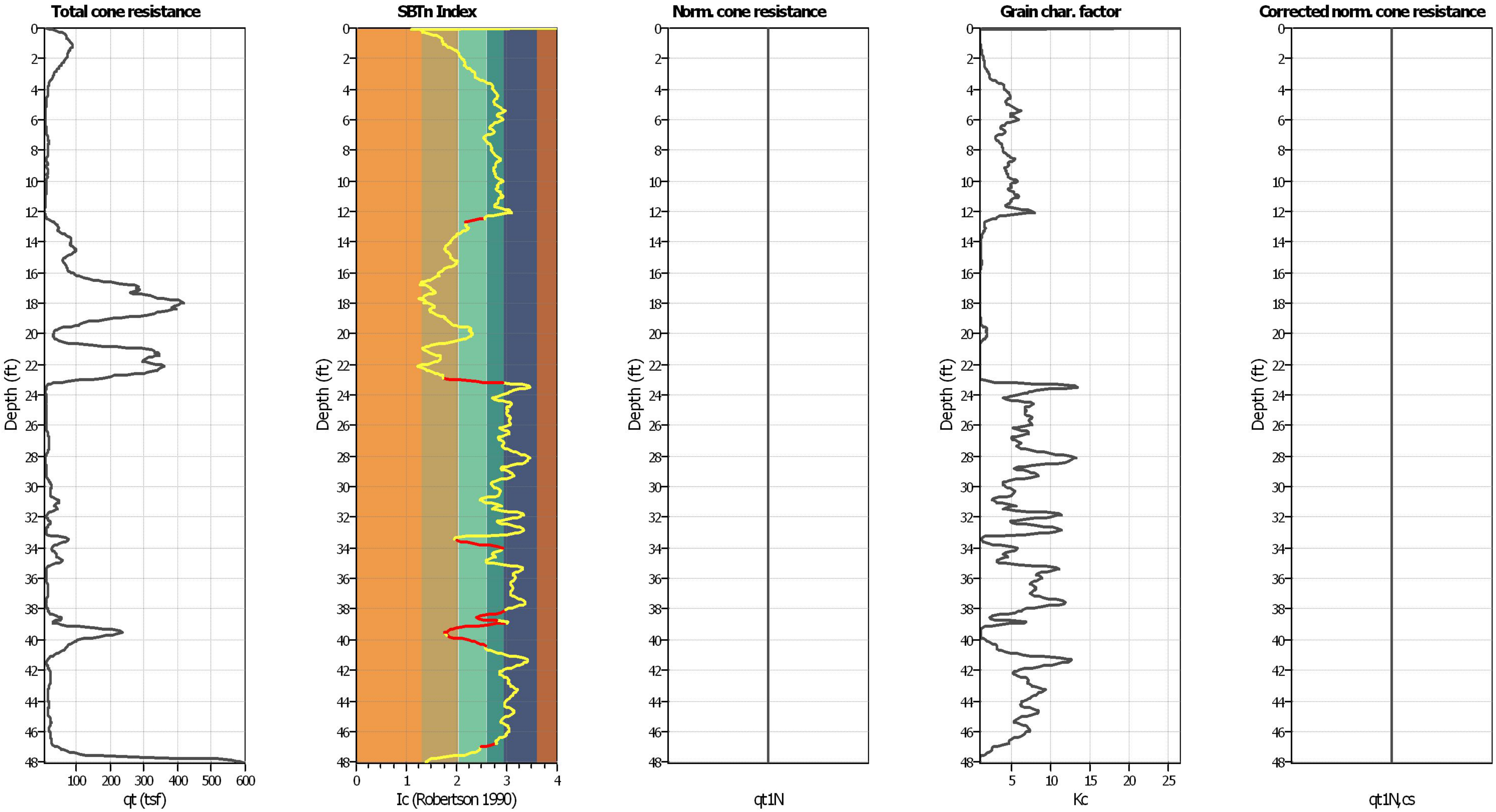
Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

SBTn legend

1. Sensitive fine grained	4. Clayey silt to silty	7. Gravely sand to sand
2. Organic material	5. Silty sand to sandy silt	8. Very stiff sand to
3. Clay to silty clay	6. Clean sand to silty sand	9. Very stiff fine grained

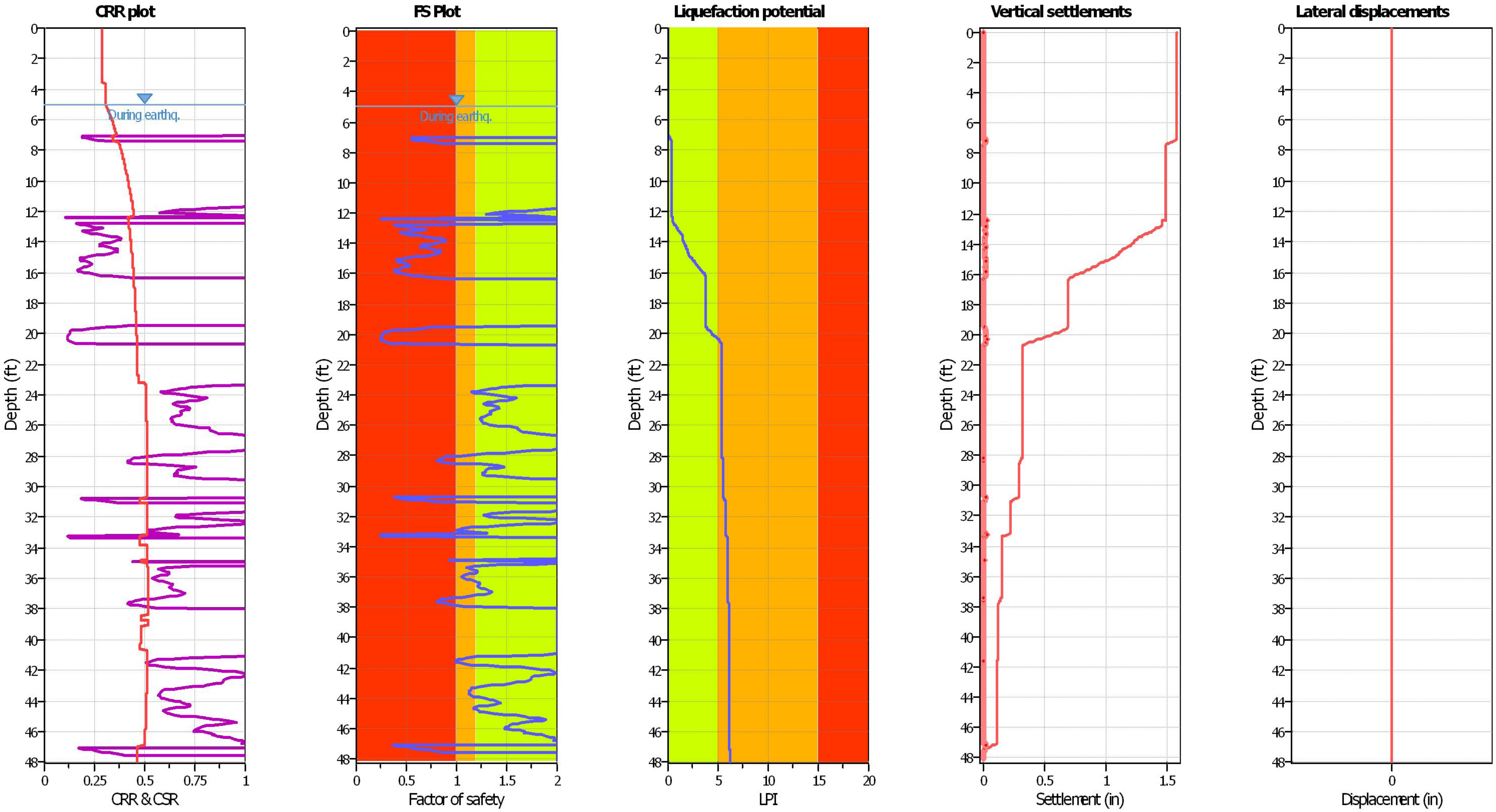
Liquefaction analysis overall plots (intermediate results)



Input parameters and analysis data

Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

Liquefaction analysis overall plots



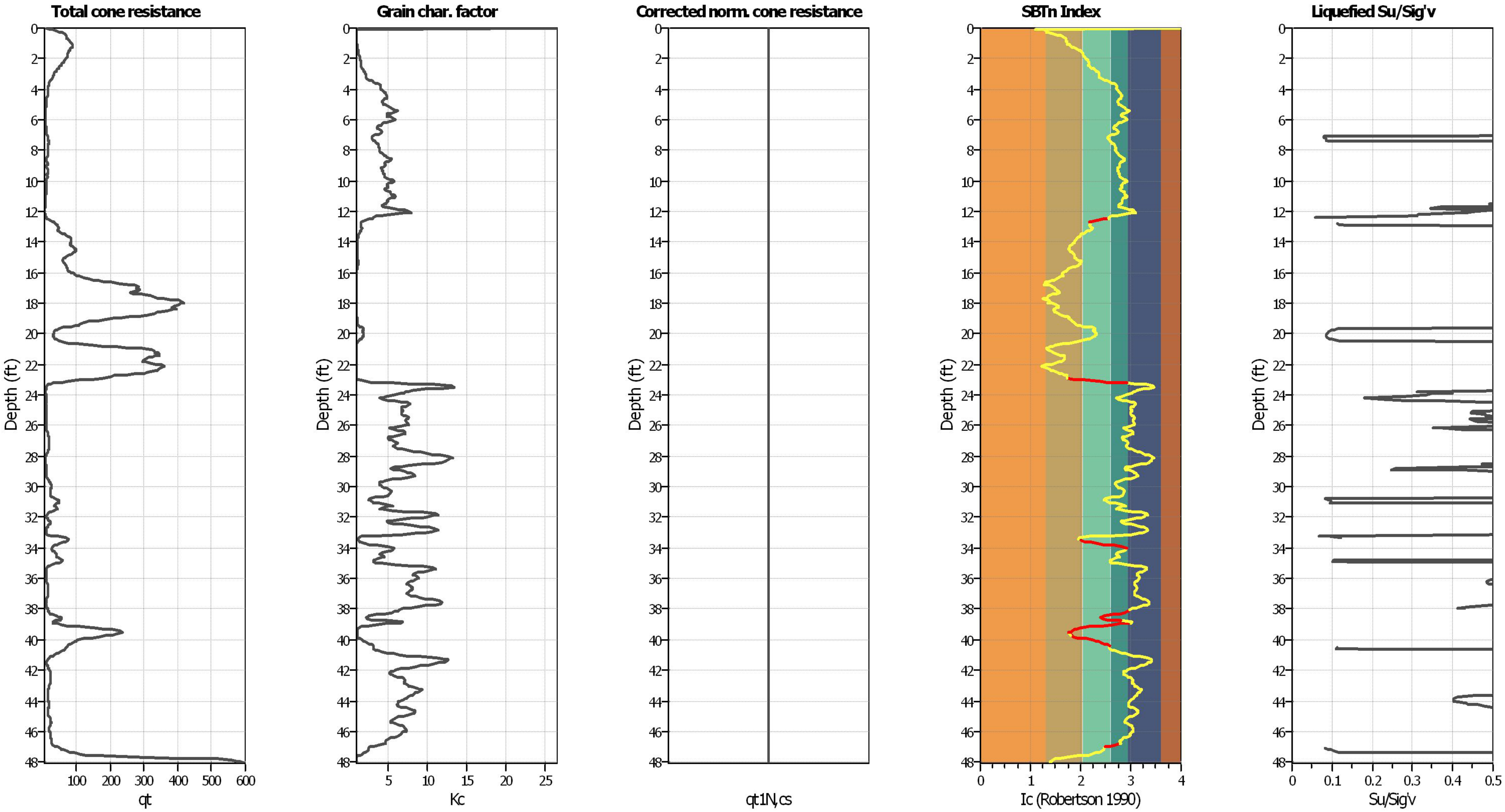
Input parameters and analysis data

Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_σ applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

F.S. color scheme
- Liquefied
- Marginally liquefied
- Non-liquefied

LPI color scheme
- Very high risk
- High risk
- Low risk

Check for strenght loss plots (Olsen & Stark (2002))



Input parameters and analysis data

Analysis method:	NCEER 1998	Depth to water table (erthq.):	5.00 ft	Fill weight:	N/A
Fines correction method:	Robertson & Wride	Average results interval:	3	Transition detect. applied:	Yes
Points to test:	Based on Ic value	Ic cut-off value:	2.60	K_{σ} applied:	Yes
Earthquake magnitude M_w:	7.26	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Yes
Peak ground acceleration:	0.48	Use fill:	No	Limit depth applied:	No
Depth to water table (insitu):	5.00 ft	Fill height:	N/A	Limit depth:	N/A

:: Field input data ::

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
2	0.07	20.96	0.01	-0.12	0.00	117.80
3	0.13	31.18	0.17	-0.26	0.03	117.80
4	0.20	41.95	0.23	-0.32	0.47	120.90
5	0.26	53.06	0.28	-0.36	0.51	120.90
6	0.33	64.56	0.44	-0.38	1.26	120.90
7	0.39	66.53	0.65	-0.29	2.32	120.90
8	0.46	68.85	0.80	-0.33	3.56	120.90
9	0.52	71.19	0.95	-0.42	4.54	117.80
10	0.59	70.33	1.07	-0.62	5.43	117.80
11	0.66	69.62	1.18	-0.42	6.07	117.80
12	0.72	75.11	1.31	-0.30	6.37	117.80
13	0.79	78.99	1.40	0.49	6.40	117.80
14	0.85	80.98	1.40	0.55	6.42	117.80
15	0.92	82.05	1.42	0.33	6.52	117.80
16	0.98	85.70	1.56	0.17	6.64	117.80
17	1.05	89.87	1.65	0.23	6.96	117.80
18	1.12	89.61	1.79	-0.25	7.50	117.80
19	1.18	87.91	1.96	-0.57	8.12	117.80
20	1.25	89.61	2.09	-0.83	8.88	117.80
21	1.31	86.09	2.20	-1.13	9.91	114.60
22	1.38	82.84	2.58	-0.58	11.29	114.60
23	1.44	79.95	2.77	-0.23	12.43	114.60
24	1.51	78.94	2.80	-0.55	13.22	114.60
25	1.57	75.72	2.81	-0.80	13.65	114.60
26	1.64	75.91	2.83	-0.78	14.02	114.60
27	1.71	75.45	2.82	-0.68	14.37	114.60
28	1.77	73.86	2.90	-0.70	14.56	114.60
29	1.84	74.28	2.80	-0.42	14.75	114.60
30	1.90	73.18	2.75	-0.78	14.87	114.60
31	1.97	71.69	2.78	-0.93	15.47	114.60
32	2.03	67.82	2.82	-0.75	16.20	114.60
33	2.10	66.25	2.83	-0.55	16.87	114.60
34	2.16	64.67	2.77	-0.65	17.38	114.60
35	2.23	61.99	2.75	-1.09	17.89	114.60
36	2.30	60.32	2.71	-0.77	17.95	114.60
37	2.36	57.59	2.22	-1.23	17.85	114.60
38	2.43	55.82	2.18	-1.16	17.59	114.60
39	2.49	53.36	2.00	-0.70	18.03	114.60
40	2.56	50.79	1.99	-0.99	18.70	114.60
41	2.62	47.93	1.98	-1.75	19.78	114.60
42	2.69	45.34	2.00	-1.60	20.99	114.60
43	2.76	42.68	1.99	-1.97	22.09	114.60
44	2.82	40.23	1.90	-1.99	23.01	114.60
45	2.89	38.01	1.83	-0.86	23.96	114.60
46	2.95	34.85	1.73	-0.77	24.69	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
47	3.02	34.35	1.68	-0.71	25.18	111.40
48	3.08	33.35	1.58	-0.71	25.24	114.60
49	3.15	31.82	1.45	-0.74	25.09	114.60
50	3.21	30.57	1.26	-1.10	25.23	114.60
51	3.28	29.35	1.26	-2.00	25.87	114.60
52	3.35	27.81	1.30	-2.39	27.85	111.40
53	3.41	24.64	1.35	-2.49	30.18	111.40
54	3.48	23.14	1.37	-2.81	32.73	111.40
55	3.54	21.61	1.38	-3.18	34.76	111.40
56	3.61	20.33	1.41	-4.09	37.02	111.40
57	3.67	19.23	1.48	-6.09	39.09	111.40
58	3.74	18.24	1.46	-6.12	40.81	111.40
59	3.80	17.66	1.45	-5.64	41.60	111.40
60	3.87	17.51	1.40	-5.37	41.64	111.40
61	3.94	17.64	1.34	-5.23	41.46	111.40
62	4.00	17.59	1.35	-5.21	41.65	111.40
63	4.07	17.16	1.36	-5.08	42.56	111.40
64	4.13	16.56	1.36	-5.73	43.75	111.40
65	4.20	15.97	1.36	-5.34	44.77	111.40
66	4.26	15.80	1.35	-4.99	45.57	111.40
67	4.33	15.46	1.34	-4.77	46.03	111.40
68	4.40	15.24	1.31	-4.51	46.73	111.40
69	4.46	14.49	1.25	-4.13	47.15	111.40
70	4.53	14.01	1.16	-3.97	46.96	111.40
71	4.59	14.08	1.04	-3.97	46.31	111.40
72	4.66	13.73	0.98	-3.77	44.90	111.40
73	4.72	14.08	0.88	-3.42	43.79	111.40
74	4.79	14.07	0.83	-3.29	42.74	111.40
75	4.85	13.75	0.78	-3.15	42.77	111.40
76	4.92	13.17	0.75	-2.91	43.43	111.40
77	4.99	12.81	0.75	-2.67	43.88	111.40
78	5.05	12.51	0.68	-2.68	45.35	111.40
79	5.12	11.17	0.71	-2.48	47.69	111.40
80	5.18	9.48	0.64	-2.54	50.01	111.40
81	5.25	9.02	0.50	-1.62	50.39	111.40
82	5.31	8.61	0.42	-2.94	51.58	111.40
83	5.38	7.63	0.51	-2.90	54.69	111.40
84	5.44	7.51	0.56	-2.97	56.06	111.40
85	5.51	8.49	0.51	-3.16	53.34	111.40
86	5.58	9.10	0.46	-2.78	49.85	111.40
87	5.64	8.61	0.39	-2.45	47.29	111.40
88	5.71	9.25	0.38	-2.17	46.93	111.40
89	5.77	9.67	0.48	-1.41	47.27	111.40
90	5.84	9.52	0.50	-1.39	49.39	111.40
91	5.90	8.53	0.48	-1.22	51.44	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
92	5.97	7.88	0.45	-1.03	53.67	111.40
93	6.04	7.53	0.44	-0.74	53.38	111.40
94	6.10	8.09	0.40	-0.49	49.88	111.40
95	6.17	9.48	0.36	-0.36	45.97	111.40
96	6.23	9.09	0.29	-2.58	43.22	114.60
97	6.30	9.35	0.30	-0.49	42.08	114.60
98	6.36	9.74	0.29	-0.19	40.96	114.60
99	6.43	10.34	0.30	0.03	39.42	114.60
100	6.49	11.30	0.32	0.32	38.05	114.60
101	6.56	11.96	0.33	0.42	38.00	114.60
102	6.63	11.30	0.36	-0.52	39.42	114.60
103	6.69	10.94	0.41	-1.15	41.57	114.60
104	6.76	10.77	0.42	-0.88	42.78	111.40
105	6.82	11.11	0.44	-0.46	42.88	111.40
106	6.89	11.27	0.44	-0.38	41.87	111.40
107	6.95	11.80	0.41	0.29	38.91	114.60
108	7.02	14.42	0.42	0.86	35.76	114.60
109	7.08	15.23	0.41	1.26	33.41	114.60
110	7.15	15.97	0.43	1.46	32.32	114.60
111	7.22	16.99	0.45	1.33	32.70	114.60
112	7.28	17.54	0.59	1.94	33.28	114.60
113	7.35	17.97	0.63	2.26	34.47	114.60
114	7.41	18.13	0.69	2.68	35.16	114.60
115	7.48	18.32	0.74	2.93	36.22	114.60
116	7.54	18.07	0.79	2.52	37.45	111.40
117	7.61	17.70	0.85	2.93	38.86	111.40
118	7.68	17.41	0.89	3.44	39.03	111.40
119	7.74	18.60	0.87	4.21	39.56	111.40
120	7.81	17.46	0.91	4.28	39.59	111.40
121	7.87	17.47	0.89	4.42	40.26	111.40
122	7.94	17.40	0.86	4.73	39.73	111.40
123	8.00	17.76	0.84	4.48	39.68	111.40
124	8.07	17.33	0.86	4.52	40.24	111.40
125	8.13	17.37	0.94	5.13	41.56	111.40
126	8.20	17.10	0.99	5.42	42.81	111.40
127	8.27	16.40	0.97	5.74	43.85	111.40
128	8.33	15.79	0.93	2.60	44.68	111.40
129	8.40	14.94	0.87	1.94	45.42	111.40
130	8.46	14.48	0.85	0.84	47.29	111.40
131	8.53	13.02	0.88	1.04	49.54	111.40
132	8.59	12.51	0.89	1.44	50.79	111.40
133	8.66	13.15	0.85	1.83	50.06	111.40
134	8.72	13.58	0.84	2.06	47.78	111.40
135	8.79	14.21	0.76	2.57	46.07	111.40
136	8.86	14.63	0.76	2.96	45.11	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
137	8.92	14.51	0.79	3.65	45.25	111.40
138	8.99	14.08	0.76	4.32	45.40	111.40
139	9.05	13.46	0.65	4.42	44.25	111.40
140	9.12	13.96	0.57	4.23	42.92	111.40
141	9.18	13.84	0.56	3.29	41.78	111.40
142	9.25	14.49	0.60	2.55	41.93	111.40
143	9.32	15.01	0.68	3.61	42.52	111.40
144	9.38	14.68	0.71	4.23	43.41	111.40
145	9.45	14.38	0.70	4.67	43.53	111.40
146	9.51	14.72	0.66	4.57	43.91	111.40
147	9.58	14.13	0.70	5.12	44.20	111.40
148	9.64	14.07	0.70	5.05	44.56	111.40
149	9.71	14.62	0.69	5.35	44.31	111.40
150	9.77	14.44	0.69	5.68	45.14	111.40
151	9.84	14.06	0.80	5.84	47.09	111.40
152	9.91	13.28	0.80	5.23	50.17	111.40
153	9.97	12.27	0.85	3.16	51.75	111.40
154	10.04	12.48	0.80	3.05	53.09	111.40
155	10.10	11.51	0.73	3.63	51.23	111.40
156	10.17	12.91	0.69	8.47	49.37	111.40
157	10.23	12.78	0.61	7.11	47.17	111.40
158	10.30	12.67	0.60	7.40	46.95	111.40
159	10.36	12.14	0.57	7.93	47.99	111.40
160	10.43	11.60	0.60	8.37	47.58	111.40
161	10.50	13.17	0.60	8.99	45.32	111.40
162	10.56	14.64	0.56	9.22	44.66	111.40
163	10.63	12.07	0.54	-2.61	46.14	111.40
164	10.69	11.15	0.54	-2.47	49.70	111.40
165	10.76	10.90	0.53	-2.06	50.24	111.40
166	10.82	11.14	0.49	-1.67	49.90	111.40
167	10.89	10.90	0.48	-1.33	50.89	111.40
168	10.96	10.27	0.55	-1.13	52.86	111.40
169	11.02	10.09	0.55	-0.83	54.05	111.40
170	11.09	9.80	0.46	-0.38	52.65	111.40
171	11.15	9.83	0.38	-0.12	49.83	111.40
172	11.22	9.83	0.30	0.06	47.92	114.60
173	11.28	9.06	0.26	0.23	47.24	114.60
174	11.35	8.78	0.25	0.41	47.75	114.60
175	11.41	8.62	0.24	0.68	47.22	114.60
176	11.48	8.90	0.22	1.00	46.22	114.60
177	11.55	9.74	0.26	1.67	45.12	114.60
178	11.61	10.35	0.29	2.12	42.93	114.60
179	11.68	10.73	0.21	2.32	43.64	114.60
180	11.74	7.62	0.17	1.46	44.87	114.60
181	11.81	7.08	0.16	1.16	51.58	114.60

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
182	11.87	6.47	0.21	0.87	56.53	111.40
183	11.94	5.96	0.23	0.94	61.09	111.40
184	12.00	5.69	0.21	1.17	64.24	111.40
185	12.07	5.15	0.20	1.70	65.70	111.40
186	12.14	5.04	0.19	2.38	59.17	111.40
187	12.20	7.47	0.15	3.19	49.47	114.60
188	12.27	9.23	0.15	3.97	40.25	114.60
189	12.33	10.68	0.14	4.61	36.13	114.60
190	12.40	11.80	0.16	5.05	33.67	120.90
191	12.46	13.07	0.18	4.64	33.22	114.60
192	12.53	13.84	0.23	5.61	28.16	114.60
193	12.60	23.99	0.28	6.67	23.32	114.60
194	12.66	30.06	0.32	6.87	19.12	117.80
195	12.73	34.31	0.36	4.73	18.39	117.80
196	12.79	36.57	0.52	-4.51	18.43	117.80
197	12.86	40.66	0.64	-5.70	18.65	117.80
198	12.92	44.14	0.71	-7.51	18.38	117.80
199	12.99	46.98	0.81	-9.99	18.66	117.80
200	13.05	48.01	0.97	-10.63	19.28	114.60
201	13.12	47.98	1.03	-11.03	20.33	114.60
202	13.19	47.45	1.15	-11.11	19.28	114.60
203	13.25	45.67	0.54	-8.18	18.15	117.80
204	13.32	46.19	0.65	-8.48	16.16	117.80
205	13.38	49.88	0.72	-8.70	15.46	117.80
206	13.45	60.43	0.80	-8.80	14.13	117.80
207	13.51	66.59	0.86	-8.95	13.11	117.80
208	13.58	71.01	0.98	-9.27	12.65	117.80
209	13.64	76.36	1.08	-9.44	12.29	117.80
210	13.71	81.48	1.13	-9.60	11.70	120.90
211	13.78	84.93	1.11	-9.48	11.07	120.90
212	13.84	88.16	1.10	-7.05	10.60	120.90
213	13.91	86.49	1.03	-5.05	10.21	120.90
214	13.97	85.83	0.94	-3.89	10.01	120.90
215	14.04	83.84	0.90	-3.93	9.82	120.90
216	14.10	81.36	0.83	-4.05	9.16	120.90
217	14.17	81.93	0.59	0.49	8.53	120.90
218	14.24	84.61	0.67	0.20	7.85	120.90
219	14.30	88.55	0.70	-2.19	7.78	120.90
220	14.37	93.75	0.76	-2.44	7.54	120.90
221	14.43	97.32	0.79	-2.45	7.42	120.90
222	14.50	98.87	0.83	-2.51	7.52	120.90
223	14.56	98.25	0.89	-2.62	7.66	120.90
224	14.63	97.09	0.85	-2.78	8.07	120.90
225	14.69	93.63	0.91	-1.99	8.54	120.90
226	14.76	88.47	0.90	-1.12	9.19	120.90

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
227	14.83	83.07	0.84	-0.68	9.62	120.90
228	14.89	76.96	0.72	-0.70	9.78	120.90
229	14.96	72.58	0.62	-0.68	9.88	120.90
230	15.02	65.15	0.50	-0.68	9.92	120.90
231	15.09	62.54	0.45	-0.73	10.17	120.90
232	15.15	59.61	0.44	-0.77	11.26	120.90
233	15.22	57.68	0.63	-1.10	12.39	120.90
234	15.28	60.41	0.69	-1.44	13.29	117.80
235	15.35	63.69	0.78	-1.90	13.18	117.80
236	15.42	67.28	0.84	-2.60	12.93	117.80
237	15.48	68.84	0.83	-2.70	12.31	120.90
238	15.55	70.01	0.73	-2.57	11.43	120.90
239	15.61	70.65	0.62	-1.41	9.94	120.90
240	15.68	71.88	0.42	-1.44	8.56	120.90
241	15.74	74.05	0.40	-2.09	7.26	120.90
242	15.81	75.70	0.33	-2.73	6.64	120.90
243	15.88	77.19	0.32	-2.93	6.12	120.90
244	15.94	80.41	0.33	-3.06	5.61	120.90
245	16.01	84.90	0.30	-3.20	5.10	124.10
246	16.07	91.08	0.33	-3.38	4.89	124.10
247	16.14	98.92	0.47	-4.42	5.12	124.10
248	16.20	102.35	0.57	-8.85	5.22	124.10
249	16.27	107.72	0.57	-10.28	4.69	124.10
250	16.33	124.33	0.57	-10.28	3.82	124.10
251	16.40	137.03	0.62	-10.28	2.98	124.10
252	16.47	155.03	0.70	-10.21	2.25	124.10
253	16.53	166.81	0.62	-10.19	1.55	124.10
254	16.60	181.55	0.63	-10.21	0.82	124.10
255	16.66	198.86	0.60	-10.16	0.36	124.10
256	16.73	230.38	0.79	-9.90	0.32	124.10
257	16.79	253.21	1.19	-8.96	0.12	127.30
258	16.86	305.51	1.32	-8.96	1.38	124.10
259	16.92	267.61	2.78	-9.34	1.86	124.10
260	16.99	282.45	2.26	-8.74	2.71	124.10
261	17.06	286.85	2.34	-8.82	2.54	124.10
262	17.12	290.06	2.84	-7.83	3.00	124.10
263	17.19	285.70	3.05	-7.90	3.54	124.10
264	17.25	272.98	3.00	-8.70	3.64	124.10
265	17.32	258.32	2.40	-8.86	3.97	124.10
266	17.38	250.53	2.90	-8.85	3.05	124.10
267	17.45	300.75	2.09	-8.74	1.93	124.10
268	17.52	332.39	1.79	-8.60	1.03	127.30
269	17.58	332.39	2.50	-8.61	0.78	127.30
270	17.65	332.06	2.02	-8.57	0.50	127.30
271	17.71	362.11	1.63	-8.64	0.00	127.30

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
272	17.78	392.61	2.11	-8.79	0.74	127.30
273	17.84	396.77	4.31	-8.73	1.00	127.30
274	17.91	429.49	3.05	-8.70	1.29	127.30
275	17.97	410.82	3.06	-8.16	0.88	127.30
276	18.04	422.72	3.64	-8.21	1.96	124.10
277	18.11	394.59	5.22	-8.25	3.14	124.10
278	18.17	394.59	5.86	-8.66	3.86	124.10
279	18.24	376.32	4.64	-7.89	3.82	124.10
280	18.30	382.87	4.84	-7.63	3.17	124.10
281	18.37	392.43	4.12	-6.60	2.69	124.10
282	18.43	414.88	4.12	-6.16	2.41	124.10
283	18.50	349.96	3.57	-7.16	2.35	124.10
284	18.56	347.07	3.21	-6.63	2.53	124.10
285	18.63	335.75	3.18	-6.83	2.90	124.10
286	18.70	339.34	4.16	-6.34	3.63	124.10
287	18.76	316.28	4.13	-6.82	4.63	124.10
288	18.83	278.16	4.04	-7.47	6.29	120.90
289	18.89	252.01	5.43	-6.90	7.00	120.90
290	18.96	232.91	3.21	-6.09	7.78	120.90
291	19.02	200.05	3.13	-7.08	7.22	120.90
292	19.09	190.19	2.85	-7.24	8.17	120.90
293	19.16	156.59	2.35	-7.70	8.65	120.90
294	19.22	137.62	1.93	-8.06	8.87	120.90
295	19.29	117.03	1.11	-7.32	9.96	120.90
296	19.35	112.99	2.00	-7.55	10.66	120.90
297	19.42	103.87	1.47	-7.38	11.75	120.90
298	19.48	102.45	1.37	-7.44	12.86	117.80
299	19.55	83.73	1.75	-7.64	15.32	117.80
300	19.61	54.20	1.09	-7.84	20.37	117.80
301	19.68	44.32	1.22	-7.87	22.68	114.60
302	19.75	43.24	0.68	-8.03	22.37	117.80
303	19.81	38.26	0.32	-7.84	20.26	117.80
304	19.88	34.19	0.45	-7.80	21.19	117.80
305	19.94	33.05	0.51	-7.90	22.79	117.80
306	20.01	31.58	0.35	-7.86	22.85	117.80
307	20.07	32.46	0.40	-7.83	22.29	117.80
308	20.14	31.87	0.40	-7.82	22.17	117.80
309	20.20	32.22	0.35	-7.80	21.13	117.80
310	20.27	34.28	0.31	-7.77	19.60	117.80
311	20.34	36.98	0.33	-7.66	18.06	117.80
312	20.40	41.11	0.36	-7.63	16.34	117.80
313	20.47	46.15	0.33	-7.66	13.25	120.90
314	20.53	63.84	0.38	-7.66	10.07	120.90
315	20.60	79.87	0.40	-7.60	6.93	120.90
316	20.66	103.12	0.38	-7.55	4.80	124.10

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
317	20.73	142.49	0.64	-7.40	2.80	124.10
318	20.80	205.19	0.87	-6.86	2.02	124.10
319	20.86	207.90	0.97	-7.25	1.37	124.10
320	20.93	254.40	1.25	-7.31	0.78	127.30
321	20.99	308.03	1.28	-7.35	0.62	127.30
322	21.06	329.84	1.98	-7.05	0.94	127.30
323	21.12	333.12	2.59	-6.41	1.73	124.10
324	21.19	331.19	2.91	-6.99	2.49	124.10
325	21.25	331.06	3.38	-6.79	2.41	124.10
326	21.32	370.62	3.02	-6.84	3.48	124.10
327	21.39	334.07	5.17	-7.32	4.60	124.10
328	21.45	334.22	5.93	-7.24	5.87	120.90
329	21.52	325.79	4.94	-8.06	5.86	120.90
330	21.58	314.29	4.59	-8.22	5.73	124.10
331	21.65	303.96	4.84	-7.89	5.58	124.10
332	21.71	297.58	3.92	-8.35	5.31	124.10
333	21.78	294.67	3.55	-8.80	4.62	124.10
334	21.84	299.95	3.41	-8.96	3.76	124.10
335	21.91	322.28	2.83	-9.03	2.67	124.10
336	21.98	346.64	2.45	-8.87	1.56	127.30
337	22.04	351.37	2.14	-8.85	0.44	127.30
338	22.11	367.23	1.35	-9.00	0.00	127.30
339	22.17	369.75	1.19	-9.09	0.00	127.30
340	22.24	342.69	2.28	-9.90	0.48	127.30
341	22.30	334.56	2.33	-9.90	1.44	127.30
342	22.37	352.24	2.68	-9.87	1.80	124.10
343	22.44	330.83	2.76	-9.93	2.38	124.10
344	22.50	313.83	3.08	-9.58	3.38	124.10
345	22.57	286.92	3.42	-9.61	4.13	124.10
346	22.63	293.75	3.40	-9.35	5.09	124.10
347	22.70	230.77	3.02	-9.56	5.93	124.10
348	22.76	212.57	3.10	-9.72	6.85	124.10
349	22.83	198.15	2.43	-9.79	6.84	124.10
350	22.89	192.25	2.08	-10.88	6.92	124.10
351	22.96	143.94	1.61	-11.24	10.71	120.90
352	23.03	83.72	2.96	-8.05	15.52	117.80
353	23.09	89.40	2.22	-8.29	25.71	114.60
354	23.16	45.40	3.16	-8.50	33.53	111.40
355	23.22	30.15	3.13	-8.74	53.06	111.40
356	23.29	22.45	3.11	-8.70	67.61	111.40
357	23.35	16.27	2.83	-8.69	82.89	111.40
358	23.42	12.47	3.12	-8.73	93.83	111.40
359	23.48	10.81	1.75	-8.73	95.92	111.40
360	23.55	11.53	1.37	-8.79	84.71	111.40
361	23.62	11.34	0.74	-8.79	76.16	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
362	23.68	10.05	0.46	-8.76	66.82	111.40
363	23.75	9.94	0.25	-8.77	62.86	114.60
364	23.81	9.72	0.30	-8.79	61.49	114.60
365	23.88	9.42	0.32	-8.83	60.77	114.60
366	23.94	10.79	0.28	-8.83	57.89	114.60
367	24.01	11.24	0.27	-8.86	52.51	114.60
368	24.08	12.12	0.23	-8.83	47.19	114.60
369	24.14	13.09	0.15	-8.83	42.52	114.60
370	24.21	13.24	0.15	-8.83	40.80	114.60
371	24.27	12.99	0.19	-8.83	43.72	114.60
372	24.34	12.27	0.24	-8.82	48.51	114.60
373	24.40	11.89	0.31	-8.79	54.12	114.60
374	24.47	11.49	0.41	-8.79	59.65	114.60
375	24.53	11.03	0.49	-8.80	63.75	111.40
376	24.60	10.69	0.48	-8.80	65.43	111.40
377	24.67	10.89	0.46	-8.79	63.66	111.40
378	24.73	11.77	0.44	-8.77	61.29	111.40
379	24.80	11.89	0.43	-8.76	59.00	114.60
380	24.86	12.33	0.43	-8.74	58.39	114.60
381	24.93	12.18	0.43	-8.70	58.51	114.60
382	24.99	11.84	0.43	-8.67	59.39	114.60
383	25.06	11.46	0.41	-8.67	60.03	114.60
384	25.12	11.20	0.38	-8.64	59.00	114.60
385	25.19	12.07	0.38	-8.51	58.91	114.60
386	25.26	11.58	0.41	-8.44	59.09	114.60
387	25.32	11.45	0.41	-8.47	60.47	114.60
388	25.39	11.54	0.42	-8.50	62.15	111.40
389	25.45	11.07	0.47	-8.57	63.92	111.40
390	25.52	10.58	0.44	-8.56	63.58	111.40
391	25.58	11.40	0.38	-8.16	62.53	111.40
392	25.65	10.97	0.39	-8.15	61.27	114.60
393	25.72	11.05	0.40	-8.13	62.27	111.40
394	25.78	11.19	0.42	-8.13	62.64	111.40
395	25.85	11.39	0.45	-8.12	63.62	111.40
396	25.91	11.52	0.51	-8.09	63.97	111.40
397	25.98	11.75	0.50	-8.08	62.36	111.40
398	26.04	12.30	0.42	-8.02	56.43	114.60
399	26.11	14.02	0.30	-7.99	51.34	114.60
400	26.17	14.12	0.32	-7.90	48.76	114.60
401	26.24	14.16	0.37	-7.84	52.78	114.60
402	26.31	14.17	0.61	-7.79	56.67	114.60
403	26.37	14.46	0.69	-7.79	60.52	111.40
404	26.44	14.44	0.78	-7.74	61.50	111.40
405	26.50	15.17	0.84	-7.71	61.92	111.40
406	26.57	15.47	0.87	-7.70	59.63	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
407	26.63	17.42	0.87	-7.69	55.81	111.40
408	26.70	18.88	0.76	-7.66	50.94	114.60
409	26.76	20.85	0.76	-7.66	47.82	114.60
410	26.83	21.24	0.78	-7.66	47.40	114.60
411	26.90	20.42	0.84	-7.66	48.56	114.60
412	26.96	19.97	0.85	-7.61	51.09	111.40
413	27.03	19.44	0.98	-7.55	53.36	111.40
414	27.09	19.15	1.04	-7.53	55.41	111.40
415	27.16	19.42	1.11	-7.51	55.81	111.40
416	27.22	19.96	1.11	-7.50	54.35	111.40
417	27.29	20.88	1.00	-7.50	52.69	111.40
418	27.36	20.92	0.99	-7.51	52.03	111.40
419	27.42	20.73	1.08	-7.48	53.60	111.40
420	27.49	19.94	1.16	-7.50	56.26	111.40
421	27.55	18.97	1.21	-7.50	60.05	111.40
422	27.62	17.07	1.24	-7.51	64.09	111.40
423	27.68	15.94	1.25	-7.48	68.56	111.40
424	27.75	14.69	1.24	-7.51	72.75	111.40
425	27.81	13.26	1.21	-7.55	77.16	111.40
426	27.88	12.29	1.19	-7.58	81.38	111.40
427	27.95	11.39	1.13	-7.61	86.54	111.40
428	28.01	9.66	1.04	-7.67	91.31	111.40
429	28.08	8.98	0.93	-7.71	95.16	111.40
430	28.14	8.63	0.81	-7.70	93.50	111.40
431	28.21	8.88	0.68	-7.63	91.35	111.40
432	28.27	8.56	0.64	-7.58	89.95	111.40
433	28.34	8.26	0.62	-7.57	89.88	111.40
434	28.40	8.43	0.57	-7.54	87.68	111.40
435	28.47	8.81	0.52	-7.53	80.91	111.40
436	28.54	9.98	0.44	-7.47	72.71	111.40
437	28.60	12.11	0.52	-7.45	63.37	111.40
438	28.67	14.60	0.50	-7.44	57.77	114.60
439	28.73	14.01	0.39	-7.44	52.44	114.60
440	28.80	13.67	0.24	-7.42	50.27	114.60
441	28.86	12.69	0.23	-7.41	52.54	114.60
442	28.93	12.28	0.41	-7.40	57.36	114.60
443	29.00	12.90	0.48	-7.38	61.93	111.40
444	29.06	12.54	0.54	-7.37	63.58	111.40
445	29.13	12.63	0.57	-7.35	65.84	111.40
446	29.19	12.35	0.61	-7.35	67.49	111.40
447	29.26	12.31	0.66	-7.34	68.84	111.40
448	29.32	12.66	0.70	-7.32	67.49	111.40
449	29.39	13.67	0.65	-7.28	63.43	111.40
450	29.45	14.88	0.57	-7.25	56.73	114.60
451	29.52	17.63	0.56	-7.22	51.17	114.60

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
452	29.59	18.93	0.55	-7.18	46.19	114.60
453	29.65	20.60	0.49	-7.09	42.12	114.60
454	29.72	25.25	0.63	-6.64	40.26	114.60
455	29.78	24.68	0.69	-6.58	39.86	114.60
456	29.85	25.36	0.74	-6.54	40.74	114.60
457	29.91	26.17	0.81	-6.48	41.22	114.60
458	29.98	26.43	0.89	-6.42	42.44	114.60
459	30.04	25.75	0.97	-6.32	44.15	114.60
460	30.11	25.08	1.02	-6.29	46.46	114.60
461	30.18	23.24	1.01	-6.25	48.44	114.60
462	30.24	22.33	0.99	-6.22	50.08	111.40
463	30.31	21.87	0.98	-6.16	50.49	111.40
464	30.37	22.02	0.95	-6.08	49.77	114.60
465	30.44	22.52	0.89	-6.05	48.44	114.60
466	30.50	22.76	0.85	-5.93	48.61	114.60
467	30.57	21.45	0.92	-5.90	48.17	114.60
468	30.64	23.11	0.87	-5.81	42.99	114.60
469	30.70	33.13	0.88	-5.74	35.55	114.60
470	30.77	40.78	0.93	-5.73	30.64	114.60
471	30.83	43.51	1.03	-5.70	29.40	114.60
472	30.90	49.23	1.46	-5.57	30.53	114.60
473	30.96	49.09	1.76	-5.50	32.27	114.60
474	31.03	48.22	1.95	-5.51	34.64	114.60
475	31.09	45.73	2.08	-5.55	40.37	111.40
476	31.16	32.02	2.39	-5.66	47.12	111.40
477	31.23	32.76	2.75	-5.57	51.68	111.40
478	31.29	37.08	2.61	-5.51	47.93	111.40
479	31.36	42.27	2.38	-5.51	43.12	111.40
480	31.42	45.69	2.40	-5.58	40.72	111.40
481	31.49	45.07	2.50	-5.66	44.00	111.40
482	31.55	31.24	2.47	-5.81	51.09	111.40
483	31.62	24.53	2.34	-5.81	63.73	111.40
484	31.68	18.55	2.27	-5.71	75.19	111.40
485	31.75	14.77	2.12	-5.64	83.01	111.40
486	31.82	14.08	1.48	-5.51	85.05	111.40
487	31.88	13.50	1.28	-5.48	81.41	111.40
488	31.95	13.19	1.10	-5.44	78.27	111.40
489	32.01	13.76	0.94	-5.44	73.20	111.40
490	32.08	14.77	0.84	-5.35	65.35	111.40
491	32.14	17.24	0.72	-5.35	56.67	111.40
492	32.21	20.32	0.66	-5.28	49.77	114.60
493	32.28	23.10	0.76	-5.23	46.71	114.60
494	32.34	24.59	0.92	-5.23	48.22	114.60
495	32.41	22.47	1.08	-5.22	52.82	111.40
496	32.47	19.60	1.18	-5.19	60.33	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
497	32.54	16.74	1.25	-5.16	67.68	111.40
498	32.60	15.40	1.25	-5.16	74.40	111.40
499	32.67	13.50	1.18	-5.05	79.27	111.40
500	32.73	12.29	1.10	-5.00	82.92	111.40
501	32.80	11.77	0.98	-4.96	84.97	111.40
502	32.87	10.99	0.89	-4.92	83.85	111.40
503	32.93	11.33	0.76	-4.87	80.74	111.40
504	33.00	11.72	0.65	-4.81	74.53	111.40
505	33.06	12.44	0.53	-4.76	68.59	111.40
506	33.13	13.35	0.51	-4.65	59.85	114.60
507	33.19	16.97	0.47	-4.50	31.53	114.60
508	33.26	56.59	0.40	-4.35	18.23	117.80
509	33.32	73.93	0.48	-4.36	12.38	120.90
510	33.39	76.66	0.54	-4.44	11.95	120.90
511	33.46	77.20	0.67	-4.83	12.82	120.90
512	33.52	76.05	0.76	-4.87	13.72	120.90
513	33.59	74.71	0.76	-4.89	16.01	120.90
514	33.65	54.02	0.76	-4.97	19.44	117.80
515	33.72	50.42	0.96	-5.09	25.27	117.80
516	33.78	39.71	0.95	-5.22	30.67	114.60
517	33.85	33.83	1.08	-5.26	39.36	114.60
518	33.92	27.31	1.47	-4.70	47.40	111.40
519	33.98	26.08	1.59	-4.58	53.12	111.40
520	34.05	25.89	1.51	-4.57	52.36	111.40
521	34.11	29.24	1.52	-4.23	51.64	111.40
522	34.18	29.47	1.83	-3.97	49.87	111.40
523	34.24	33.21	1.94	-3.89	47.67	111.40
524	34.31	38.11	1.94	-3.86	42.80	111.40
525	34.37	45.04	1.97	-3.99	40.70	114.60
526	34.44	42.76	2.17	-4.00	40.62	114.60
527	34.51	42.28	2.33	-4.07	43.05	111.40
528	34.57	41.44	2.54	-4.05	44.23	111.40
529	34.64	42.62	2.63	-4.05	42.12	111.40
530	34.70	53.86	2.77	-3.92	38.37	111.40
531	34.77	59.20	2.70	-3.84	35.38	114.60
532	34.83	59.05	2.74	-4.03	34.14	114.60
533	34.90	55.95	2.31	-4.25	34.52	114.60
534	34.96	49.51	2.03	-4.25	36.22	114.60
535	35.03	40.01	1.80	-4.28	43.10	114.60
536	35.10	23.21	1.66	-4.32	53.01	111.40
537	35.16	19.29	1.37	-4.31	67.49	111.40
538	35.23	15.20	1.32	-4.19	74.48	111.40
539	35.29	13.38	1.12	-3.93	81.47	111.40
540	35.36	12.64	1.10	-3.84	83.02	111.40
541	35.42	12.99	1.05	-3.77	81.67	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
542	35.49	13.77	1.01	-3.68	78.20	111.40
543	35.56	13.84	0.88	-3.63	74.14	111.40
544	35.62	14.33	0.78	-3.57	70.11	111.40
545	35.69	14.36	0.64	-3.48	67.55	111.40
546	35.75	13.93	0.62	-3.44	67.03	111.40
547	35.82	13.42	0.62	-3.38	68.94	111.40
548	35.88	12.77	0.62	-3.31	70.71	111.40
549	35.95	12.46	0.59	-3.23	71.46	111.40
550	36.01	12.61	0.57	-3.15	70.55	111.40
551	36.08	12.90	0.55	-3.00	68.75	111.40
552	36.15	13.38	0.54	-2.91	67.00	111.40
553	36.21	13.65	0.54	-2.83	65.18	111.40
554	36.28	14.24	0.54	-2.74	63.76	114.60
555	36.34	14.66	0.55	-2.68	62.82	114.60
556	36.41	14.77	0.57	-2.62	63.35	114.60
557	36.47	14.72	0.64	-2.48	64.82	111.40
558	36.54	14.48	0.67	-2.41	66.33	111.40
559	36.60	14.44	0.68	-2.32	67.06	111.40
560	36.67	14.59	0.69	-2.25	66.65	111.40
561	36.74	14.94	0.68	-2.17	65.81	111.40
562	36.80	15.36	0.70	-2.04	64.93	111.40
563	36.87	15.56	0.71	-1.96	63.83	111.40
564	36.93	16.25	0.71	-1.87	63.03	111.40
565	37.00	16.23	0.71	-1.80	62.72	111.40
566	37.06	15.90	0.71	-1.74	63.95	111.40
567	37.13	15.38	0.74	-1.70	66.24	111.40
568	37.20	14.55	0.75	-1.60	69.19	111.40
569	37.26	13.79	0.75	-1.58	72.28	111.40
570	37.33	13.20	0.76	-1.55	76.54	111.40
571	37.39	11.85	0.78	-1.54	81.39	111.40
572	37.46	11.05	0.78	-1.48	85.56	111.40
573	37.52	10.95	0.76	-1.42	87.17	111.40
574	37.59	10.68	0.71	-1.32	87.36	111.40
575	37.65	10.38	0.67	-1.26	86.48	111.40
576	37.72	10.59	0.62	-1.17	82.15	111.40
577	37.79	11.96	0.56	-1.07	76.02	111.40
578	37.85	12.67	0.51	-1.00	70.20	111.40
579	37.92	13.15	0.48	-0.93	64.64	114.60
580	37.98	15.43	0.50	0.00	60.01	114.60
581	38.05	17.20	0.56	0.23	57.00	114.60
582	38.11	17.11	0.56	0.32	55.35	114.60
583	38.18	18.01	0.56	0.51	52.95	114.60
584	38.24	20.76	0.62	0.64	50.51	114.60
585	38.31	20.79	0.60	1.01	43.38	114.60
586	38.38	30.98	0.65	1.23	36.45	114.60

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
587	38.44	40.61	0.84	1.33	28.97	114.60
588	38.51	52.90	0.88	1.42	27.45	114.60
589	38.57	50.86	1.22	0.84	25.59	117.80
590	38.64	65.45	1.48	-0.78	27.53	114.60
591	38.70	53.63	1.54	-7.90	33.20	114.60
592	38.77	33.81	2.13	-8.87	46.41	111.40
593	38.84	26.75	2.59	-8.83	59.90	111.40
594	38.90	29.42	2.71	-8.64	57.82	111.40
595	38.97	41.48	2.71	-8.45	45.49	111.40
596	39.03	60.13	2.47	-8.44	37.15	114.60
597	39.10	63.63	2.61	-8.44	26.10	114.60
598	39.16	113.79	2.46	-8.83	17.71	117.80
599	39.23	159.23	2.25	-8.44	12.74	120.90
600	39.29	193.90	3.52	-8.32	10.65	120.90
601	39.36	211.61	3.48	-9.35	10.06	120.90
602	39.43	221.33	3.44	-9.24	8.74	120.90
603	39.49	253.92	3.50	-9.22	7.98	120.90
604	39.56	231.82	2.96	-9.27	7.44	124.10
605	39.62	225.91	2.80	-9.43	7.91	124.10
606	39.69	203.43	2.86	-9.22	8.20	124.10
607	39.75	184.22	2.11	-9.09	8.63	124.10
608	39.82	168.71	1.84	-8.70	9.38	120.90
609	39.88	148.28	2.19	-9.15	11.96	120.90
610	39.95	111.47	2.23	-9.03	16.13	117.80
611	40.02	103.60	2.76	-9.14	20.26	117.80
612	40.08	100.25	3.05	-9.16	23.03	114.60
613	40.15	96.44	3.44	-9.25	24.86	114.60
614	40.21	90.86	3.33	-9.08	27.34	114.60
615	40.28	83.90	3.78	-9.18	30.15	114.60
616	40.34	75.36	3.87	-9.24	32.88	130.50
617	40.41	72.79	3.72	-9.27	34.29	130.50
618	40.48	72.97	3.73	-9.28	34.00	130.50
619	40.54	71.62	3.29	-9.31	34.06	130.50
620	40.61	67.37	3.23	-9.32	34.67	130.50
621	40.67	65.48	3.39	-9.32	36.62	130.50
622	40.74	60.15	3.35	-9.31	39.32	111.40
623	40.80	52.58	3.25	-9.31	42.84	111.40
624	40.87	45.48	3.03	-9.34	47.42	111.40
625	40.93	39.95	3.07	-9.38	52.50	111.40
626	41.00	35.04	3.06	-9.34	57.23	111.40
627	41.07	31.67	2.79	-9.35	64.36	111.40
628	41.13	21.57	2.40	-9.34	72.80	111.40
629	41.20	17.56	2.09	-9.32	84.36	111.40
630	41.26	15.65	1.90	-9.32	89.98	111.40
631	41.33	14.84	1.79	-9.31	92.04	111.40

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
632	41.39	14.27	1.55	-9.29	91.20	111.40
633	41.46	13.90	1.25	-9.28	88.88	111.40
634	41.52	13.58	1.09	-9.27	85.48	111.40
635	41.59	13.75	0.94	-9.24	82.00	111.40
636	41.66	14.10	0.85	-9.27	77.44	111.40
637	41.72	14.66	0.74	-9.22	72.61	111.40
638	41.79	15.90	0.73	-9.21	68.51	111.40
639	41.85	16.75	0.75	-9.16	62.89	111.40
640	41.92	20.05	0.75	-9.12	58.15	114.60
641	41.98	21.43	0.75	-9.12	53.97	114.60
642	42.05	22.36	0.76	-9.09	51.67	114.60
643	42.12	24.20	0.81	-8.66	49.72	114.60
644	42.18	24.89	0.77	-8.57	49.10	114.60
645	42.25	24.86	0.88	-8.56	49.56	114.60
646	42.31	25.40	0.98	-8.53	50.84	114.60
647	42.38	25.89	1.07	-8.51	53.19	114.60
648	42.44	23.99	1.19	-8.50	55.95	111.40
649	42.51	23.38	1.25	-8.47	59.25	111.40
650	42.57	22.77	1.30	-8.42	60.69	111.40
651	42.64	22.68	1.28	-8.40	61.32	111.40
652	42.71	22.62	1.26	-8.38	61.12	111.40
653	42.77	22.70	1.24	-8.32	60.54	111.40
654	42.84	22.99	1.21	-8.34	60.84	111.40
655	42.90	21.68	1.19	-8.32	61.49	111.40
656	42.97	21.14	1.15	-8.27	63.11	111.40
657	43.03	20.33	1.13	-8.25	64.16	111.40
658	43.10	19.82	1.11	-8.24	66.30	111.40
659	43.16	18.21	1.08	-8.19	69.35	111.40
660	43.23	16.65	1.05	-8.19	72.50	111.40
661	43.30	16.34	1.02	-8.18	73.84	111.40
662	43.36	15.83	0.88	-8.11	72.65	111.40
663	43.43	15.96	0.79	-8.08	70.44	111.40
664	43.49	16.06	0.72	-8.08	68.73	111.40
665	43.56	15.68	0.67	-8.02	67.80	111.40
666	43.62	15.59	0.65	-7.98	66.89	111.40
667	43.69	15.78	0.60	-7.96	65.22	114.60
668	43.76	16.01	0.54	-7.89	63.39	114.60
669	43.82	16.12	0.53	-7.86	62.33	114.60
670	43.89	16.12	0.53	-7.83	61.06	114.60
671	43.95	17.12	0.53	-7.77	59.18	114.60
672	44.02	18.02	0.53	-7.74	57.20	114.60
673	44.08	18.41	0.54	-7.71	56.24	114.60
674	44.15	18.75	0.57	-7.61	55.97	114.60
675	44.21	19.02	0.59	-7.57	55.46	114.60
676	44.28	19.93	0.62	-7.48	55.20	114.60

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
677	44.35	19.87	0.64	-7.48	56.04	114.60
678	44.41	18.99	0.67	-7.42	58.48	114.60
679	44.48	17.96	0.70	-7.37	61.95	114.60
680	44.54	17.02	0.73	-7.28	65.34	111.40
681	44.61	16.21	0.73	-7.24	67.79	111.40
682	44.67	16.36	0.77	-7.19	68.56	111.40
683	44.74	17.12	0.83	-7.15	68.47	111.40
684	44.80	17.15	0.84	-7.13	67.85	111.40
685	44.87	17.29	0.81	-7.09	66.51	111.40
686	44.94	17.76	0.74	-7.00	63.72	111.40
687	45.00	18.90	0.71	-6.93	60.06	114.60
688	45.07	20.31	0.71	-6.89	56.18	114.60
689	45.13	22.43	0.73	-6.86	53.81	114.60
690	45.20	22.53	0.74	-6.80	52.25	114.60
691	45.26	23.41	0.77	-6.76	51.66	114.60
692	45.33	24.37	0.81	-6.67	50.38	114.60
693	45.40	25.95	0.85	-6.63	49.98	114.60
694	45.46	26.01	0.93	-6.60	51.61	114.60
695	45.53	23.10	0.95	-6.55	54.63	114.60
696	45.59	22.68	1.00	-6.51	58.07	114.60
697	45.66	21.91	1.03	-6.48	59.93	111.40
698	45.72	21.24	1.02	-6.45	60.85	111.40
699	45.79	21.15	0.96	-6.44	61.13	111.40
700	45.85	21.15	0.98	-6.42	61.62	111.40
701	45.92	20.57	1.01	-6.39	62.31	111.40
702	45.99	20.61	0.99	-6.35	62.49	111.40
703	46.05	20.72	0.95	-6.32	59.69	111.40
704	46.12	24.16	1.01	-5.79	58.30	114.60
705	46.18	22.83	1.02	-5.76	57.54	114.60
706	46.25	22.43	1.01	-5.71	57.84	114.60
707	46.31	23.67	1.00	-5.67	56.18	114.60
708	46.38	24.65	0.95	-5.57	52.53	114.60
709	46.44	25.61	0.75	-5.51	49.75	114.60
710	46.51	25.47	0.74	-5.45	47.49	114.60
711	46.58	26.01	0.73	-5.37	46.19	114.60
712	46.64	27.57	0.71	-5.31	45.47	114.60
713	46.71	26.94	0.74	-5.26	45.47	114.60
714	46.77	26.22	0.74	-5.21	46.07	114.60
715	46.84	26.85	0.74	-5.00	45.06	114.60
716	46.90	29.34	0.76	-4.86	39.36	114.60
717	46.97	39.89	0.75	-4.76	33.81	114.60
718	47.04	46.27	0.86	-4.70	29.81	114.60
719	47.10	51.64	1.04	-4.73	29.24	114.60
720	47.17	57.91	1.48	-4.63	28.97	114.60
721	47.23	63.98	1.70	-4.58	28.66	114.60

:: Field input data :: (continued)

Point ID	Depth (ft)	q_c (tsf)	f_s (tsf)	u (psi)	Fines content (%)	Unit weight (pcf)
722	47.30	69.30	1.92	-4.51	26.64	114.60
723	47.36	84.60	2.15	-4.47	24.67	114.60
724	47.43	94.97	2.44	-4.41	22.31	117.80
725	47.49	108.75	2.65	-4.34	20.05	117.80
726	47.56	127.44	2.77	-4.22	16.89	117.80
727	47.63	156.03	2.77	-4.10	11.31	120.90
728	47.69	254.22	2.77	-3.92	6.56	124.10
729	47.76	445.40	5.07	-5.93	3.69	124.10
730	47.82	544.33	5.07	-5.93	2.56	127.30
731	47.89	567.63	5.14	-6.18	1.91	127.30
732	47.95	575.51	5.06	-6.24	1.66	127.30
733	48.02	588.89	4.91	-6.13	1.51	127.30
734	48.08	606.65	4.91	-6.06	1.27	127.30

Abbreviations

Depth: Depth from free surface, at which CPT was performed (ft)
q_c: Measured cone resistance (tsf)
f_s: Sleeve friction resistance (tsf)
u: Pore pressure (psi)
Fines content: Percentage of fines in soil (%)
Unit weight: Bulk soil unit weight (pcf)

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data ::

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
2	0.07	0.00	0.00	0.00	1.00	0.31	1.09	0.29	1.00	2.00	No
3	0.13	0.01	0.00	0.01	1.00	0.31	1.09	0.29	1.00	2.00	No
4	0.20	0.01	0.00	0.01	1.00	0.31	1.09	0.29	1.00	2.00	No
5	0.26	0.02	0.00	0.02	1.00	0.31	1.09	0.29	1.00	2.00	No
6	0.33	0.02	0.00	0.02	1.00	0.31	1.09	0.29	1.00	2.00	No
7	0.39	0.02	0.00	0.02	1.00	0.31	1.09	0.29	1.00	2.00	No
8	0.46	0.03	0.00	0.03	1.00	0.31	1.09	0.29	1.00	2.00	No
9	0.52	0.03	0.00	0.03	1.00	0.31	1.09	0.29	1.00	2.00	No
10	0.59	0.04	0.00	0.04	1.00	0.31	1.09	0.29	1.00	2.00	No
11	0.66	0.04	0.00	0.04	1.00	0.31	1.09	0.29	1.00	2.00	No
12	0.72	0.04	0.00	0.04	1.00	0.31	1.09	0.29	1.00	2.00	No
13	0.79	0.05	0.00	0.05	1.00	0.31	1.09	0.29	1.00	2.00	No
14	0.85	0.05	0.00	0.05	1.00	0.31	1.09	0.29	1.00	2.00	No
15	0.92	0.05	0.00	0.05	1.00	0.31	1.09	0.29	1.00	2.00	No
16	0.98	0.06	0.00	0.06	1.00	0.31	1.09	0.29	1.00	2.00	No
17	1.05	0.06	0.00	0.06	1.00	0.31	1.09	0.29	1.00	2.00	No
18	1.12	0.07	0.00	0.07	1.00	0.31	1.09	0.29	1.00	2.00	No
19	1.18	0.07	0.00	0.07	1.00	0.31	1.09	0.29	1.00	2.00	No
20	1.25	0.07	0.00	0.07	1.00	0.31	1.09	0.29	1.00	2.00	No
21	1.31	0.08	0.00	0.08	1.00	0.31	1.09	0.29	1.00	2.00	No
22	1.38	0.08	0.00	0.08	1.00	0.31	1.09	0.29	1.00	2.00	No
23	1.44	0.09	0.00	0.09	1.00	0.31	1.09	0.29	1.00	2.00	No
24	1.51	0.09	0.00	0.09	1.00	0.31	1.09	0.29	1.00	2.00	No
25	1.57	0.09	0.00	0.09	1.00	0.31	1.09	0.29	1.00	2.00	No
26	1.64	0.10	0.00	0.10	1.00	0.31	1.09	0.29	1.00	2.00	No
27	1.71	0.10	0.00	0.10	1.00	0.31	1.09	0.29	1.00	2.00	No
28	1.77	0.10	0.00	0.10	1.00	0.31	1.09	0.29	1.00	2.00	No
29	1.84	0.11	0.00	0.11	1.00	0.31	1.09	0.29	1.00	2.00	No
30	1.90	0.11	0.00	0.11	1.00	0.31	1.09	0.29	1.00	2.00	No
31	1.97	0.12	0.00	0.12	1.00	0.31	1.09	0.29	1.00	2.00	No
32	2.03	0.12	0.00	0.12	1.00	0.31	1.09	0.29	1.00	2.00	No
33	2.10	0.12	0.00	0.12	1.00	0.31	1.09	0.29	1.00	2.00	No
34	2.16	0.13	0.00	0.13	1.00	0.31	1.09	0.29	1.00	2.00	No
35	2.23	0.13	0.00	0.13	1.00	0.31	1.09	0.29	1.00	2.00	No
36	2.30	0.13	0.00	0.13	1.00	0.31	1.09	0.29	1.00	2.00	No
37	2.36	0.14	0.00	0.14	1.00	0.31	1.09	0.29	1.00	2.00	No
38	2.43	0.14	0.00	0.14	1.00	0.31	1.09	0.29	1.00	2.00	No
39	2.49	0.15	0.00	0.15	1.00	0.31	1.09	0.29	1.00	2.00	No
40	2.56	0.15	0.00	0.15	1.00	0.31	1.09	0.29	1.00	2.00	No
41	2.62	0.15	0.00	0.15	1.00	0.31	1.09	0.29	1.00	2.00	No
42	2.69	0.16	0.00	0.16	1.00	0.31	1.09	0.29	1.00	2.00	No
43	2.76	0.16	0.00	0.16	1.00	0.31	1.09	0.29	1.00	2.00	No
44	2.82	0.16	0.00	0.16	1.00	0.31	1.09	0.29	1.00	2.00	No
45	2.89	0.17	0.00	0.17	1.00	0.31	1.09	0.29	1.00	2.00	No
46	2.95	0.17	0.00	0.17	1.00	0.31	1.09	0.29	1.00	2.00	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
47	3.02	0.18	0.00	0.18	0.99	0.31	1.09	0.29	1.00	2.00	No
48	3.08	0.18	0.00	0.18	0.99	0.31	1.09	0.29	1.00	2.00	No
49	3.15	0.18	0.00	0.18	0.99	0.31	1.09	0.29	1.00	2.00	No
50	3.21	0.19	0.00	0.19	0.99	0.31	1.09	0.29	1.00	2.00	No
51	3.28	0.19	0.00	0.19	0.99	0.31	1.09	0.29	1.00	2.00	No
52	3.35	0.19	0.00	0.19	0.99	0.31	1.09	0.29	1.00	2.00	No
53	3.41	0.20	0.00	0.20	0.99	0.31	1.09	0.29	1.00	2.00	No
54	3.48	0.20	0.00	0.20	0.99	0.31	1.09	0.29	1.00	2.00	No
55	3.54	0.20	0.00	0.20	0.99	0.31	1.09	0.29	1.00	2.00	No
56	3.61	0.21	0.00	0.21	0.99	0.31	1.09	0.29	1.00	2.00	No
57	3.67	0.21	0.00	0.21	0.99	0.31	1.09	0.29	1.00	2.00	No
58	3.74	0.22	0.00	0.22	0.99	0.31	1.09	0.29	1.00	2.00	No
59	3.80	0.22	0.00	0.22	0.99	0.31	1.09	0.29	1.00	2.00	No
60	3.87	0.22	0.00	0.22	0.99	0.31	1.09	0.29	1.00	2.00	No
61	3.94	0.23	0.00	0.23	0.99	0.31	1.09	0.29	1.00	2.00	No
62	4.00	0.23	0.00	0.23	0.99	0.31	1.09	0.29	1.00	2.00	No
63	4.07	0.23	0.00	0.23	0.99	0.31	1.09	0.29	1.00	2.00	No
64	4.13	0.24	0.00	0.24	0.99	0.31	1.09	0.28	1.00	2.00	No
65	4.20	0.24	0.00	0.24	0.99	0.31	1.09	0.28	1.00	2.00	No
66	4.26	0.24	0.00	0.24	0.99	0.31	1.09	0.28	1.00	2.00	No
67	4.33	0.25	0.00	0.25	0.99	0.31	1.09	0.28	1.00	2.00	No
68	4.40	0.25	0.00	0.25	0.99	0.31	1.09	0.28	1.00	2.00	No
69	4.46	0.26	0.00	0.26	0.99	0.31	1.09	0.28	1.00	2.00	No
70	4.53	0.26	0.00	0.26	0.99	0.31	1.09	0.28	1.00	2.00	No
71	4.59	0.26	0.00	0.26	0.99	0.31	1.09	0.28	1.00	2.00	No
72	4.66	0.27	0.00	0.27	0.99	0.31	1.09	0.28	1.00	2.00	No
73	4.72	0.27	0.00	0.27	0.99	0.31	1.09	0.28	1.00	2.00	No
74	4.79	0.27	0.00	0.27	0.99	0.31	1.09	0.28	1.00	2.00	No
75	4.85	0.28	0.00	0.28	0.99	0.31	1.09	0.28	1.00	2.00	No
76	4.92	0.28	0.00	0.28	0.99	0.31	1.09	0.28	1.00	2.00	No
77	4.99	0.29	0.00	0.29	0.99	0.31	1.09	0.28	1.00	2.00	No
78	5.05	0.29	0.00	0.29	0.99	0.31	1.09	0.29	1.00	0.31	No
79	5.12	0.29	0.00	0.29	0.99	0.31	1.09	0.29	1.00	0.31	No
80	5.18	0.30	0.01	0.29	0.99	0.31	1.09	0.29	1.00	0.31	No
81	5.25	0.30	0.01	0.29	0.99	0.32	1.09	0.29	1.00	0.31	No
82	5.31	0.30	0.01	0.29	0.99	0.32	1.09	0.29	1.00	0.32	No
83	5.38	0.31	0.01	0.30	0.99	0.32	1.09	0.30	1.00	0.32	No
84	5.44	0.31	0.01	0.30	0.99	0.32	1.09	0.30	1.00	0.32	No
85	5.51	0.31	0.02	0.30	0.99	0.33	1.09	0.30	1.00	0.32	No
86	5.58	0.32	0.02	0.30	0.99	0.33	1.09	0.30	1.00	0.32	No
87	5.64	0.32	0.02	0.30	0.99	0.33	1.09	0.30	1.00	0.33	No
88	5.71	0.33	0.02	0.30	0.99	0.33	1.09	0.30	1.00	0.33	No
89	5.77	0.33	0.02	0.30	0.99	0.33	1.09	0.31	1.00	0.33	No
90	5.84	0.33	0.03	0.31	0.99	0.33	1.09	0.31	1.00	0.33	No
91	5.90	0.34	0.03	0.31	0.99	0.34	1.09	0.31	1.00	0.33	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
92	5.97	0.34	0.03	0.31	0.99	0.34	1.09	0.31	1.00	0.33	No
93	6.04	0.34	0.03	0.31	0.99	0.34	1.09	0.31	1.00	0.34	No
94	6.10	0.35	0.03	0.31	0.99	0.34	1.09	0.31	1.00	0.34	No
95	6.17	0.35	0.04	0.31	0.99	0.34	1.09	0.32	1.00	0.34	No
96	6.23	0.35	0.04	0.32	0.99	0.35	1.09	0.32	1.00	0.34	No
97	6.30	0.36	0.04	0.32	0.99	0.35	1.09	0.32	1.00	0.34	No
98	6.36	0.36	0.04	0.32	0.99	0.35	1.09	0.32	1.00	0.35	No
99	6.43	0.37	0.04	0.32	0.99	0.35	1.09	0.32	1.00	0.35	No
100	6.49	0.37	0.05	0.32	0.99	0.35	1.09	0.32	1.00	0.35	No
101	6.56	0.37	0.05	0.32	0.99	0.35	1.09	0.33	1.00	0.35	No
102	6.63	0.38	0.05	0.33	0.99	0.36	1.09	0.33	1.00	0.35	No
103	6.69	0.38	0.05	0.33	0.99	0.36	1.09	0.33	1.00	0.35	No
104	6.76	0.38	0.05	0.33	0.99	0.36	1.09	0.33	1.00	0.36	No
105	6.82	0.39	0.06	0.33	0.99	0.36	1.09	0.33	1.00	0.36	No
106	6.89	0.39	0.06	0.33	0.99	0.36	1.09	0.33	1.00	0.36	No
107	6.95	0.40	0.06	0.33	0.99	0.36	1.09	0.33	1.00	0.36	No
108	7.02	0.40	0.06	0.34	0.99	0.37	1.09	0.34	1.00	0.36	No
109	7.08	0.40	0.06	0.34	0.99	0.37	1.09	0.34	1.00	0.34	No
110	7.15	0.41	0.07	0.34	0.99	0.37	1.09	0.34	1.00	0.34	No
111	7.22	0.41	0.07	0.34	0.99	0.37	1.09	0.34	1.00	0.34	No
112	7.28	0.41	0.07	0.34	0.99	0.37	1.09	0.34	1.00	0.34	No
113	7.35	0.42	0.07	0.35	0.98	0.37	1.09	0.34	1.00	0.34	No
114	7.41	0.42	0.08	0.35	0.98	0.37	1.09	0.34	1.00	0.34	No
115	7.48	0.43	0.08	0.35	0.98	0.38	1.09	0.35	1.00	0.37	No
116	7.54	0.43	0.08	0.35	0.98	0.38	1.09	0.35	1.00	0.37	No
117	7.61	0.43	0.08	0.35	0.98	0.38	1.09	0.35	1.00	0.37	No
118	7.68	0.44	0.08	0.35	0.98	0.38	1.09	0.35	1.00	0.38	No
119	7.74	0.44	0.09	0.35	0.98	0.38	1.09	0.35	1.00	0.38	No
120	7.81	0.44	0.09	0.36	0.98	0.38	1.09	0.35	1.00	0.38	No
121	7.87	0.45	0.09	0.36	0.98	0.38	1.09	0.35	1.00	0.38	No
122	7.94	0.45	0.09	0.36	0.98	0.39	1.09	0.35	1.00	0.38	No
123	8.00	0.45	0.09	0.36	0.98	0.39	1.09	0.36	1.00	0.38	No
124	8.07	0.46	0.10	0.36	0.98	0.39	1.09	0.36	1.00	0.38	No
125	8.13	0.46	0.10	0.36	0.98	0.39	1.09	0.36	1.00	0.38	No
126	8.20	0.47	0.10	0.37	0.98	0.39	1.09	0.36	1.00	0.39	No
127	8.27	0.47	0.10	0.37	0.98	0.39	1.09	0.36	1.00	0.39	No
128	8.33	0.47	0.10	0.37	0.98	0.39	1.09	0.36	1.00	0.39	No
129	8.40	0.48	0.11	0.37	0.98	0.39	1.09	0.36	1.00	0.39	No
130	8.46	0.48	0.11	0.37	0.98	0.40	1.09	0.36	1.00	0.39	No
131	8.53	0.48	0.11	0.37	0.98	0.40	1.09	0.37	1.00	0.39	No
132	8.59	0.49	0.11	0.38	0.98	0.40	1.09	0.37	1.00	0.39	No
133	8.66	0.49	0.11	0.38	0.98	0.40	1.09	0.37	1.00	0.39	No
134	8.72	0.50	0.12	0.38	0.98	0.40	1.09	0.37	1.00	0.40	No
135	8.79	0.50	0.12	0.38	0.98	0.40	1.09	0.37	1.00	0.40	No
136	8.86	0.50	0.12	0.38	0.98	0.40	1.09	0.37	1.00	0.40	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
137	8.92	0.51	0.12	0.38	0.98	0.40	1.09	0.37	1.00	0.40	No
138	8.99	0.51	0.12	0.39	0.98	0.41	1.09	0.37	1.00	0.40	No
139	9.05	0.51	0.13	0.39	0.98	0.41	1.09	0.37	1.00	0.40	No
140	9.12	0.52	0.13	0.39	0.98	0.41	1.09	0.37	1.00	0.40	No
141	9.18	0.52	0.13	0.39	0.98	0.41	1.09	0.38	1.00	0.40	No
142	9.25	0.52	0.13	0.39	0.98	0.41	1.09	0.38	1.00	0.41	No
143	9.32	0.53	0.13	0.39	0.98	0.41	1.09	0.38	1.00	0.41	No
144	9.38	0.53	0.14	0.40	0.98	0.41	1.09	0.38	1.00	0.41	No
145	9.45	0.54	0.14	0.40	0.98	0.41	1.09	0.38	1.00	0.41	No
146	9.51	0.54	0.14	0.40	0.98	0.41	1.09	0.38	1.00	0.41	No
147	9.58	0.54	0.14	0.40	0.98	0.41	1.09	0.38	1.00	0.41	No
148	9.64	0.55	0.14	0.40	0.98	0.42	1.09	0.38	1.00	0.41	No
149	9.71	0.55	0.15	0.40	0.98	0.42	1.09	0.38	1.00	0.41	No
150	9.77	0.55	0.15	0.40	0.98	0.42	1.09	0.38	1.00	0.41	No
151	9.84	0.56	0.15	0.41	0.98	0.42	1.09	0.39	1.00	0.41	No
152	9.91	0.56	0.15	0.41	0.98	0.42	1.09	0.39	1.00	0.42	No
153	9.97	0.56	0.16	0.41	0.98	0.42	1.09	0.39	1.00	0.42	No
154	10.04	0.57	0.16	0.41	0.98	0.42	1.09	0.39	1.00	0.42	No
155	10.10	0.57	0.16	0.41	0.98	0.42	1.09	0.39	1.00	0.42	No
156	10.17	0.58	0.16	0.41	0.98	0.42	1.09	0.39	1.00	0.42	No
157	10.23	0.58	0.16	0.42	0.98	0.43	1.09	0.39	1.00	0.42	No
158	10.30	0.58	0.17	0.42	0.98	0.43	1.09	0.39	1.00	0.42	No
159	10.36	0.59	0.17	0.42	0.98	0.43	1.09	0.39	1.00	0.42	No
160	10.43	0.59	0.17	0.42	0.98	0.43	1.09	0.39	1.00	0.42	No
161	10.50	0.59	0.17	0.42	0.98	0.43	1.09	0.39	1.00	0.42	No
162	10.56	0.60	0.17	0.42	0.98	0.43	1.09	0.40	1.00	0.43	No
163	10.63	0.60	0.18	0.43	0.98	0.43	1.09	0.40	1.00	0.43	No
164	10.69	0.60	0.18	0.43	0.98	0.43	1.09	0.40	1.00	0.43	No
165	10.76	0.61	0.18	0.43	0.98	0.43	1.09	0.40	1.00	0.43	No
166	10.82	0.61	0.18	0.43	0.98	0.43	1.09	0.40	1.00	0.43	No
167	10.89	0.62	0.18	0.43	0.98	0.43	1.09	0.40	1.00	0.43	No
168	10.96	0.62	0.19	0.43	0.98	0.44	1.09	0.40	1.00	0.43	No
169	11.02	0.62	0.19	0.44	0.98	0.44	1.09	0.40	1.00	0.43	No
170	11.09	0.63	0.19	0.44	0.98	0.44	1.09	0.40	1.00	0.43	No
171	11.15	0.63	0.19	0.44	0.98	0.44	1.09	0.40	1.00	0.43	No
172	11.22	0.63	0.19	0.44	0.98	0.44	1.09	0.40	1.00	0.43	No
173	11.28	0.64	0.20	0.44	0.98	0.44	1.09	0.40	1.00	0.44	No
174	11.35	0.64	0.20	0.44	0.98	0.44	1.09	0.41	1.00	0.44	No
175	11.41	0.65	0.20	0.45	0.98	0.44	1.09	0.41	1.00	0.44	No
176	11.48	0.65	0.20	0.45	0.98	0.44	1.09	0.41	1.00	0.44	No
177	11.55	0.65	0.20	0.45	0.98	0.44	1.09	0.41	1.00	0.44	No
178	11.61	0.66	0.21	0.45	0.98	0.44	1.09	0.41	1.00	0.44	No
179	11.68	0.66	0.21	0.45	0.98	0.44	1.09	0.41	1.00	0.44	No
180	11.74	0.66	0.21	0.45	0.98	0.45	1.09	0.41	1.00	0.44	No
181	11.81	0.67	0.21	0.46	0.98	0.45	1.09	0.41	1.00	0.44	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
182	11.87	0.67	0.21	0.46	0.98	0.45	1.09	0.41	1.00	0.44	No
183	11.94	0.68	0.22	0.46	0.98	0.45	1.09	0.41	1.00	0.44	No
184	12.00	0.68	0.22	0.46	0.97	0.45	1.09	0.41	1.00	0.44	No
185	12.07	0.68	0.22	0.46	0.97	0.45	1.09	0.41	1.00	0.44	No
186	12.14	0.69	0.22	0.46	0.97	0.45	1.09	0.41	1.00	0.45	No
187	12.20	0.69	0.22	0.47	0.97	0.45	1.09	0.41	1.00	0.45	No
188	12.27	0.69	0.23	0.47	0.97	0.45	1.09	0.42	1.00	0.45	No
189	12.33	0.70	0.23	0.47	0.97	0.45	1.09	0.42	1.00	0.45	No
190	12.40	0.70	0.23	0.47	0.97	0.45	1.09	0.42	1.00	0.42	No
191	12.46	0.71	0.23	0.47	0.97	0.45	1.09	0.42	1.00	2.00	Yes
192	12.53	0.71	0.23	0.47	0.97	0.45	1.09	0.42	1.00	2.00	Yes
193	12.60	0.71	0.24	0.48	0.97	0.46	1.09	0.42	1.00	2.00	Yes
194	12.66	0.72	0.24	0.48	0.97	0.46	1.09	0.42	1.00	2.00	Yes
195	12.73	0.72	0.24	0.48	0.97	0.46	1.09	0.42	1.00	2.00	Yes
196	12.79	0.72	0.24	0.48	0.97	0.46	1.09	0.42	1.00	0.42	No
197	12.86	0.73	0.25	0.48	0.97	0.46	1.09	0.42	1.00	0.42	No
198	12.92	0.73	0.25	0.48	0.97	0.46	1.09	0.42	1.00	0.42	No
199	12.99	0.74	0.25	0.49	0.97	0.46	1.09	0.42	1.00	0.42	No
200	13.05	0.74	0.25	0.49	0.97	0.46	1.09	0.42	1.00	0.42	No
201	13.12	0.74	0.25	0.49	0.97	0.46	1.09	0.42	1.00	0.42	No
202	13.19	0.75	0.26	0.49	0.97	0.46	1.09	0.42	1.00	0.42	No
203	13.25	0.75	0.26	0.49	0.97	0.46	1.09	0.42	1.00	0.42	No
204	13.32	0.76	0.26	0.50	0.97	0.46	1.09	0.43	1.00	0.43	No
205	13.38	0.76	0.26	0.50	0.97	0.46	1.09	0.43	1.00	0.43	No
206	13.45	0.76	0.26	0.50	0.97	0.46	1.09	0.43	1.00	0.43	No
207	13.51	0.77	0.27	0.50	0.97	0.46	1.09	0.43	1.00	0.43	No
208	13.58	0.77	0.27	0.50	0.97	0.46	1.09	0.43	1.00	0.43	No
209	13.64	0.77	0.27	0.50	0.97	0.47	1.09	0.43	1.00	0.43	No
210	13.71	0.78	0.27	0.51	0.97	0.47	1.09	0.43	1.00	0.43	No
211	13.78	0.78	0.27	0.51	0.97	0.47	1.09	0.43	1.00	0.43	No
212	13.84	0.79	0.28	0.51	0.97	0.47	1.09	0.43	1.00	0.43	No
213	13.91	0.79	0.28	0.51	0.97	0.47	1.09	0.43	1.00	0.43	No
214	13.97	0.79	0.28	0.51	0.97	0.47	1.09	0.43	1.00	0.43	No
215	14.04	0.80	0.28	0.52	0.97	0.47	1.09	0.43	1.00	0.43	No
216	14.10	0.80	0.28	0.52	0.97	0.47	1.09	0.43	1.00	0.43	No
217	14.17	0.81	0.29	0.52	0.97	0.47	1.09	0.43	1.00	0.43	No
218	14.24	0.81	0.29	0.52	0.97	0.47	1.09	0.43	1.00	0.43	No
219	14.30	0.81	0.29	0.52	0.97	0.47	1.09	0.43	1.00	0.43	No
220	14.37	0.82	0.29	0.53	0.97	0.47	1.09	0.43	1.00	0.43	No
221	14.43	0.82	0.29	0.53	0.97	0.47	1.09	0.43	1.00	0.43	No
222	14.50	0.83	0.30	0.53	0.97	0.47	1.09	0.43	1.00	0.43	No
223	14.56	0.83	0.30	0.53	0.97	0.47	1.09	0.43	1.00	0.43	No
224	14.63	0.83	0.30	0.53	0.97	0.47	1.09	0.44	1.00	0.44	No
225	14.69	0.84	0.30	0.54	0.97	0.47	1.09	0.44	1.00	0.44	No
226	14.76	0.84	0.30	0.54	0.97	0.47	1.09	0.44	1.00	0.44	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
227	14.83	0.85	0.31	0.54	0.97	0.47	1.09	0.44	1.00	0.44	No
228	14.89	0.85	0.31	0.54	0.97	0.47	1.09	0.44	1.00	0.44	No
229	14.96	0.85	0.31	0.54	0.97	0.48	1.09	0.44	1.00	0.44	No
230	15.02	0.86	0.31	0.54	0.97	0.48	1.09	0.44	1.00	0.44	No
231	15.09	0.86	0.31	0.55	0.97	0.48	1.09	0.44	1.00	0.44	No
232	15.15	0.87	0.32	0.55	0.97	0.48	1.09	0.44	1.00	0.44	No
233	15.22	0.87	0.32	0.55	0.97	0.48	1.09	0.44	1.00	0.44	No
234	15.28	0.87	0.32	0.55	0.97	0.48	1.09	0.44	1.00	0.44	No
235	15.35	0.88	0.32	0.55	0.97	0.48	1.09	0.44	1.00	0.44	No
236	15.42	0.88	0.33	0.56	0.97	0.48	1.09	0.44	1.00	0.44	No
237	15.48	0.89	0.33	0.56	0.97	0.48	1.09	0.44	1.00	0.44	No
238	15.55	0.89	0.33	0.56	0.97	0.48	1.09	0.44	1.00	0.44	No
239	15.61	0.89	0.33	0.56	0.97	0.48	1.09	0.44	1.00	0.44	No
240	15.68	0.90	0.33	0.56	0.97	0.48	1.09	0.44	1.00	0.44	No
241	15.74	0.90	0.34	0.57	0.97	0.48	1.09	0.44	1.00	0.44	No
242	15.81	0.90	0.34	0.57	0.97	0.48	1.09	0.44	1.00	0.44	No
243	15.88	0.91	0.34	0.57	0.97	0.48	1.09	0.44	1.00	0.44	No
244	15.94	0.91	0.34	0.57	0.97	0.48	1.09	0.44	1.00	0.44	No
245	16.01	0.92	0.34	0.57	0.97	0.48	1.09	0.44	1.00	0.44	No
246	16.07	0.92	0.35	0.58	0.97	0.48	1.09	0.44	1.00	0.44	No
247	16.14	0.93	0.35	0.58	0.97	0.48	1.09	0.44	1.00	0.44	No
248	16.20	0.93	0.35	0.58	0.97	0.48	1.09	0.44	1.00	0.44	No
249	16.27	0.93	0.35	0.58	0.97	0.48	1.09	0.45	1.00	0.45	No
250	16.33	0.94	0.35	0.58	0.97	0.48	1.09	0.45	1.00	0.45	No
251	16.40	0.94	0.36	0.59	0.97	0.48	1.09	0.45	1.00	0.45	No
252	16.47	0.95	0.36	0.59	0.97	0.48	1.09	0.45	1.00	0.45	No
253	16.53	0.95	0.36	0.59	0.97	0.48	1.09	0.45	1.00	0.45	No
254	16.60	0.95	0.36	0.59	0.97	0.49	1.09	0.45	1.00	0.45	No
255	16.66	0.96	0.36	0.59	0.96	0.49	1.09	0.45	1.00	0.45	No
256	16.73	0.96	0.37	0.60	0.96	0.49	1.09	0.45	1.00	0.45	No
257	16.79	0.97	0.37	0.60	0.96	0.49	1.09	0.45	1.00	0.45	No
258	16.86	0.97	0.37	0.60	0.96	0.49	1.09	0.45	1.00	0.45	No
259	16.92	0.97	0.37	0.60	0.96	0.49	1.09	0.45	1.00	0.45	No
260	16.99	0.98	0.37	0.60	0.96	0.49	1.09	0.45	1.00	0.45	No
261	17.06	0.98	0.38	0.61	0.96	0.49	1.09	0.45	1.00	0.45	No
262	17.12	0.99	0.38	0.61	0.96	0.49	1.09	0.45	1.00	0.45	No
263	17.19	0.99	0.38	0.61	0.96	0.49	1.09	0.45	1.00	0.45	No
264	17.25	0.99	0.38	0.61	0.96	0.49	1.09	0.45	1.00	0.45	No
265	17.32	1.00	0.38	0.61	0.96	0.49	1.09	0.45	1.00	0.45	No
266	17.38	1.00	0.39	0.62	0.96	0.49	1.09	0.45	1.00	0.45	No
267	17.45	1.01	0.39	0.62	0.96	0.49	1.09	0.45	1.00	0.45	No
268	17.52	1.01	0.39	0.62	0.96	0.49	1.09	0.45	1.00	0.45	No
269	17.58	1.01	0.39	0.62	0.96	0.49	1.09	0.45	1.00	0.45	No
270	17.65	1.02	0.39	0.62	0.96	0.49	1.09	0.45	1.00	0.45	No
271	17.71	1.02	0.40	0.63	0.96	0.49	1.09	0.45	1.00	0.45	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR*	Belongs to transition layer
272	17.78	1.03	0.40	0.63	0.96	0.49	1.09	0.45	1.00	0.45	No
273	17.84	1.03	0.40	0.63	0.96	0.49	1.09	0.45	1.00	0.45	No
274	17.91	1.04	0.40	0.63	0.96	0.49	1.09	0.45	1.00	0.45	No
275	17.97	1.04	0.40	0.64	0.96	0.49	1.09	0.45	1.00	0.45	No
276	18.04	1.04	0.41	0.64	0.96	0.49	1.09	0.45	1.00	0.45	No
277	18.11	1.05	0.41	0.64	0.96	0.49	1.09	0.45	1.00	0.45	No
278	18.17	1.05	0.41	0.64	0.96	0.49	1.09	0.45	1.00	0.45	No
279	18.24	1.06	0.41	0.64	0.96	0.49	1.09	0.45	1.00	0.45	No
280	18.30	1.06	0.41	0.65	0.96	0.49	1.09	0.45	1.00	0.45	No
281	18.37	1.06	0.42	0.65	0.96	0.49	1.09	0.45	1.00	0.45	No
282	18.43	1.07	0.42	0.65	0.96	0.49	1.09	0.45	1.00	0.45	No
283	18.50	1.07	0.42	0.65	0.96	0.49	1.09	0.45	1.00	0.45	No
284	18.56	1.08	0.42	0.65	0.96	0.49	1.09	0.45	1.00	0.45	No
285	18.63	1.08	0.43	0.66	0.96	0.49	1.09	0.45	1.00	0.45	No
286	18.70	1.09	0.43	0.66	0.96	0.49	1.09	0.45	1.00	0.45	No
287	18.76	1.09	0.43	0.66	0.96	0.49	1.09	0.46	1.00	0.46	No
288	18.83	1.09	0.43	0.66	0.96	0.49	1.09	0.46	1.00	0.46	No
289	18.89	1.10	0.43	0.66	0.96	0.50	1.09	0.46	1.00	0.46	No
290	18.96	1.10	0.44	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
291	19.02	1.10	0.44	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
292	19.09	1.11	0.44	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
293	19.16	1.11	0.44	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
294	19.22	1.12	0.44	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
295	19.29	1.12	0.45	0.67	0.96	0.50	1.09	0.46	1.00	0.46	No
296	19.35	1.12	0.45	0.68	0.96	0.50	1.09	0.46	1.00	0.46	No
297	19.42	1.13	0.45	0.68	0.96	0.50	1.09	0.46	1.00	0.46	No
298	19.48	1.13	0.45	0.68	0.96	0.50	1.09	0.46	1.00	0.46	No
299	19.55	1.14	0.45	0.68	0.96	0.50	1.09	0.46	1.00	0.46	No
300	19.61	1.14	0.46	0.68	0.96	0.50	1.09	0.46	1.00	0.46	No
301	19.68	1.14	0.46	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
302	19.75	1.15	0.46	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
303	19.81	1.15	0.46	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
304	19.88	1.16	0.46	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
305	19.94	1.16	0.47	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
306	20.01	1.16	0.47	0.69	0.96	0.50	1.09	0.46	1.00	0.46	No
307	20.07	1.17	0.47	0.70	0.96	0.50	1.09	0.46	1.00	0.46	No
308	20.14	1.17	0.47	0.70	0.96	0.50	1.09	0.46	1.00	0.46	No
309	20.20	1.17	0.47	0.70	0.96	0.50	1.09	0.46	1.00	0.46	No
310	20.27	1.18	0.48	0.70	0.96	0.50	1.09	0.46	1.00	0.46	No
311	20.34	1.18	0.48	0.70	0.96	0.50	1.09	0.46	1.00	0.46	No
312	20.40	1.19	0.48	0.71	0.96	0.50	1.09	0.46	1.00	0.46	No
313	20.47	1.19	0.48	0.71	0.96	0.50	1.09	0.46	1.00	0.46	No
314	20.53	1.19	0.48	0.71	0.96	0.50	1.09	0.46	1.00	0.46	No
315	20.60	1.20	0.49	0.71	0.96	0.50	1.09	0.46	1.00	0.46	No
316	20.66	1.20	0.49	0.71	0.96	0.50	1.09	0.46	1.00	0.46	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
317	20.73	1.21	0.49	0.72	0.95	0.50	1.09	0.46	1.00	0.46	No
318	20.80	1.21	0.49	0.72	0.95	0.50	1.09	0.46	1.00	0.46	No
319	20.86	1.21	0.49	0.72	0.95	0.50	1.09	0.46	1.00	0.46	No
320	20.93	1.22	0.50	0.72	0.95	0.50	1.09	0.46	1.00	0.46	No
321	20.99	1.22	0.50	0.72	0.95	0.50	1.09	0.46	1.00	0.46	No
322	21.06	1.23	0.50	0.73	0.95	0.50	1.09	0.46	1.00	0.46	No
323	21.12	1.23	0.50	0.73	0.95	0.50	1.09	0.46	1.00	0.46	No
324	21.19	1.24	0.51	0.73	0.95	0.50	1.09	0.46	1.00	0.46	No
325	21.25	1.24	0.51	0.73	0.95	0.50	1.09	0.46	1.00	0.46	No
326	21.32	1.24	0.51	0.73	0.95	0.50	1.09	0.46	1.00	0.46	No
327	21.39	1.25	0.51	0.74	0.95	0.50	1.09	0.46	1.00	0.46	No
328	21.45	1.25	0.51	0.74	0.95	0.50	1.09	0.46	1.00	0.46	No
329	21.52	1.26	0.52	0.74	0.95	0.50	1.09	0.46	1.00	0.46	No
330	21.58	1.26	0.52	0.74	0.95	0.50	1.09	0.46	1.00	0.46	No
331	21.65	1.26	0.52	0.74	0.95	0.50	1.09	0.46	1.00	0.46	No
332	21.71	1.27	0.52	0.75	0.95	0.50	1.09	0.46	1.00	0.46	No
333	21.78	1.27	0.52	0.75	0.95	0.50	1.09	0.46	1.00	0.46	No
334	21.84	1.28	0.53	0.75	0.95	0.51	1.09	0.46	1.00	0.46	No
335	21.91	1.28	0.53	0.75	0.95	0.51	1.09	0.47	1.00	0.47	No
336	21.98	1.28	0.53	0.75	0.95	0.51	1.09	0.47	1.00	0.47	No
337	22.04	1.29	0.53	0.76	0.95	0.51	1.09	0.47	1.00	0.47	No
338	22.11	1.29	0.53	0.76	0.95	0.51	1.09	0.47	1.00	0.47	No
339	22.17	1.30	0.54	0.76	0.95	0.51	1.09	0.47	1.00	0.47	No
340	22.24	1.30	0.54	0.76	0.95	0.51	1.09	0.47	1.00	0.47	No
341	22.30	1.30	0.54	0.76	0.95	0.51	1.09	0.47	1.00	0.47	No
342	22.37	1.31	0.54	0.77	0.95	0.51	1.09	0.47	1.00	0.47	No
343	22.44	1.31	0.54	0.77	0.95	0.51	1.09	0.47	1.00	0.47	No
344	22.50	1.32	0.55	0.77	0.95	0.51	1.09	0.47	1.00	0.47	No
345	22.57	1.32	0.55	0.77	0.95	0.51	1.09	0.47	1.00	0.47	No
346	22.63	1.33	0.55	0.77	0.95	0.51	1.09	0.47	1.00	0.47	No
347	22.70	1.33	0.55	0.78	0.95	0.51	1.09	0.47	1.00	0.47	No
348	22.76	1.33	0.55	0.78	0.95	0.51	1.09	0.47	1.00	0.47	No
349	22.83	1.34	0.56	0.78	0.95	0.51	1.09	0.47	1.00	0.47	No
350	22.89	1.34	0.56	0.78	0.95	0.51	1.09	0.47	1.00	2.00	Yes
351	22.96	1.35	0.56	0.79	0.95	0.51	1.09	0.47	1.00	2.00	Yes
352	23.03	1.35	0.56	0.79	0.95	0.51	1.09	0.47	1.00	2.00	Yes
353	23.09	1.35	0.56	0.79	0.95	0.51	1.09	0.47	1.00	2.00	Yes
354	23.16	1.36	0.57	0.79	0.95	0.51	1.09	0.47	1.00	2.00	Yes
355	23.22	1.36	0.57	0.79	0.95	0.51	1.09	0.47	1.00	2.00	Yes
356	23.29	1.36	0.57	0.79	0.95	0.51	1.09	0.47	1.00	0.50	No
357	23.35	1.37	0.57	0.79	0.95	0.51	1.09	0.47	1.00	0.50	No
358	23.42	1.37	0.57	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No
359	23.48	1.37	0.58	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No
360	23.55	1.38	0.58	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No
361	23.62	1.38	0.58	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
362	23.68	1.39	0.58	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No
363	23.75	1.39	0.59	0.80	0.95	0.51	1.09	0.47	1.00	0.50	No
364	23.81	1.39	0.59	0.81	0.95	0.51	1.09	0.47	1.00	0.50	No
365	23.88	1.40	0.59	0.81	0.95	0.51	1.09	0.47	1.00	0.50	No
366	23.94	1.40	0.59	0.81	0.95	0.51	1.09	0.47	1.00	0.50	No
367	24.01	1.40	0.59	0.81	0.95	0.51	1.09	0.47	1.00	0.51	No
368	24.08	1.41	0.60	0.81	0.94	0.51	1.09	0.47	1.00	0.51	No
369	24.14	1.41	0.60	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
370	24.21	1.42	0.60	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
371	24.27	1.42	0.60	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
372	24.34	1.42	0.60	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
373	24.40	1.43	0.61	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
374	24.47	1.43	0.61	0.82	0.94	0.51	1.09	0.47	1.00	0.51	No
375	24.53	1.43	0.61	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
376	24.60	1.44	0.61	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
377	24.67	1.44	0.61	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
378	24.73	1.45	0.62	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
379	24.80	1.45	0.62	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
380	24.86	1.45	0.62	0.83	0.94	0.51	1.09	0.47	1.00	0.51	No
381	24.93	1.46	0.62	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
382	24.99	1.46	0.62	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
383	25.06	1.46	0.63	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
384	25.12	1.47	0.63	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
385	25.19	1.47	0.63	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
386	25.26	1.48	0.63	0.84	0.94	0.51	1.09	0.47	1.00	0.51	No
387	25.32	1.48	0.63	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
388	25.39	1.48	0.64	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
389	25.45	1.49	0.64	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
390	25.52	1.49	0.64	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
391	25.58	1.49	0.64	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
392	25.65	1.50	0.64	0.85	0.94	0.51	1.09	0.47	1.00	0.51	No
393	25.72	1.50	0.65	0.86	0.94	0.51	1.09	0.47	1.00	0.51	No
394	25.78	1.51	0.65	0.86	0.94	0.51	1.09	0.47	1.00	0.51	No
395	25.85	1.51	0.65	0.86	0.94	0.51	1.09	0.47	1.00	0.51	No
396	25.91	1.51	0.65	0.86	0.94	0.51	1.09	0.47	1.00	0.51	No
397	25.98	1.52	0.65	0.86	0.94	0.52	1.09	0.47	1.00	0.51	No
398	26.04	1.52	0.66	0.86	0.94	0.52	1.09	0.47	1.00	0.51	No
399	26.11	1.52	0.66	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
400	26.17	1.53	0.66	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
401	26.24	1.53	0.66	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
402	26.31	1.54	0.66	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
403	26.37	1.54	0.67	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
404	26.44	1.54	0.67	0.87	0.94	0.52	1.09	0.47	1.00	0.51	No
405	26.50	1.55	0.67	0.87	0.94	0.52	1.09	0.48	1.00	0.51	No
406	26.57	1.55	0.67	0.88	0.94	0.52	1.09	0.48	1.00	0.51	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
407	26.63	1.55	0.67	0.88	0.94	0.52	1.09	0.48	1.00	0.51	No
408	26.70	1.56	0.68	0.88	0.94	0.52	1.09	0.48	1.00	0.51	No
409	26.76	1.56	0.68	0.88	0.94	0.52	1.09	0.48	1.00	0.51	No
410	26.83	1.56	0.68	0.88	0.93	0.52	1.09	0.48	1.00	0.51	No
411	26.90	1.57	0.68	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
412	26.96	1.57	0.69	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
413	27.03	1.58	0.69	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
414	27.09	1.58	0.69	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
415	27.16	1.58	0.69	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
416	27.22	1.59	0.69	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
417	27.29	1.59	0.70	0.89	0.93	0.52	1.09	0.48	1.00	0.51	No
418	27.36	1.59	0.70	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
419	27.42	1.60	0.70	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
420	27.49	1.60	0.70	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
421	27.55	1.60	0.70	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
422	27.62	1.61	0.71	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
423	27.68	1.61	0.71	0.90	0.93	0.52	1.09	0.48	1.00	0.51	No
424	27.75	1.62	0.71	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
425	27.81	1.62	0.71	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
426	27.88	1.62	0.71	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
427	27.95	1.63	0.72	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
428	28.01	1.63	0.72	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
429	28.08	1.63	0.72	0.91	0.93	0.52	1.09	0.48	1.00	0.51	No
430	28.14	1.64	0.72	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
431	28.21	1.64	0.72	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
432	28.27	1.64	0.73	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
433	28.34	1.65	0.73	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
434	28.40	1.65	0.73	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
435	28.47	1.66	0.73	0.92	0.93	0.52	1.09	0.48	1.00	0.51	No
436	28.54	1.66	0.73	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
437	28.60	1.66	0.74	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
438	28.67	1.67	0.74	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
439	28.73	1.67	0.74	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
440	28.80	1.67	0.74	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
441	28.86	1.68	0.74	0.93	0.93	0.52	1.09	0.48	1.00	0.51	No
442	28.93	1.68	0.75	0.94	0.93	0.52	1.09	0.48	1.00	0.51	No
443	29.00	1.69	0.75	0.94	0.93	0.52	1.09	0.48	1.00	0.51	No
444	29.06	1.69	0.75	0.94	0.93	0.52	1.09	0.48	1.00	0.51	No
445	29.13	1.69	0.75	0.94	0.92	0.52	1.09	0.48	1.00	0.51	No
446	29.19	1.70	0.75	0.94	0.92	0.52	1.09	0.48	1.00	0.51	No
447	29.26	1.70	0.76	0.94	0.92	0.52	1.09	0.48	1.00	0.51	No
448	29.32	1.70	0.76	0.94	0.92	0.52	1.09	0.48	1.00	0.51	No
449	29.39	1.71	0.76	0.95	0.92	0.52	1.09	0.48	1.00	0.51	No
450	29.45	1.71	0.76	0.95	0.92	0.52	1.09	0.48	1.00	0.51	No
451	29.52	1.72	0.77	0.95	0.92	0.52	1.09	0.48	1.00	0.51	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
452	29.59	1.72	0.77	0.95	0.92	0.52	1.09	0.48	1.00	0.51	No
453	29.65	1.72	0.77	0.95	0.92	0.52	1.09	0.48	1.00	0.51	No
454	29.72	1.73	0.77	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
455	29.78	1.73	0.77	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
456	29.85	1.73	0.78	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
457	29.91	1.74	0.78	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
458	29.98	1.74	0.78	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
459	30.04	1.74	0.78	0.96	0.92	0.52	1.09	0.48	1.00	0.51	No
460	30.11	1.75	0.78	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
461	30.18	1.75	0.79	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
462	30.24	1.76	0.79	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
463	30.31	1.76	0.79	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
464	30.37	1.76	0.79	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
465	30.44	1.77	0.79	0.97	0.92	0.52	1.09	0.48	1.00	0.51	No
466	30.50	1.77	0.80	0.98	0.92	0.52	1.09	0.48	1.00	0.51	No
467	30.57	1.78	0.80	0.98	0.92	0.52	1.09	0.48	1.00	0.51	No
468	30.64	1.78	0.80	0.98	0.92	0.52	1.09	0.48	1.00	0.51	No
469	30.70	1.78	0.80	0.98	0.92	0.52	1.09	0.48	1.00	0.51	No
470	30.77	1.79	0.80	0.98	0.92	0.52	1.09	0.48	1.00	0.48	No
471	30.83	1.79	0.81	0.98	0.92	0.52	1.09	0.48	1.00	0.48	No
472	30.90	1.79	0.81	0.99	0.92	0.52	1.09	0.48	1.00	0.48	No
473	30.96	1.80	0.81	0.99	0.92	0.52	1.09	0.48	1.00	0.48	No
474	31.03	1.80	0.81	0.99	0.92	0.52	1.09	0.48	1.00	0.48	No
475	31.09	1.80	0.81	0.99	0.91	0.52	1.09	0.48	1.00	0.51	No
476	31.16	1.81	0.82	0.99	0.91	0.52	1.09	0.48	1.00	0.51	No
477	31.23	1.81	0.82	0.99	0.91	0.52	1.09	0.48	1.00	0.51	No
478	31.29	1.82	0.82	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
479	31.36	1.82	0.82	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
480	31.42	1.82	0.82	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
481	31.49	1.83	0.83	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
482	31.55	1.83	0.83	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
483	31.62	1.83	0.83	1.00	0.91	0.52	1.09	0.48	1.00	0.51	No
484	31.68	1.84	0.83	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
485	31.75	1.84	0.83	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
486	31.82	1.85	0.84	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
487	31.88	1.85	0.84	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
488	31.95	1.85	0.84	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
489	32.01	1.86	0.84	1.01	0.91	0.52	1.09	0.48	1.00	0.51	No
490	32.08	1.86	0.84	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
491	32.14	1.86	0.85	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
492	32.21	1.87	0.85	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
493	32.28	1.87	0.85	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
494	32.34	1.87	0.85	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
495	32.41	1.88	0.86	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No
496	32.47	1.88	0.86	1.02	0.91	0.52	1.09	0.48	1.00	0.51	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
497	32.54	1.89	0.86	1.03	0.91	0.52	1.09	0.48	1.00	0.51	No
498	32.60	1.89	0.86	1.03	0.91	0.52	1.09	0.48	1.00	0.51	No
499	32.67	1.89	0.86	1.03	0.91	0.52	1.09	0.48	1.00	0.51	No
500	32.73	1.90	0.87	1.03	0.91	0.52	1.09	0.48	1.00	0.51	No
501	32.80	1.90	0.87	1.03	0.90	0.52	1.09	0.48	1.00	0.51	No
502	32.87	1.90	0.87	1.03	0.90	0.52	1.09	0.48	1.00	0.51	No
503	32.93	1.91	0.87	1.04	0.90	0.52	1.09	0.48	1.00	0.51	No
504	33.00	1.91	0.87	1.04	0.90	0.52	1.09	0.48	1.00	0.51	No
505	33.06	1.91	0.88	1.04	0.90	0.52	1.09	0.48	1.00	0.51	No
506	33.13	1.92	0.88	1.04	0.90	0.52	1.09	0.48	1.00	0.51	No
507	33.19	1.92	0.88	1.04	0.90	0.52	1.09	0.48	1.00	0.48	No
508	33.26	1.93	0.88	1.04	0.90	0.52	1.09	0.48	1.00	0.48	No
509	33.32	1.93	0.88	1.05	0.90	0.52	1.09	0.48	1.00	0.48	No
510	33.39	1.93	0.89	1.05	0.90	0.52	1.09	0.48	1.00	2.00	Yes
511	33.46	1.94	0.89	1.05	0.90	0.52	1.09	0.48	1.00	2.00	Yes
512	33.52	1.94	0.89	1.05	0.90	0.52	1.09	0.48	1.00	2.00	Yes
513	33.59	1.95	0.89	1.05	0.90	0.52	1.09	0.48	1.00	2.00	Yes
514	33.65	1.95	0.89	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
515	33.72	1.95	0.90	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
516	33.78	1.96	0.90	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
517	33.85	1.96	0.90	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
518	33.92	1.97	0.90	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
519	33.98	1.97	0.90	1.06	0.90	0.52	1.09	0.48	1.00	2.00	Yes
520	34.05	1.97	0.91	1.07	0.90	0.52	1.09	0.48	1.00	0.51	No
521	34.11	1.98	0.91	1.07	0.90	0.52	1.09	0.48	1.00	0.51	No
522	34.18	1.98	0.91	1.07	0.90	0.52	1.09	0.48	1.00	0.51	No
523	34.24	1.98	0.91	1.07	0.90	0.52	1.09	0.48	1.00	0.51	No
524	34.31	1.99	0.91	1.07	0.90	0.52	1.09	0.48	1.00	0.51	No
525	34.37	1.99	0.92	1.07	0.89	0.52	1.09	0.48	1.00	0.51	No
526	34.44	1.99	0.92	1.08	0.89	0.52	1.09	0.48	1.00	0.51	No
527	34.51	2.00	0.92	1.08	0.89	0.52	1.09	0.48	1.00	0.51	No
528	34.57	2.00	0.92	1.08	0.89	0.52	1.09	0.48	0.99	0.51	No
529	34.64	2.01	0.92	1.08	0.89	0.52	1.09	0.48	0.99	0.51	No
530	34.70	2.01	0.93	1.08	0.89	0.52	1.09	0.48	0.99	0.51	No
531	34.77	2.01	0.93	1.08	0.89	0.52	1.09	0.48	0.99	0.51	No
532	34.83	2.02	0.93	1.09	0.89	0.52	1.09	0.48	0.99	0.48	No
533	34.90	2.02	0.93	1.09	0.89	0.52	1.09	0.48	0.99	0.48	No
534	34.96	2.02	0.93	1.09	0.89	0.52	1.09	0.48	0.99	0.51	No
535	35.03	2.03	0.94	1.09	0.89	0.52	1.09	0.48	0.99	0.51	No
536	35.10	2.03	0.94	1.09	0.89	0.52	1.09	0.48	0.99	0.52	No
537	35.16	2.04	0.94	1.09	0.89	0.52	1.09	0.48	0.99	0.52	No
538	35.23	2.04	0.94	1.10	0.89	0.52	1.09	0.48	0.99	0.52	No
539	35.29	2.04	0.95	1.10	0.89	0.52	1.09	0.47	0.99	0.52	No
540	35.36	2.05	0.95	1.10	0.89	0.52	1.09	0.47	0.99	0.52	No
541	35.42	2.05	0.95	1.10	0.89	0.52	1.09	0.47	0.99	0.52	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
542	35.49	2.05	0.95	1.10	0.89	0.52	1.09	0.47	0.99	0.52	No
543	35.56	2.06	0.95	1.10	0.89	0.52	1.09	0.47	0.99	0.52	No
544	35.62	2.06	0.96	1.11	0.89	0.52	1.09	0.47	0.99	0.52	No
545	35.69	2.06	0.96	1.11	0.89	0.52	1.09	0.47	0.99	0.52	No
546	35.75	2.07	0.96	1.11	0.89	0.52	1.09	0.47	0.99	0.52	No
547	35.82	2.07	0.96	1.11	0.88	0.52	1.09	0.47	0.99	0.52	No
548	35.88	2.08	0.96	1.11	0.88	0.52	1.09	0.47	0.99	0.52	No
549	35.95	2.08	0.97	1.11	0.88	0.51	1.09	0.47	0.99	0.52	No
550	36.01	2.08	0.97	1.11	0.88	0.51	1.09	0.47	0.99	0.52	No
551	36.08	2.09	0.97	1.12	0.88	0.51	1.09	0.47	0.99	0.52	No
552	36.15	2.09	0.97	1.12	0.88	0.51	1.09	0.47	0.99	0.52	No
553	36.21	2.09	0.97	1.12	0.88	0.51	1.09	0.47	0.99	0.52	No
554	36.28	2.10	0.98	1.12	0.88	0.51	1.09	0.47	0.99	0.52	No
555	36.34	2.10	0.98	1.12	0.88	0.51	1.09	0.47	0.99	0.52	No
556	36.41	2.11	0.98	1.13	0.88	0.51	1.09	0.47	0.99	0.52	No
557	36.47	2.11	0.98	1.13	0.88	0.51	1.09	0.47	0.99	0.52	No
558	36.54	2.11	0.98	1.13	0.88	0.51	1.09	0.47	0.98	0.52	No
559	36.60	2.12	0.99	1.13	0.88	0.51	1.09	0.47	0.98	0.52	No
560	36.67	2.12	0.99	1.13	0.88	0.51	1.09	0.47	0.98	0.52	No
561	36.74	2.12	0.99	1.13	0.88	0.51	1.09	0.47	0.98	0.52	No
562	36.80	2.13	0.99	1.13	0.88	0.51	1.09	0.47	0.98	0.52	No
563	36.87	2.13	0.99	1.14	0.88	0.51	1.09	0.47	0.98	0.52	No
564	36.93	2.13	1.00	1.14	0.88	0.51	1.09	0.47	0.98	0.52	No
565	37.00	2.14	1.00	1.14	0.88	0.51	1.09	0.47	0.98	0.52	No
566	37.06	2.14	1.00	1.14	0.88	0.51	1.09	0.47	0.98	0.52	No
567	37.13	2.15	1.00	1.14	0.87	0.51	1.09	0.47	0.98	0.52	No
568	37.20	2.15	1.00	1.14	0.87	0.51	1.09	0.47	0.98	0.52	No
569	37.26	2.15	1.01	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
570	37.33	2.16	1.01	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
571	37.39	2.16	1.01	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
572	37.46	2.16	1.01	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
573	37.52	2.17	1.01	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
574	37.59	2.17	1.02	1.15	0.87	0.51	1.09	0.47	0.98	0.52	No
575	37.65	2.17	1.02	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
576	37.72	2.18	1.02	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
577	37.79	2.18	1.02	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
578	37.85	2.19	1.02	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
579	37.92	2.19	1.03	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
580	37.98	2.19	1.03	1.16	0.87	0.51	1.09	0.47	0.98	0.52	No
581	38.05	2.20	1.03	1.17	0.87	0.51	1.09	0.47	0.98	2.00	Yes
582	38.11	2.20	1.03	1.17	0.87	0.51	1.09	0.47	0.98	2.00	Yes
583	38.18	2.20	1.04	1.17	0.87	0.51	1.09	0.47	0.98	2.00	Yes
584	38.24	2.21	1.04	1.17	0.87	0.51	1.09	0.47	0.98	2.00	Yes
585	38.31	2.21	1.04	1.17	0.87	0.51	1.09	0.47	0.98	2.00	Yes
586	38.38	2.22	1.04	1.17	0.86	0.51	1.09	0.47	0.98	2.00	Yes

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
587	38.44	2.22	1.04	1.18	0.86	0.51	1.09	0.47	0.98	2.00	Yes
588	38.51	2.22	1.05	1.18	0.86	0.51	1.09	0.47	0.98	2.00	Yes
589	38.57	2.23	1.05	1.18	0.86	0.51	1.09	0.47	0.97	2.00	Yes
590	38.64	2.23	1.05	1.18	0.86	0.51	1.09	0.47	0.97	2.00	Yes
591	38.70	2.23	1.05	1.18	0.86	0.51	1.09	0.47	0.97	2.00	Yes
592	38.77	2.24	1.05	1.18	0.86	0.51	1.09	0.47	0.97	2.00	Yes
593	38.84	2.24	1.06	1.19	0.86	0.51	1.09	0.47	0.97	0.52	No
594	38.90	2.25	1.06	1.19	0.86	0.51	1.09	0.47	0.97	2.00	Yes
595	38.97	2.25	1.06	1.19	0.86	0.51	1.09	0.47	0.97	2.00	Yes
596	39.03	2.25	1.06	1.19	0.86	0.51	1.09	0.47	0.97	2.00	Yes
597	39.10	2.26	1.06	1.19	0.86	0.51	1.09	0.47	0.97	2.00	Yes
598	39.16	2.26	1.07	1.19	0.86	0.51	1.09	0.47	0.97	2.00	Yes
599	39.23	2.26	1.07	1.20	0.86	0.51	1.09	0.47	0.97	2.00	Yes
600	39.29	2.27	1.07	1.20	0.86	0.51	1.09	0.47	0.97	2.00	Yes
601	39.36	2.27	1.07	1.20	0.86	0.51	1.09	0.47	0.97	2.00	Yes
602	39.43	2.28	1.07	1.20	0.86	0.51	1.09	0.47	0.97	2.00	Yes
603	39.49	2.28	1.08	1.20	0.86	0.51	1.09	0.47	0.97	2.00	Yes
604	39.56	2.28	1.08	1.21	0.85	0.51	1.09	0.46	0.97	2.00	Yes
605	39.62	2.29	1.08	1.21	0.85	0.50	1.09	0.46	0.97	0.48	No
606	39.69	2.29	1.08	1.21	0.85	0.50	1.09	0.46	0.97	2.00	Yes
607	39.75	2.30	1.08	1.21	0.85	0.50	1.09	0.46	0.97	2.00	Yes
608	39.82	2.30	1.09	1.21	0.85	0.50	1.09	0.46	0.97	2.00	Yes
609	39.88	2.30	1.09	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
610	39.95	2.31	1.09	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
611	40.02	2.31	1.09	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
612	40.08	2.32	1.09	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
613	40.15	2.32	1.10	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
614	40.21	2.32	1.10	1.22	0.85	0.50	1.09	0.46	0.97	2.00	Yes
615	40.28	2.33	1.10	1.23	0.85	0.50	1.09	0.46	0.97	2.00	Yes
616	40.34	2.33	1.10	1.23	0.85	0.50	1.09	0.46	0.97	2.00	Yes
617	40.41	2.34	1.10	1.23	0.85	0.50	1.09	0.46	0.97	2.00	Yes
618	40.48	2.34	1.11	1.23	0.85	0.50	1.09	0.46	0.96	0.48	No
619	40.54	2.34	1.11	1.24	0.85	0.50	1.09	0.46	0.96	0.48	No
620	40.61	2.35	1.11	1.24	0.85	0.50	1.09	0.46	0.96	0.48	No
621	40.67	2.35	1.11	1.24	0.85	0.50	1.09	0.46	0.96	0.51	No
622	40.74	2.36	1.12	1.24	0.84	0.50	1.09	0.46	0.96	0.51	No
623	40.80	2.36	1.12	1.24	0.84	0.50	1.09	0.46	0.96	0.51	No
624	40.87	2.36	1.12	1.24	0.84	0.50	1.09	0.46	0.96	0.51	No
625	40.93	2.37	1.12	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
626	41.00	2.37	1.12	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
627	41.07	2.37	1.13	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
628	41.13	2.38	1.13	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
629	41.20	2.38	1.13	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
630	41.26	2.39	1.13	1.25	0.84	0.50	1.09	0.46	0.96	0.51	No
631	41.33	2.39	1.13	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
632	41.39	2.39	1.14	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No
633	41.46	2.40	1.14	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No
634	41.52	2.40	1.14	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No
635	41.59	2.40	1.14	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No
636	41.66	2.41	1.14	1.26	0.84	0.50	1.09	0.46	0.96	0.51	No
637	41.72	2.41	1.15	1.27	0.84	0.50	1.09	0.46	0.96	0.51	No
638	41.79	2.42	1.15	1.27	0.83	0.50	1.09	0.46	0.96	0.51	No
639	41.85	2.42	1.15	1.27	0.83	0.50	1.09	0.46	0.96	0.51	No
640	41.92	2.42	1.15	1.27	0.83	0.50	1.09	0.46	0.96	0.51	No
641	41.98	2.43	1.15	1.27	0.83	0.50	1.09	0.46	0.96	0.51	No
642	42.05	2.43	1.16	1.27	0.83	0.50	1.09	0.46	0.96	0.51	No
643	42.12	2.43	1.16	1.28	0.83	0.50	1.09	0.46	0.96	0.51	No
644	42.18	2.44	1.16	1.28	0.83	0.49	1.09	0.46	0.96	0.51	No
645	42.25	2.44	1.16	1.28	0.83	0.49	1.09	0.46	0.96	0.51	No
646	42.31	2.44	1.16	1.28	0.83	0.49	1.09	0.45	0.96	0.51	No
647	42.38	2.45	1.17	1.28	0.83	0.49	1.09	0.45	0.96	0.51	No
648	42.44	2.45	1.17	1.28	0.83	0.49	1.09	0.45	0.96	0.51	No
649	42.51	2.46	1.17	1.29	0.83	0.49	1.09	0.45	0.96	0.51	No
650	42.57	2.46	1.17	1.29	0.83	0.49	1.09	0.45	0.96	0.51	No
651	42.64	2.46	1.17	1.29	0.83	0.49	1.09	0.45	0.96	0.51	No
652	42.71	2.47	1.18	1.29	0.83	0.49	1.09	0.45	0.95	0.51	No
653	42.77	2.47	1.18	1.29	0.83	0.49	1.09	0.45	0.95	0.51	No
654	42.84	2.47	1.18	1.29	0.82	0.49	1.09	0.45	0.95	0.51	No
655	42.90	2.48	1.18	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
656	42.97	2.48	1.18	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
657	43.03	2.48	1.19	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
658	43.10	2.49	1.19	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
659	43.16	2.49	1.19	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
660	43.23	2.50	1.19	1.30	0.82	0.49	1.09	0.45	0.95	0.51	No
661	43.30	2.50	1.19	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
662	43.36	2.50	1.20	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
663	43.43	2.51	1.20	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
664	43.49	2.51	1.20	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
665	43.56	2.51	1.20	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
666	43.62	2.52	1.20	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
667	43.69	2.52	1.21	1.31	0.82	0.49	1.09	0.45	0.95	0.51	No
668	43.76	2.53	1.21	1.32	0.82	0.49	1.09	0.45	0.95	0.51	No
669	43.82	2.53	1.21	1.32	0.82	0.49	1.09	0.45	0.95	0.51	No
670	43.89	2.53	1.21	1.32	0.81	0.49	1.09	0.45	0.95	0.51	No
671	43.95	2.54	1.22	1.32	0.81	0.49	1.09	0.45	0.95	0.51	No
672	44.02	2.54	1.22	1.32	0.81	0.49	1.09	0.45	0.95	0.51	No
673	44.08	2.54	1.22	1.32	0.81	0.49	1.09	0.45	0.95	0.51	No
674	44.15	2.55	1.22	1.33	0.81	0.49	1.09	0.45	0.95	0.51	No
675	44.21	2.55	1.22	1.33	0.81	0.49	1.09	0.45	0.95	0.51	No
676	44.28	2.56	1.23	1.33	0.81	0.49	1.09	0.45	0.95	0.51	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
677	44.35	2.56	1.23	1.33	0.81	0.49	1.09	0.45	0.95	0.51	No
678	44.41	2.56	1.23	1.33	0.81	0.49	1.09	0.45	0.95	0.51	No
679	44.48	2.57	1.23	1.34	0.81	0.49	1.09	0.45	0.95	0.51	No
680	44.54	2.57	1.23	1.34	0.81	0.48	1.09	0.45	0.95	0.51	No
681	44.61	2.57	1.24	1.34	0.81	0.48	1.09	0.45	0.95	0.51	No
682	44.67	2.58	1.24	1.34	0.81	0.48	1.09	0.45	0.95	0.51	No
683	44.74	2.58	1.24	1.34	0.81	0.48	1.09	0.45	0.95	0.51	No
684	44.80	2.58	1.24	1.34	0.81	0.48	1.09	0.45	0.95	0.51	No
685	44.87	2.59	1.24	1.34	0.80	0.48	1.09	0.44	0.95	0.51	No
686	44.94	2.59	1.25	1.35	0.80	0.48	1.09	0.44	0.95	0.51	No
687	45.00	2.60	1.25	1.35	0.80	0.48	1.09	0.44	0.95	0.51	No
688	45.07	2.60	1.25	1.35	0.80	0.48	1.09	0.44	0.94	0.51	No
689	45.13	2.60	1.25	1.35	0.80	0.48	1.09	0.44	0.94	0.51	No
690	45.20	2.61	1.25	1.35	0.80	0.48	1.09	0.44	0.94	0.51	No
691	45.26	2.61	1.26	1.35	0.80	0.48	1.09	0.44	0.94	0.50	No
692	45.33	2.62	1.26	1.36	0.80	0.48	1.09	0.44	0.94	0.50	No
693	45.40	2.62	1.26	1.36	0.80	0.48	1.09	0.44	0.94	0.50	No
694	45.46	2.62	1.26	1.36	0.80	0.48	1.09	0.44	0.94	0.50	No
695	45.53	2.63	1.26	1.36	0.80	0.48	1.09	0.44	0.94	0.50	No
696	45.59	2.63	1.27	1.36	0.80	0.48	1.09	0.44	0.94	0.50	No
697	45.66	2.63	1.27	1.37	0.80	0.48	1.09	0.44	0.94	0.50	No
698	45.72	2.64	1.27	1.37	0.80	0.48	1.09	0.44	0.94	0.50	No
699	45.79	2.64	1.27	1.37	0.80	0.48	1.09	0.44	0.94	0.50	No
700	45.85	2.64	1.27	1.37	0.80	0.48	1.09	0.44	0.94	0.50	No
701	45.92	2.65	1.28	1.37	0.79	0.48	1.09	0.44	0.94	0.50	No
702	45.99	2.65	1.28	1.37	0.79	0.48	1.09	0.44	0.94	0.50	No
703	46.05	2.66	1.28	1.37	0.79	0.48	1.09	0.44	0.94	0.50	No
704	46.12	2.66	1.28	1.38	0.79	0.48	1.09	0.44	0.94	0.50	No
705	46.18	2.66	1.28	1.38	0.79	0.48	1.09	0.44	0.94	0.50	No
706	46.25	2.67	1.29	1.38	0.79	0.48	1.09	0.44	0.94	0.50	No
707	46.31	2.67	1.29	1.38	0.79	0.48	1.09	0.44	0.94	0.50	No
708	46.38	2.67	1.29	1.38	0.79	0.48	1.09	0.44	0.94	0.50	No
709	46.44	2.68	1.29	1.39	0.79	0.48	1.09	0.44	0.94	0.50	No
710	46.51	2.68	1.30	1.39	0.79	0.48	1.09	0.44	0.94	0.50	No
711	46.58	2.69	1.30	1.39	0.79	0.48	1.09	0.44	0.94	0.50	No
712	46.64	2.69	1.30	1.39	0.79	0.48	1.09	0.44	0.94	0.50	No
713	46.71	2.69	1.30	1.39	0.79	0.47	1.09	0.44	0.94	0.50	No
714	46.77	2.70	1.30	1.39	0.79	0.47	1.09	0.44	0.94	0.50	No
715	46.84	2.70	1.31	1.40	0.79	0.47	1.09	0.44	0.94	2.00	Yes
716	46.90	2.70	1.31	1.40	0.78	0.47	1.09	0.44	0.94	2.00	Yes
717	46.97	2.71	1.31	1.40	0.78	0.47	1.09	0.44	0.94	2.00	Yes
718	47.04	2.71	1.31	1.40	0.78	0.47	1.09	0.44	0.94	2.00	Yes
719	47.10	2.72	1.31	1.40	0.78	0.47	1.09	0.44	0.94	0.46	No
720	47.17	2.72	1.32	1.40	0.78	0.47	1.09	0.43	0.94	0.46	No
721	47.23	2.72	1.32	1.41	0.78	0.47	1.09	0.43	0.94	0.46	No

:: Cyclic Stress Ratio fully adjusted (CSR*) calculation data :: (continued)

Point ID	Depth (ft)	σ_v (tsf)	u (psi)	σ_v' (tsf)	r_d	CSR	MSF	CSR_{eq}	K_σ	CSR^*	Belongs to transition layer
722	47.30	2.73	1.32	1.41	0.78	0.47	1.09	0.43	0.94	0.46	No
723	47.36	2.73	1.32	1.41	0.78	0.47	1.09	0.43	0.94	0.46	No
724	47.43	2.73	1.32	1.41	0.78	0.47	1.09	0.43	0.94	0.46	No
725	47.49	2.74	1.33	1.41	0.78	0.47	1.09	0.43	0.94	0.46	No
726	47.56	2.74	1.33	1.41	0.78	0.47	1.09	0.43	0.93	0.46	No
727	47.63	2.75	1.33	1.42	0.78	0.47	1.09	0.43	0.93	0.46	No
728	47.69	2.75	1.33	1.42	0.78	0.47	1.09	0.43	0.93	0.46	No
729	47.76	2.75	1.33	1.42	0.78	0.47	1.09	0.43	0.93	0.46	No
730	47.82	2.76	1.34	1.42	0.78	0.47	1.09	0.43	0.93	0.46	No
731	47.89	2.76	1.34	1.42	0.77	0.47	1.09	0.43	0.93	0.46	No
732	47.95	2.77	1.34	1.43	0.77	0.47	1.09	0.43	0.93	0.46	No
733	48.02	2.77	1.34	1.43	0.77	0.47	1.09	0.43	0.93	0.46	No
734	48.08	2.78	1.34	1.43	0.77	0.47	1.09	0.43	0.93	0.46	No

Abbreviations

Depth:	Depth from free surface, at which CPT was performed (ft)
σ_v:	Total overburden pressure at test point (tsf)
u:	Water pressure at test point (psi)
σ_v':	Effective overburden pressure based on GWT during earthquake (tsf)
r_d:	Nonlinear shear mass factor
CSR:	Cyclic Stress Ratio
MSF:	Magnitude Scaling Factor
CSR_{eq}:	CSR adjusted for M=7.5
K_σ:	Effective overburden stress factor
CSR^*:	CSR fully adjusted

:: Cyclic Resistance Ratio (CRR) calculation data ::

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
2	24.37	1.10	0.26	0.50	368.88	1.00	368.88	4.00	No	No
3	31.36	1.26	0.43	0.50	348.34	1.00	348.34	4.00	No	No
4	42.06	1.31	0.54	0.50	374.89	1.00	374.89	4.00	No	No
5	53.18	1.31	0.60	0.50	414.95	1.00	414.95	4.00	No	No
6	61.38	1.38	0.74	0.50	424.49	1.00	424.49	4.00	No	No
7	66.64	1.46	0.95	0.50	423.62	1.00	423.62	4.00	No	No
8	68.85	1.55	1.16	0.50	402.71	1.00	402.71	4.00	No	No
9	70.12	1.61	1.34	0.50	386.12	1.00	386.12	4.00	No	No
10	70.38	1.66	1.51	0.51	375.16	1.01	379.64	4.00	No	No
11	71.68	1.70	1.65	0.52	370.04	1.04	383.37	4.00	No	No
12	74.57	1.71	1.74	0.52	373.82	1.05	391.39	4.00	No	No
13	78.36	1.71	1.75	0.52	375.00	1.05	392.94	4.00	No	No
14	80.68	1.72	1.74	0.52	372.21	1.05	390.30	4.00	No	No
15	82.92	1.72	1.76	0.52	368.94	1.05	388.23	4.00	No	No
16	85.88	1.73	1.80	0.52	371.71	1.06	392.63	4.00	No	No
17	88.39	1.74	1.88	0.53	374.05	1.07	399.17	4.00	No	No
18	89.12	1.77	2.02	0.54	372.60	1.09	404.54	4.00	No	No
19	89.03	1.80	2.19	0.55	372.72	1.11	412.50	4.00	No	No
20	87.85	1.83	2.37	0.56	366.45	1.13	415.19	4.00	No	No
21	86.17	1.88	2.66	0.57	362.93	1.17	424.81	4.00	No	No
22	82.95	1.94	3.04	0.59	352.80	1.22	432.17	4.00	No	No
23	80.57	1.98	3.37	0.60	345.95	1.28	441.20	4.00	No	No
24	78.20	2.01	3.57	0.61	333.84	1.31	438.36	4.00	No	No
25	76.85	2.03	3.66	0.61	324.25	1.33	432.73	4.00	No	No
26	75.68	2.04	3.73	0.62	314.12	1.35	425.31	4.00	No	No
27	75.06	2.05	3.80	0.62	306.51	1.37	420.80	4.00	No	No
28	74.52	2.06	3.82	0.62	299.32	1.38	413.90	4.00	No	No
29	73.77	2.06	3.82	0.63	290.70	1.39	405.14	4.00	No	No
30	73.04	2.07	3.80	0.63	282.97	1.40	396.15	4.00	No	No
31	70.89	2.09	3.93	0.63	272.29	1.43	390.66	4.00	No	No
32	68.58	2.11	4.10	0.64	262.67	1.48	388.31	4.00	No	No
33	66.24	2.13	4.24	0.65	251.87	1.52	383.04	4.00	No	No
34	64.29	2.15	4.33	0.65	242.61	1.55	377.06	4.00	No	No
35	62.31	2.17	4.41	0.66	232.68	1.59	369.57	4.00	No	No
36	59.95	2.17	4.28	0.66	219.66	1.59	349.82	4.00	No	No
37	57.90	2.17	4.11	0.66	208.20	1.59	330.20	4.00	No	No
38	55.57	2.16	3.85	0.65	195.10	1.57	305.94	4.00	No	No
39	53.31	2.17	3.87	0.66	185.72	1.60	296.82	4.00	No	No
40	50.68	2.19	3.95	0.66	175.46	1.65	288.70	4.00	No	No
41	48.00	2.22	4.17	0.67	166.74	1.73	287.71	4.00	No	No
42	45.29	2.26	4.42	0.68	157.68	1.82	287.04	4.00	No	No
43	42.72	2.29	4.62	0.69	148.68	1.91	284.18	4.00	No	No
44	40.28	2.31	4.75	0.70	140.06	1.99	278.96	4.00	No	No
45	37.68	2.34	4.85	0.71	130.54	2.08	271.12	4.00	No	No
46	35.73	2.36	4.91	0.71	123.28	2.15	264.47	4.00	No	No

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
47	34.17	2.37	4.89	0.72	116.78	2.19	255.93	4.00	No	No
48	33.16	2.37	4.76	0.72	111.82	2.20	245.70	4.00	No	No
49	31.90	2.37	4.51	0.72	105.62	2.18	230.62	4.00	No	No
50	30.56	2.37	4.36	0.72	99.99	2.20	219.66	4.00	No	No
51	29.22	2.39	4.39	0.72	94.88	2.26	214.35	4.00	No	No
52	27.23	2.43	4.81	0.74	89.26	2.46	219.57	4.00	No	No
53	25.16	2.49	5.36	0.75	83.62	2.71	226.72	4.00	No	No
54	23.09	2.54	5.96	0.77	77.70	3.01	233.56	4.00	No	No
55	21.64	2.59	6.46	0.78	73.40	3.25	238.69	4.00	No	No
56	20.33	2.63	7.07	0.80	69.41	3.54	245.62	4.00	No	Yes
57	19.19	2.67	7.65	0.81	65.93	3.81	251.24	4.00	No	Yes
58	18.29	2.71	8.10	0.82	62.86	4.04	254.23	4.00	No	Yes
59	17.72	2.72	8.21	0.82	60.52	4.15	251.40	4.00	No	Yes
60	17.53	2.72	8.06	0.82	58.99	4.16	245.36	4.00	No	Yes
61	17.51	2.72	7.88	0.82	57.98	4.13	239.71	4.00	No	Yes
62	17.39	2.72	7.85	0.82	56.99	4.16	237.12	4.00	No	Yes
63	17.03	2.74	8.06	0.83	55.42	4.29	237.66	4.00	No	Yes
64	16.49	2.76	8.35	0.84	53.52	4.46	238.55	4.00	No	Yes
65	16.03	2.78	8.57	0.84	51.72	4.61	238.18	4.00	No	Yes
66	15.67	2.79	8.73	0.85	50.25	4.72	237.29	4.00	No	Yes
67	15.43	2.80	8.76	0.85	48.98	4.79	234.61	4.00	No	Yes
68	15.00	2.81	8.80	0.85	47.19	4.89	230.93	4.00	No	Yes
69	14.52	2.82	8.69	0.85	45.28	4.96	224.37	4.00	No	Yes
70	14.14	2.82	8.30	0.85	43.42	4.93	213.95	4.00	No	Yes
71	13.88	2.81	7.79	0.85	41.97	4.83	202.74	4.00	No	Yes
72	13.91	2.78	7.09	0.84	41.09	4.62	190.00	4.00	No	Yes
73	13.91	2.76	6.56	0.84	40.33	4.46	180.00	4.00	No	Yes
74	13.92	2.74	6.07	0.83	39.56	4.31	170.67	4.00	No	Yes
75	13.62	2.74	5.90	0.83	38.29	4.32	165.37	4.00	No	Yes
76	13.20	2.75	5.90	0.83	36.83	4.41	162.49	4.00	No	Yes
77	12.79	2.76	5.82	0.84	35.35	4.48	158.23	4.00	No	Yes
78	12.13	2.79	6.03	0.84	33.63	4.69	157.73	2.35	No	Yes
79	11.02	2.83	6.30	0.86	30.80	5.04	155.11	2.12	No	Yes
80	9.86	2.87	6.44	0.87	27.76	5.39	149.61	1.88	No	Yes
81	9.00	2.87	5.96	0.87	25.20	5.45	137.29	1.70	No	Yes
82	8.39	2.89	5.90	0.88	23.47	5.63	132.24	1.57	No	Yes
83	7.87	2.94	6.58	0.89	22.28	6.13	136.48	1.46	No	Yes
84	7.83	2.96	7.04	0.90	22.23	6.35	141.05	1.45	No	Yes
85	8.32	2.92	6.39	0.88	23.17	5.91	136.91	1.53	No	Yes
86	8.69	2.87	5.40	0.87	23.60	5.37	126.65	1.59	No	Yes
87	8.95	2.82	4.72	0.85	23.83	4.98	118.61	1.63	No	Yes
88	9.15	2.82	4.69	0.85	24.18	4.92	119.07	1.66	No	Yes
89	9.46	2.82	4.96	0.85	24.97	4.97	124.20	1.71	No	Yes
90	9.22	2.86	5.48	0.87	24.52	5.29	129.81	1.66	No	Yes
91	8.63	2.89	5.75	0.88	23.07	5.61	129.44	1.54	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
92	7.96	2.93	5.98	0.89	21.39	5.96	127.53	1.41	No	Yes
93	7.82	2.92	5.72	0.88	20.84	5.92	123.32	1.37	No	Yes
94	8.36	2.87	4.95	0.87	21.78	5.37	116.93	1.46	No	Yes
95	8.87	2.80	4.08	0.85	22.50	4.78	107.59	1.55	No	Yes
96	9.29	2.75	3.54	0.83	23.10	4.38	101.22	1.61	No	Yes
97	9.38	2.73	3.28	0.83	23.03	4.22	97.23	1.62	No	Yes
98	9.81	2.71	3.17	0.82	23.83	4.07	96.90	1.69	No	Yes
99	10.46	2.68	3.04	0.81	25.09	3.86	96.73	1.79	No	Yes
100	11.20	2.65	2.96	0.80	26.57	3.67	97.61	1.92	No	Yes
101	11.52	2.65	3.03	0.80	27.20	3.67	99.72	1.96	No	Yes
102	11.39	2.68	3.32	0.81	27.03	3.86	104.19	1.93	No	Yes
103	10.99	2.72	3.71	0.82	26.30	4.15	109.17	1.85	No	Yes
104	10.93	2.74	3.99	0.83	26.23	4.32	113.33	1.83	No	Yes
105	11.04	2.74	4.05	0.83	26.42	4.33	114.50	1.84	No	Yes
106	11.39	2.73	3.89	0.83	26.98	4.19	113.10	1.89	No	Yes
107	12.50	2.67	3.48	0.81	29.01	3.79	109.89	2.07	No	Yes
108	13.83	2.61	3.06	0.79	31.37	3.38	105.97	2.28	No	Yes
109	15.22	2.56	2.82	0.78	33.93	3.09	104.72	0.19	No	No
110	16.08	2.54	2.73	0.77	35.45	2.96	104.81	0.19	No	No
111	16.86	2.54	2.96	0.77	37.14	3.00	111.49	0.21	No	No
112	17.52	2.56	3.23	0.77	38.67	3.07	118.77	0.24	No	No
113	17.91	2.58	3.62	0.78	39.71	3.22	127.71	0.27	No	No
114	18.18	2.60	3.86	0.79	40.35	3.30	133.23	0.30	No	No
115	18.22	2.62	4.17	0.79	40.55	3.44	139.33	2.92	No	Yes
116	18.07	2.64	4.50	0.80	40.41	3.59	145.25	2.88	No	Yes
117	17.77	2.67	4.86	0.81	39.92	3.78	150.90	2.82	No	Yes
118	17.96	2.67	4.95	0.81	40.23	3.80	153.01	2.83	No	Yes
119	17.88	2.68	5.09	0.81	40.05	3.87	155.16	2.81	No	Yes
120	17.90	2.68	5.08	0.81	39.94	3.88	154.88	2.80	No	Yes
121	17.51	2.70	5.18	0.82	39.05	3.97	155.00	2.72	No	Yes
122	17.61	2.69	5.01	0.81	39.00	3.90	151.97	2.72	No	Yes
123	17.56	2.69	4.96	0.81	38.75	3.89	150.75	2.71	No	Yes
124	17.55	2.70	5.13	0.82	38.70	3.97	153.52	2.69	No	Yes
125	17.34	2.72	5.51	0.82	38.38	4.15	159.22	2.65	No	Yes
126	17.04	2.74	5.84	0.83	37.81	4.32	163.50	2.59	No	Yes
127	16.50	2.76	6.02	0.84	36.65	4.47	163.88	2.49	No	Yes
128	15.76	2.78	6.03	0.84	35.00	4.59	160.72	2.36	No	Yes
129	15.09	2.79	6.02	0.84	33.48	4.70	157.32	2.25	No	Yes
130	14.16	2.82	6.31	0.85	31.55	4.98	157.02	2.10	No	Yes
131	13.35	2.86	6.76	0.87	29.90	5.32	159.01	1.96	No	Yes
132	12.91	2.88	7.00	0.87	28.97	5.51	159.61	1.89	No	Yes
133	13.11	2.87	6.79	0.87	29.18	5.40	157.49	1.91	No	Yes
134	13.68	2.83	6.18	0.86	30.04	5.05	151.72	1.99	No	Yes
135	14.18	2.80	5.75	0.85	30.76	4.80	147.51	2.05	No	Yes
136	14.49	2.78	5.52	0.84	31.19	4.65	145.18	2.09	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
137	14.46	2.79	5.53	0.84	31.03	4.67	145.05	2.08	No	Yes
138	14.08	2.79	5.41	0.84	30.08	4.70	141.28	2.01	No	Yes
139	13.90	2.77	4.94	0.84	29.40	4.53	133.14	1.98	No	Yes
140	13.81	2.75	4.48	0.83	28.88	4.34	125.34	1.95	No	Yes
141	14.15	2.72	4.24	0.83	29.33	4.18	122.56	2.00	No	Yes
142	14.49	2.73	4.39	0.83	29.99	4.20	125.98	2.04	No	Yes
143	14.78	2.74	4.64	0.83	30.58	4.28	130.96	2.07	No	Yes
144	14.75	2.75	4.90	0.83	30.56	4.41	134.76	2.06	No	Yes
145	14.66	2.76	4.88	0.83	30.26	4.43	133.95	2.03	No	Yes
146	14.48	2.76	4.92	0.84	29.83	4.48	133.68	2.00	No	Yes
147	14.38	2.77	4.95	0.84	29.55	4.52	133.66	1.98	No	Yes
148	14.35	2.77	5.04	0.84	29.44	4.58	134.70	1.96	No	Yes
149	14.45	2.77	4.98	0.84	29.52	4.54	133.97	1.97	No	Yes
150	14.45	2.79	5.23	0.84	29.55	4.66	137.65	1.96	No	Yes
151	14.01	2.82	5.69	0.85	28.77	4.95	142.33	1.89	No	Yes
152	13.27	2.87	6.44	0.87	27.49	5.41	148.85	1.78	No	Yes
153	12.73	2.90	6.72	0.88	26.42	5.66	149.55	1.70	No	Yes
154	12.13	2.92	6.86	0.88	25.17	5.87	147.75	1.61	No	Yes
155	12.37	2.89	6.28	0.87	25.39	5.58	141.64	1.63	No	Yes
156	12.49	2.86	5.67	0.87	25.33	5.29	134.06	1.64	No	Yes
157	12.90	2.82	5.11	0.85	25.84	4.96	128.16	1.69	No	Yes
158	12.64	2.82	4.91	0.85	25.17	4.93	124.00	1.65	No	Yes
159	12.25	2.83	5.04	0.86	24.41	5.08	124.04	1.59	No	Yes
160	12.42	2.83	4.97	0.86	24.62	5.02	123.60	1.61	No	Yes
161	13.26	2.79	4.62	0.84	25.99	4.69	121.75	1.71	No	Yes
162	13.37	2.78	4.44	0.84	26.03	4.59	119.45	1.72	No	Yes
163	12.64	2.80	4.57	0.85	24.63	4.81	118.37	1.62	No	Yes
164	11.34	2.86	5.02	0.87	22.26	5.34	118.94	1.44	No	Yes
165	11.03	2.87	5.01	0.87	21.60	5.42	117.17	1.39	No	Yes
166	10.95	2.87	4.84	0.87	21.33	5.37	114.61	1.37	No	Yes
167	10.75	2.88	5.01	0.87	20.92	5.53	115.60	1.34	No	Yes
168	10.40	2.91	5.40	0.88	20.30	5.83	118.41	1.29	No	Yes
169	10.04	2.93	5.54	0.89	19.58	6.02	117.94	1.24	No	Yes
170	9.90	2.91	4.99	0.88	19.10	5.80	110.79	1.21	No	Yes
171	9.82	2.86	4.13	0.87	18.65	5.36	99.98	1.20	No	Yes
172	9.58	2.83	3.50	0.86	17.93	5.07	90.94	1.16	No	Yes
173	9.23	2.82	3.16	0.85	17.12	4.97	85.07	1.11	No	Yes
174	8.83	2.83	3.06	0.86	16.29	5.05	82.20	1.05	No	Yes
175	8.78	2.82	2.91	0.85	16.09	4.97	79.93	1.04	No	Yes
176	9.10	2.80	2.84	0.85	16.60	4.82	79.97	1.08	No	Yes
177	9.68	2.78	2.85	0.84	17.59	4.66	81.88	1.15	No	Yes
178	10.30	2.75	2.63	0.83	18.54	4.34	80.51	1.22	No	Yes
179	9.59	2.76	2.49	0.84	17.17	4.44	76.29	1.13	No	Yes
180	8.50	2.78	2.27	0.84	15.10	4.62	69.78	0.99	No	Yes
181	7.07	2.89	2.77	0.88	12.66	5.63	71.31	0.80	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
182	6.52	2.97	3.40	0.90	11.76	6.42	75.53	0.73	No	Yes
183	6.06	3.04	4.01	0.92	10.97	7.18	78.72	0.67	No	Yes
184	5.62	3.08	4.30	0.93	10.15	7.71	78.29	0.61	No	Yes
185	5.32	3.10	4.28	0.94	9.54	7.97	76.00	0.57	No	Yes
186	5.92	3.01	3.39	0.91	10.49	6.86	71.95	0.64	No	Yes
187	7.29	2.86	2.42	0.87	12.70	5.31	67.40	0.81	No	Yes
188	9.18	2.70	1.68	0.82	15.64	3.97	62.05	1.04	No	Yes
189	10.63	2.62	1.47	0.79	17.90	3.42	61.31	1.21	No	Yes
190	11.92	2.56	1.40	0.78	19.89	3.12	62.02	0.10	No	No
191	12.98	2.56	1.53	0.77	21.66	3.06	66.38	4.00	Yes	No
192	17.05	2.44	1.41	0.74	27.98	2.49	69.75	4.00	Yes	No
193	22.72	2.32	1.27	0.70	36.50	2.02	73.69	4.00	Yes	No
194	29.54	2.20	1.11	0.67	46.37	1.68	77.70	4.00	Yes	No
195	33.68	2.18	1.21	0.66	52.60	1.62	85.40	4.00	Yes	No
196	37.15	2.18	1.39	0.66	58.03	1.63	94.36	0.16	No	No
197	40.37	2.19	1.57	0.66	63.08	1.64	103.59	0.18	No	No
198	43.82	2.18	1.67	0.66	68.27	1.62	110.76	0.21	No	No
199	46.24	2.19	1.83	0.66	72.06	1.64	118.34	0.23	No	No
200	47.51	2.21	2.01	0.67	74.22	1.69	125.29	0.26	No	No
201	47.66	2.24	2.24	0.68	74.79	1.77	132.23	0.30	No	No
202	46.89	2.21	1.97	0.67	72.85	1.69	122.94	0.25	No	No
203	46.30	2.17	1.71	0.66	71.20	1.61	114.38	0.22	No	No
204	47.12	2.11	1.37	0.64	71.27	1.48	105.19	0.19	No	No
205	52.04	2.09	1.41	0.63	78.24	1.43	112.20	0.21	No	No
206	58.84	2.04	1.37	0.62	87.48	1.36	118.96	0.24	No	No
207	65.88	2.01	1.35	0.61	97.08	1.31	126.97	0.27	No	No
208	71.19	1.99	1.38	0.60	104.34	1.29	134.13	0.30	No	No
209	76.15	1.98	1.41	0.60	111.13	1.27	141.01	0.34	No	No
210	80.79	1.95	1.38	0.59	117.09	1.24	145.51	0.37	No	No
211	84.73	1.93	1.32	0.59	121.88	1.22	148.19	0.38	No	No
212	86.42	1.91	1.26	0.58	123.57	1.20	147.91	0.38	No	No
213	86.75	1.89	1.19	0.58	123.30	1.18	145.70	0.37	No	No
214	85.32	1.88	1.13	0.57	120.80	1.17	141.84	0.35	No	No
215	83.62	1.88	1.07	0.57	117.89	1.17	137.56	0.32	No	No
216	82.34	1.85	0.94	0.56	115.13	1.14	131.57	0.29	No	No
217	82.62	1.82	0.85	0.55	114.56	1.12	128.38	0.28	No	No
218	85.02	1.79	0.77	0.54	116.88	1.10	128.26	0.28	No	No
219	88.95	1.78	0.81	0.54	122.01	1.10	133.61	0.30	No	No
220	93.17	1.77	0.81	0.54	127.28	1.09	138.36	0.33	No	No
221	96.61	1.77	0.83	0.54	131.61	1.08	142.50	0.35	No	No
222	98.11	1.77	0.86	0.54	133.53	1.09	145.07	0.36	No	No
223	98.03	1.78	0.88	0.54	133.36	1.09	145.50	0.37	No	No
224	96.29	1.80	0.92	0.55	131.22	1.11	145.00	0.36	No	No
225	93.03	1.82	0.96	0.55	127.07	1.12	142.45	0.35	No	No
226	88.37	1.85	1.01	0.56	121.11	1.14	138.55	0.33	No	No

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
227	82.82	1.87	1.00	0.57	113.61	1.16	131.73	0.29	No	No
228	77.53	1.87	0.94	0.57	106.22	1.17	123.78	0.26	No	No
229	71.55	1.88	0.87	0.57	97.81	1.17	114.38	0.22	No	No
230	66.74	1.88	0.79	0.57	91.01	1.17	106.54	0.19	No	No
231	62.42	1.89	0.75	0.58	85.03	1.18	100.34	0.17	No	No
232	59.93	1.94	0.85	0.59	82.15	1.22	100.54	0.17	No	No
233	59.22	1.98	1.00	0.60	81.68	1.27	104.03	0.18	No	No
234	60.57	2.01	1.17	0.61	83.96	1.32	110.57	0.21	No	No
235	63.76	2.01	1.22	0.61	88.19	1.31	115.62	0.22	No	No
236	66.57	2.00	1.24	0.61	91.76	1.30	119.19	0.24	No	No
237	68.67	1.98	1.18	0.60	94.08	1.27	119.47	0.24	No	No
238	69.80	1.94	1.05	0.59	94.82	1.23	116.71	0.23	No	No
239	70.82	1.88	0.84	0.57	94.94	1.17	111.23	0.21	No	No
240	72.17	1.82	0.67	0.55	95.46	1.12	107.09	0.19	No	No
241	73.85	1.76	0.53	0.54	96.40	1.08	103.86	0.18	No	No
242	75.61	1.73	0.47	0.53	97.97	1.00	97.97	0.17	No	No
243	77.73	1.70	0.43	0.52	100.04	1.00	100.04	0.17	No	No
244	80.79	1.67	0.40	0.51	103.33	1.00	103.33	0.18	No	No
245	85.42	1.64	0.38	0.50	108.54	1.00	108.54	0.20	No	No
246	91.58	1.63	0.41	0.50	116.18	1.00	116.18	0.23	No	No
247	97.37	1.65	0.48	0.50	123.48	1.00	123.48	0.26	No	No
248	102.88	1.65	0.53	0.50	130.47	1.00	130.97	0.29	No	No
249	111.33	1.62	0.52	0.50	140.71	1.00	140.71	0.34	No	No
250	122.88	1.57	0.48	0.50	155.19	1.00	155.19	0.43	No	No
251	138.65	1.51	0.46	0.50	174.93	1.00	174.93	4.00	No	No
252	152.81	1.46	0.42	0.50	192.56	1.00	192.56	4.00	No	No
253	167.65	1.40	0.39	0.50	211.04	1.00	211.04	4.00	No	No
254	182.26	1.34	0.34	0.50	229.11	1.00	229.11	4.00	No	No
255	203.45	1.30	0.33	0.50	255.48	1.00	255.48	4.00	No	No
256	227.34	1.29	0.38	0.50	285.10	1.00	285.10	4.00	No	No
257	262.90	1.27	0.42	0.50	329.34	1.00	329.34	4.00	No	No
258	275.31	1.39	0.64	0.50	344.32	1.00	344.32	4.00	No	No
259	285.06	1.43	0.74	0.50	356.00	1.00	356.00	4.00	No	No
260	278.84	1.49	0.88	0.50	347.58	1.00	347.58	4.00	No	No
261	286.33	1.48	0.87	0.50	356.31	1.00	356.31	4.00	No	No
262	287.42	1.51	0.96	0.50	357.11	1.00	357.11	4.00	No	No
263	282.79	1.55	1.05	0.50	350.72	1.00	350.72	4.00	No	No
264	272.21	1.55	1.04	0.50	337.03	1.00	337.03	4.00	No	No
265	260.48	1.58	1.07	0.50	321.88	1.00	321.88	4.00	No	No
266	269.74	1.52	0.92	0.50	332.86	1.00	332.86	4.00	No	No
267	294.43	1.43	0.77	0.50	362.80	1.00	362.80	4.00	No	No
268	321.72	1.36	0.66	0.50	395.81	1.00	395.81	4.00	No	No
269	332.15	1.34	0.63	0.50	408.05	1.00	408.05	4.00	No	No
270	342.06	1.31	0.60	0.50	419.49	1.00	419.49	4.00	No	No
271	362.13	1.25	0.53	0.50	443.48	1.00	443.48	4.00	No	No

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
272	383.70	1.33	0.70	0.50	469.12	1.00	469.12	4.00	No	No
273	406.16	1.35	0.78	0.50	495.88	1.00	495.88	4.00	No	No
274	412.24	1.38	0.84	0.50	502.41	1.00	502.41	4.00	No	No
275	420.89	1.34	0.77	0.50	512.18	1.00	512.18	4.00	No	No
276	409.26	1.43	0.97	0.50	497.15	1.00	497.15	4.00	No	No
277	403.84	1.52	1.22	0.50	489.72	1.00	489.72	4.00	No	No
278	388.38	1.57	1.35	0.50	470.23	1.00	470.23	4.00	No	No
279	384.48	1.57	1.33	0.50	464.70	1.00	464.70	4.00	No	No
280	383.77	1.52	1.18	0.50	463.17	1.00	463.17	4.00	No	No
281	396.63	1.49	1.10	0.50	477.93	1.00	477.93	4.00	No	No
282	385.66	1.47	1.02	0.50	464.01	1.00	464.01	4.00	No	No
283	370.54	1.46	0.98	0.50	445.03	1.00	445.03	4.00	No	No
284	344.16	1.48	0.97	0.50	412.66	1.00	412.66	4.00	No	No
285	340.62	1.50	1.04	0.50	407.73	1.00	407.73	4.00	No	No
286	330.36	1.55	1.16	0.50	394.75	1.00	394.75	4.00	No	No
287	311.16	1.62	1.33	0.50	371.21	1.00	371.21	4.00	No	No
288	282.05	1.71	1.61	0.52	339.12	1.04	354.09	4.00	No	No
289	254.26	1.75	1.67	0.53	306.72	1.07	327.77	4.00	No	No
290	228.23	1.78	1.73	0.54	276.18	1.10	302.43	4.00	No	No
291	207.62	1.76	1.48	0.53	249.81	1.08	268.80	4.00	No	No
292	182.17	1.80	1.53	0.55	220.04	1.11	243.84	4.00	No	No
293	161.35	1.82	1.48	0.56	195.00	1.12	219.32	4.00	No	No
294	136.97	1.83	1.32	0.56	165.31	1.13	187.25	4.00	No	No
295	122.44	1.88	1.39	0.57	148.31	1.17	173.84	4.00	No	No
296	111.19	1.91	1.39	0.58	134.89	1.20	161.78	4.00	No	No
297	106.33	1.95	1.53	0.59	129.45	1.25	161.18	4.00	No	No
298	96.57	2.00	1.60	0.61	117.93	1.30	152.81	0.41	No	No
299	80.02	2.08	1.78	0.63	98.42	1.43	140.36	0.34	No	No
300	60.64	2.24	2.28	0.68	75.65	1.77	134.00	0.30	No	No
301	47.14	2.30	2.16	0.70	58.87	1.96	115.51	0.22	No	No
302	41.83	2.30	1.82	0.70	51.90	1.94	100.49	0.17	No	No
303	38.45	2.24	1.30	0.68	47.15	1.76	83.11	0.13	No	No
304	35.06	2.26	1.26	0.69	42.92	1.84	78.81	0.13	No	No
305	32.83	2.31	1.37	0.70	40.25	1.97	79.39	0.13	No	No
306	32.25	2.31	1.34	0.70	39.44	1.98	77.99	0.12	No	No
307	31.86	2.29	1.24	0.70	38.80	1.93	74.84	0.12	No	No
308	32.07	2.29	1.23	0.70	38.97	1.92	74.77	0.12	No	No
309	32.68	2.26	1.12	0.69	39.53	1.83	72.42	0.12	No	No
310	34.38	2.22	1.00	0.67	41.36	1.71	70.80	0.11	No	No
311	37.34	2.17	0.92	0.66	44.71	1.60	71.54	0.11	No	No
312	41.30	2.12	0.85	0.64	49.19	1.49	73.15	0.12	No	No
313	50.26	2.01	0.72	0.61	59.29	1.31	77.97	0.12	No	No
314	63.17	1.89	0.60	0.57	73.67	1.18	86.66	0.14	No	No
315	82.16	1.74	0.47	0.53	94.45	1.00	94.45	0.16	No	No
316	108.38	1.63	0.44	0.50	123.36	1.00	123.36	0.25	No	No

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
317	150.16	1.50	0.42	0.50	171.18	1.00	171.18	4.00	No	No
318	185.09	1.44	0.45	0.50	210.99	1.00	210.99	4.00	No	No
319	222.39	1.39	0.47	0.50	253.47	1.00	253.47	4.00	No	No
320	256.67	1.34	0.46	0.50	292.29	1.00	292.29	4.00	No	No
321	297.32	1.32	0.51	0.50	338.34	1.00	338.34	4.00	No	No
322	323.56	1.35	0.61	0.50	367.74	1.00	367.74	4.00	No	No
323	331.28	1.42	0.76	0.50	376.07	1.00	376.07	4.00	No	No
324	331.69	1.47	0.90	0.50	375.97	1.00	375.97	4.00	No	No
325	344.19	1.47	0.91	0.50	389.69	1.00	389.69	4.00	No	No
326	345.15	1.54	1.12	0.50	390.20	1.00	390.20	4.00	No	No
327	346.20	1.61	1.36	0.50	390.81	1.00	390.81	4.00	No	No
328	331.25	1.69	1.62	0.51	375.32	1.03	386.18	4.00	No	No
329	324.65	1.69	1.59	0.51	367.25	1.03	377.65	4.00	No	No
330	314.56	1.68	1.53	0.51	355.07	1.02	363.40	4.00	No	No
331	305.16	1.67	1.46	0.51	343.64	1.02	349.86	4.00	No	No
332	298.62	1.66	1.38	0.50	335.26	1.01	337.74	4.00	No	No
333	297.28	1.62	1.23	0.50	332.70	1.00	332.70	4.00	No	No
334	305.51	1.56	1.07	0.50	341.52	1.00	341.52	4.00	No	No
335	322.83	1.49	0.90	0.50	360.44	1.00	360.44	4.00	No	No
336	339.97	1.40	0.73	0.50	379.08	1.00	379.08	4.00	No	No
337	354.95	1.30	0.56	0.50	395.33	1.00	395.33	4.00	No	No
338	362.65	1.22	0.43	0.50	403.33	1.00	403.33	4.00	No	No
339	359.76	1.23	0.45	0.50	399.58	1.00	399.58	4.00	No	No
340	348.86	1.31	0.56	0.50	386.86	1.00	386.86	4.00	No	No
341	343.02	1.39	0.71	0.50	379.87	1.00	379.87	4.00	No	No
342	339.07	1.42	0.77	0.50	374.94	1.00	374.94	4.00	No	No
343	332.16	1.47	0.86	0.50	366.75	1.00	366.75	4.00	No	No
344	310.39	1.54	1.00	0.50	342.20	1.00	342.20	4.00	No	No
345	298.03	1.59	1.11	0.50	328.05	1.00	328.05	4.00	No	No
346	270.34	1.64	1.22	0.50	297.17	1.00	296.73	4.00	No	No
347	245.56	1.69	1.30	0.51	270.58	1.03	278.97	4.00	No	No
348	213.69	1.74	1.34	0.53	236.02	1.06	250.97	4.00	No	No
349	200.85	1.74	1.27	0.53	221.41	1.06	235.40	4.00	No	No
350	177.96	1.74	1.15	0.53	195.83	1.07	208.72	4.00	Yes	No
351	139.82	1.91	1.60	0.58	155.70	1.20	187.05	4.00	Yes	No
352	105.55	2.09	2.17	0.64	118.86	1.44	170.84	4.00	Yes	No
353	72.72	2.38	3.90	0.72	83.43	2.24	187.11	4.00	Yes	No
354	54.86	2.56	5.31	0.78	63.43	3.10	196.76	4.00	Yes	No
355	32.54	2.92	10.05	0.88	38.07	5.87	223.35	4.00	Yes	Yes
356	22.83	3.13	14.09	0.95	26.64	8.30	221.03	1.55	No	Yes
357	16.93	3.32	19.41	1.00	19.58	11.05	216.47	1.12	No	Yes
358	13.05	3.45	21.99	1.00	14.66	13.11	192.27	0.84	No	Yes
359	11.47	3.47	20.61	1.00	12.65	13.51	170.96	0.72	No	Yes
360	11.10	3.34	13.25	1.00	12.15	11.39	138.43	0.69	No	Yes
361	10.85	3.24	9.04	0.98	11.74	9.82	115.30	0.67	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
362	10.32	3.12	5.42	0.94	10.95	8.16	89.35	0.64	No	Yes
363	9.78	3.06	4.03	0.93	10.22	7.48	76.41	0.60	No	Yes
364	9.57	3.04	3.58	0.92	9.92	7.25	71.88	0.58	No	Yes
365	9.85	3.03	3.59	0.92	10.23	7.12	72.86	0.60	No	Yes
366	10.35	2.99	3.26	0.91	10.78	6.65	71.65	0.63	No	Yes
367	11.26	2.91	2.65	0.88	11.76	5.78	67.97	0.69	No	Yes
368	12.03	2.82	2.03	0.85	12.56	4.96	62.33	0.75	No	Yes
369	12.69	2.74	1.54	0.83	13.24	4.28	56.68	0.79	No	Yes
370	12.98	2.71	1.38	0.82	13.51	4.04	54.63	0.81	No	Yes
371	12.70	2.76	1.70	0.84	13.22	4.45	58.88	0.79	No	Yes
372	12.25	2.84	2.28	0.86	12.75	5.16	65.77	0.75	No	Yes
373	11.76	2.93	3.10	0.89	12.22	6.03	73.74	0.72	No	Yes
374	11.34	3.02	4.07	0.91	11.78	6.94	81.70	0.69	No	Yes
375	10.94	3.08	4.83	0.93	11.33	7.63	86.43	0.66	No	Yes
376	10.74	3.10	5.12	0.94	11.08	7.92	87.74	0.64	No	Yes
377	10.99	3.07	4.81	0.93	11.33	7.61	86.25	0.66	No	Yes
378	11.39	3.04	4.44	0.92	11.75	7.21	84.74	0.68	No	Yes
379	11.87	3.01	4.14	0.91	12.26	6.83	83.73	0.72	No	Yes
380	12.01	3.00	4.05	0.91	12.39	6.73	83.36	0.72	No	Yes
381	11.99	3.00	4.06	0.91	12.34	6.75	83.29	0.72	No	Yes
382	11.70	3.01	4.11	0.91	11.99	6.89	82.67	0.70	No	Yes
383	11.38	3.02	4.07	0.91	11.59	7.00	81.13	0.68	No	Yes
384	11.45	3.01	3.87	0.91	11.64	6.83	79.52	0.68	No	Yes
385	11.49	3.01	3.86	0.91	11.66	6.81	79.45	0.68	No	Yes
386	11.58	3.01	3.93	0.91	11.73	6.84	80.29	0.68	No	Yes
387	11.40	3.03	4.14	0.92	11.52	7.07	81.48	0.67	No	Yes
388	11.23	3.05	4.43	0.92	11.31	7.36	83.22	0.66	No	Yes
389	10.94	3.08	4.68	0.93	10.97	7.66	84.01	0.64	No	Yes
390	10.89	3.07	4.55	0.93	10.89	7.60	82.77	0.63	No	Yes
391	10.86	3.06	4.27	0.93	10.82	7.42	80.34	0.63	No	Yes
392	11.02	3.04	4.06	0.92	10.97	7.21	79.07	0.64	No	Yes
393	10.95	3.06	4.24	0.92	10.87	7.38	80.23	0.63	No	Yes
394	11.09	3.06	4.39	0.93	11.02	7.44	81.97	0.64	No	Yes
395	11.25	3.07	4.72	0.93	11.18	7.61	85.06	0.65	No	Yes
396	11.43	3.08	4.91	0.93	11.37	7.67	87.21	0.66	No	Yes
397	11.74	3.06	4.67	0.92	11.68	7.39	86.34	0.68	No	Yes
398	12.57	2.97	3.69	0.90	12.54	6.41	80.37	0.73	No	Yes
399	13.36	2.89	2.94	0.87	13.35	5.60	74.68	0.78	No	Yes
400	13.98	2.85	2.65	0.86	13.98	5.20	72.68	0.82	No	Yes
401	14.03	2.91	3.45	0.88	14.06	5.82	81.87	0.82	No	Yes
402	14.15	2.97	4.39	0.90	14.21	6.45	91.62	0.83	No	Yes
403	14.24	3.03	5.45	0.92	14.34	7.08	101.57	0.83	No	Yes
404	14.58	3.04	5.90	0.92	14.70	7.25	106.52	0.85	No	Yes
405	14.92	3.05	6.20	0.92	15.06	7.32	110.20	0.87	No	Yes
406	15.91	3.02	5.96	0.91	16.12	6.93	111.76	0.94	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
407	17.15	2.96	5.34	0.90	17.42	6.31	109.85	1.01	No	Yes
408	18.94	2.88	4.59	0.87	19.30	5.53	106.78	1.13	No	Yes
409	20.21	2.83	4.12	0.86	20.61	5.06	104.22	1.21	No	Yes
410	20.72	2.82	4.14	0.86	21.13	4.99	105.52	1.24	No	Yes
411	20.43	2.84	4.35	0.86	20.79	5.17	107.46	1.22	No	Yes
412	19.83	2.89	4.86	0.87	20.14	5.56	111.94	1.18	No	Yes
413	19.41	2.92	5.37	0.88	19.67	5.91	116.36	1.15	No	Yes
414	19.23	2.95	5.92	0.89	19.47	6.24	121.52	1.13	No	Yes
415	19.40	2.96	6.10	0.90	19.63	6.31	123.79	1.14	No	Yes
416	19.98	2.94	5.83	0.89	20.21	6.07	122.72	1.18	No	Yes
417	20.48	2.91	5.47	0.88	20.70	5.81	120.20	1.21	No	Yes
418	20.74	2.90	5.34	0.88	20.93	5.70	119.38	1.22	No	Yes
419	20.42	2.93	5.71	0.89	20.58	5.95	122.48	1.20	No	Yes
420	19.77	2.97	6.32	0.90	19.87	6.38	126.73	1.15	No	Yes
421	18.55	3.02	7.10	0.91	18.55	7.00	129.93	1.07	No	Yes
422	17.22	3.08	7.91	0.93	17.11	7.69	131.51	0.99	No	Yes
423	15.79	3.14	8.78	0.95	15.56	8.46	131.67	0.90	No	Yes
424	14.52	3.20	9.57	0.97	14.17	9.21	130.47	0.81	No	Yes
425	13.30	3.25	10.39	0.98	12.84	10.00	128.45	0.74	No	Yes
426	12.20	3.30	11.12	1.00	11.64	10.77	125.38	0.66	No	Yes
427	11.00	3.36	11.95	1.00	10.29	11.73	120.77	0.59	No	Yes
428	9.90	3.42	12.50	1.00	9.06	12.63	114.49	0.52	No	Yes
429	8.98	3.46	12.65	1.00	8.04	13.37	107.39	0.46	No	Yes
430	8.72	3.44	11.40	1.00	7.74	13.05	100.97	0.44	No	Yes
431	8.58	3.42	10.23	1.00	7.57	12.64	95.66	0.43	No	Yes
432	8.46	3.40	9.45	1.00	7.42	12.38	91.79	0.42	No	Yes
433	8.31	3.40	9.15	1.00	7.23	12.36	89.42	0.41	No	Yes
434	8.39	3.38	8.47	1.00	7.31	11.95	87.32	0.42	No	Yes
435	8.96	3.30	7.00	1.00	7.91	10.69	84.54	0.45	No	Yes
436	10.19	3.20	5.79	0.97	9.18	9.20	84.45	0.53	No	Yes
437	12.12	3.07	4.66	0.93	11.18	7.57	84.57	0.64	No	Yes
438	13.46	2.99	3.98	0.90	12.55	6.63	83.14	0.73	No	Yes
439	13.98	2.91	3.05	0.88	13.03	5.77	75.17	0.76	No	Yes
440	13.35	2.87	2.44	0.87	12.32	5.43	66.87	0.72	No	Yes
441	12.77	2.91	2.64	0.88	11.70	5.78	67.70	0.68	No	Yes
442	12.52	2.98	3.44	0.90	11.44	6.56	75.05	0.66	No	Yes
443	12.47	3.05	4.42	0.92	11.40	7.32	83.43	0.66	No	Yes
444	12.59	3.07	4.89	0.93	11.51	7.60	87.49	0.66	No	Yes
445	12.40	3.10	5.36	0.94	11.31	7.99	90.32	0.65	No	Yes
446	12.32	3.13	5.76	0.95	11.21	8.28	92.80	0.64	No	Yes
447	12.34	3.15	6.15	0.95	11.21	8.51	95.41	0.64	No	Yes
448	12.77	3.13	6.03	0.95	11.64	8.28	96.36	0.67	No	Yes
449	13.63	3.07	5.37	0.93	12.50	7.57	94.65	0.72	No	Yes
450	15.29	2.97	4.38	0.90	14.16	6.46	91.44	0.82	No	Yes
451	17.04	2.89	3.68	0.87	15.91	5.57	88.63	0.92	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
452	18.95	2.80	3.11	0.85	17.81	4.81	85.74	1.03	No	Yes
453	21.49	2.73	2.82	0.83	20.37	4.23	86.08	1.18	No	Yes
454	23.41	2.70	2.78	0.82	22.28	3.97	88.44	1.30	No	Yes
455	25.00	2.69	2.94	0.81	23.87	3.92	93.47	1.39	No	Yes
456	25.31	2.71	3.17	0.82	24.16	4.03	97.47	1.41	No	Yes
457	25.90	2.71	3.37	0.82	24.73	4.10	101.41	1.44	No	Yes
458	26.03	2.74	3.67	0.83	24.83	4.27	106.07	1.44	No	Yes
459	25.66	2.77	4.02	0.84	24.45	4.52	110.39	1.42	No	Yes
460	24.60	2.81	4.39	0.85	23.34	4.85	113.29	1.35	No	Yes
461	23.46	2.84	4.65	0.86	22.16	5.15	114.13	1.28	No	Yes
462	22.39	2.87	4.82	0.87	21.05	5.40	113.71	1.22	No	Yes
463	21.99	2.88	4.82	0.87	20.61	5.46	112.58	1.19	No	Yes
464	22.05	2.86	4.63	0.87	20.63	5.35	110.45	1.19	No	Yes
465	22.35	2.84	4.35	0.86	20.89	5.15	107.57	1.21	No	Yes
466	22.16	2.84	4.34	0.86	20.67	5.18	106.97	1.19	No	Yes
467	22.36	2.84	4.26	0.86	20.83	5.11	106.41	1.20	No	Yes
468	25.81	2.75	3.69	0.83	24.23	4.35	105.39	1.40	No	Yes
469	32.26	2.60	2.92	0.79	30.58	3.35	102.49	1.78	No	Yes
470	39.06	2.50	2.54	0.76	37.26	2.76	102.98	0.18	No	No
471	44.42	2.47	2.68	0.75	42.54	2.63	111.69	0.21	No	No
472	47.20	2.50	3.13	0.76	45.27	2.75	124.56	0.26	No	No
473	48.77	2.53	3.67	0.77	46.81	2.95	138.15	0.33	No	No
474	47.60	2.59	4.22	0.78	45.63	3.24	147.69	0.38	No	No
475	41.91	2.70	5.34	0.82	40.00	3.98	159.36	2.31	No	Yes
476	36.76	2.82	6.88	0.85	34.88	4.95	172.72	2.01	No	Yes
477	33.87	2.89	8.05	0.88	32.00	5.65	180.77	1.84	No	Yes
478	37.29	2.83	7.27	0.86	35.32	5.07	179.17	2.04	No	Yes
479	41.60	2.75	6.19	0.83	39.49	4.37	172.50	2.28	No	Yes
480	44.26	2.71	5.71	0.82	42.05	4.03	169.57	2.43	No	Yes
481	40.58	2.76	6.34	0.84	38.38	4.49	172.50	2.21	No	Yes
482	33.53	2.89	7.68	0.87	31.42	5.56	174.59	1.81	No	Yes
483	24.69	3.08	10.32	0.93	22.69	7.63	173.01	1.30	No	Yes
484	19.20	3.23	12.90	0.98	17.26	9.64	166.40	0.99	No	Yes
485	15.72	3.32	14.09	1.00	13.78	11.08	152.67	0.79	No	Yes
486	14.04	3.35	13.35	1.00	12.09	11.46	138.49	0.69	No	Yes
487	13.51	3.30	11.04	1.00	11.55	10.78	124.46	0.66	No	Yes
488	13.40	3.27	9.58	0.99	11.41	10.20	116.41	0.65	No	Yes
489	13.83	3.20	7.99	0.97	11.80	9.29	109.58	0.68	No	Yes
490	15.18	3.10	6.24	0.94	13.09	7.90	103.46	0.75	No	Yes
491	17.36	2.97	4.76	0.90	15.19	6.45	97.91	0.87	No	Yes
492	20.14	2.86	3.90	0.87	17.86	5.35	95.58	1.03	No	Yes
493	22.59	2.81	3.76	0.85	20.20	4.89	98.79	1.16	No	Yes
494	23.31	2.84	4.29	0.86	20.88	5.12	106.81	1.20	No	Yes
495	22.14	2.91	5.22	0.88	19.72	5.83	114.92	1.13	No	Yes
496	19.52	3.03	6.63	0.92	17.17	7.05	121.06	0.98	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
497	17.17	3.13	8.04	0.95	14.86	8.31	123.49	0.85	No	Yes
498	15.14	3.22	9.27	0.97	12.88	9.50	122.34	0.74	No	Yes
499	13.66	3.28	10.00	0.99	11.42	10.39	118.62	0.65	No	Yes
500	12.45	3.32	10.29	1.00	10.23	11.06	113.13	0.58	No	Yes
501	11.61	3.35	10.17	1.00	9.40	11.44	107.55	0.54	No	Yes
502	11.29	3.33	9.34	1.00	9.07	11.23	101.90	0.52	No	Yes
503	11.28	3.30	8.17	1.00	9.04	10.66	96.37	0.52	No	Yes
504	11.76	3.22	6.57	0.97	9.49	9.53	90.36	0.54	No	Yes
505	12.44	3.14	5.36	0.95	10.12	8.47	85.67	0.58	No	Yes
506	14.19	3.02	4.11	0.91	11.77	6.97	82.03	0.67	No	Yes
507	28.90	2.52	1.70	0.76	25.79	2.87	73.89	0.12	No	No
508	49.10	2.18	0.95	0.66	44.96	1.61	72.47	0.12	No	No
509	68.99	1.98	0.71	0.60	63.81	1.27	81.22	0.13	No	No
510	75.86	1.96	0.76	0.60	70.25	1.25	88.07	4.00	Yes	No
511	76.57	2.00	0.88	0.61	70.84	1.29	91.65	4.00	Yes	No
512	75.92	2.03	0.99	0.62	70.15	1.34	93.88	4.00	Yes	No
513	68.19	2.11	1.15	0.64	62.75	1.47	92.03	4.00	Yes	No
514	59.64	2.21	1.44	0.67	54.60	1.70	92.81	4.00	Yes	No
515	47.98	2.37	1.94	0.72	43.50	2.20	95.71	4.00	Yes	No
516	41.24	2.50	2.53	0.76	37.09	2.77	102.64	4.00	Yes	No
517	33.54	2.68	3.69	0.81	29.77	3.85	114.56	4.00	Yes	Yes
518	29.00	2.82	5.10	0.86	25.45	4.99	127.08	4.00	Yes	Yes
519	26.36	2.92	6.25	0.88	22.93	5.88	134.72	4.00	Yes	Yes
520	27.01	2.91	6.16	0.88	23.50	5.75	135.24	1.34	No	Yes
521	28.14	2.89	6.20	0.88	24.53	5.64	138.42	1.40	No	Yes
522	30.58	2.87	6.17	0.87	26.78	5.37	143.78	1.53	No	Yes
523	33.54	2.83	6.03	0.86	29.52	5.03	148.58	1.68	No	Yes
524	38.73	2.74	5.31	0.83	34.33	4.32	148.42	1.96	No	Yes
525	41.91	2.70	5.08	0.82	37.27	4.03	150.17	2.12	No	Yes
526	43.30	2.70	5.22	0.82	38.51	4.02	154.75	2.19	No	Yes
527	42.10	2.75	5.85	0.83	37.33	4.36	162.68	2.13	No	Yes
528	42.05	2.77	6.24	0.84	37.23	4.53	168.53	2.12	No	Yes
529	45.91	2.73	6.02	0.83	40.77	4.23	172.32	2.32	No	Yes
530	51.83	2.66	5.42	0.81	46.24	3.72	171.78	2.63	No	Yes
531	57.31	2.60	4.95	0.79	51.27	3.33	170.72	2.91	No	Yes
532	58.01	2.57	4.61	0.78	51.86	3.18	164.70	4.00	No	No
533	54.77	2.58	4.47	0.78	48.80	3.22	157.25	0.44	No	No
534	48.43	2.62	4.40	0.79	42.86	3.44	147.25	2.43	No	Yes
535	37.51	2.75	5.15	0.83	32.69	4.37	142.70	1.86	No	Yes
536	27.44	2.92	6.33	0.88	23.34	5.86	136.72	1.33	No	Yes
537	19.17	3.13	8.45	0.95	15.69	8.28	129.85	0.90	No	Yes
538	15.90	3.22	9.14	0.97	12.66	9.52	120.47	0.72	No	Yes
539	13.69	3.30	10.10	1.00	10.61	10.79	114.50	0.61	No	Yes
540	12.95	3.32	9.99	1.00	9.92	11.08	109.90	0.57	No	Yes
541	13.08	3.31	9.56	1.00	10.02	10.83	108.52	0.57	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
542	13.48	3.27	8.59	0.99	10.37	10.19	105.70	0.59	No	Yes
543	13.93	3.21	7.50	0.97	10.77	9.45	101.80	0.61	No	Yes
544	14.13	3.16	6.35	0.96	10.94	8.74	95.53	0.62	No	Yes
545	14.16	3.13	5.61	0.95	10.95	8.29	90.71	0.62	No	Yes
546	13.85	3.12	5.29	0.94	10.65	8.20	87.32	0.61	No	Yes
547	13.32	3.15	5.48	0.95	10.16	8.53	86.62	0.58	No	Yes
548	12.83	3.17	5.63	0.96	9.69	8.84	85.71	0.55	No	Yes
549	12.57	3.18	5.64	0.96	9.44	8.97	84.68	0.54	No	Yes
550	12.61	3.17	5.42	0.96	9.46	8.81	83.41	0.54	No	Yes
551	12.92	3.14	5.14	0.95	9.73	8.50	82.67	0.55	No	Yes
552	13.27	3.12	4.89	0.94	10.03	8.19	82.12	0.57	No	Yes
553	13.72	3.10	4.67	0.94	10.42	7.87	82.01	0.59	No	Yes
554	14.14	3.08	4.54	0.93	10.78	7.63	82.27	0.61	No	Yes
555	14.52	3.06	4.48	0.93	11.10	7.47	82.95	0.63	No	Yes
556	14.68	3.07	4.68	0.93	11.23	7.56	84.88	0.64	No	Yes
557	14.62	3.09	5.01	0.94	11.15	7.81	87.13	0.63	No	Yes
558	14.51	3.11	5.33	0.94	11.03	8.07	89.07	0.63	No	Yes
559	14.47	3.12	5.49	0.94	10.97	8.20	89.99	0.62	No	Yes
560	14.62	3.12	5.46	0.94	11.09	8.13	90.18	0.63	No	Yes
561	14.93	3.10	5.38	0.94	11.35	7.98	90.60	0.65	No	Yes
562	15.25	3.09	5.30	0.94	11.62	7.83	91.03	0.66	No	Yes
563	15.69	3.08	5.21	0.93	11.99	7.64	91.65	0.68	No	Yes
564	15.98	3.07	5.13	0.93	12.24	7.51	91.86	0.70	No	Yes
565	16.10	3.06	5.09	0.93	12.32	7.45	91.82	0.70	No	Yes
566	15.81	3.08	5.27	0.93	12.04	7.66	92.30	0.68	No	Yes
567	15.25	3.11	5.60	0.94	11.52	8.06	92.85	0.66	No	Yes
568	14.55	3.15	6.03	0.95	10.88	8.57	93.26	0.62	No	Yes
569	13.82	3.19	6.47	0.97	10.21	9.12	93.15	0.58	No	Yes
570	12.92	3.24	7.11	0.98	9.40	9.89	92.90	0.54	No	Yes
571	12.01	3.30	7.88	1.00	8.57	10.78	92.36	0.49	No	Yes
572	11.26	3.35	8.53	1.00	7.91	11.55	91.32	0.45	No	Yes
573	10.87	3.37	8.63	1.00	7.55	11.85	89.55	0.43	No	Yes
574	10.65	3.37	8.41	1.00	7.35	11.89	87.35	0.42	No	Yes
575	10.53	3.36	7.95	1.00	7.23	11.72	84.77	0.41	No	Yes
576	10.96	3.31	7.02	1.00	7.59	10.92	82.84	0.43	No	Yes
577	11.73	3.24	5.91	0.98	8.25	9.79	80.81	0.47	No	Yes
578	12.58	3.16	4.99	0.96	9.00	8.75	78.73	0.51	No	Yes
579	13.74	3.09	4.31	0.93	10.00	7.78	77.85	0.57	No	Yes
580	15.26	3.02	3.94	0.91	11.32	7.00	79.19	0.64	No	Yes
581	16.58	2.98	3.77	0.90	12.46	6.50	80.98	4.00	Yes	Yes
582	17.44	2.95	3.70	0.89	13.20	6.23	82.24	4.00	Yes	Yes
583	18.63	2.92	3.54	0.88	14.22	5.85	83.15	4.00	Yes	Yes
584	19.86	2.88	3.35	0.87	15.28	5.47	83.53	4.00	Yes	Yes
585	24.19	2.75	2.82	0.83	19.06	4.41	83.99	4.00	Yes	Yes
586	30.81	2.62	2.42	0.79	24.88	3.46	86.19	4.00	Yes	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
587	41.51	2.46	2.00	0.75	34.33	2.58	88.51	4.00	Yes	No
588	48.14	2.43	2.13	0.74	40.11	2.42	97.00	4.00	Yes	No
589	56.41	2.38	2.20	0.72	47.35	2.23	105.68	4.00	Yes	No
590	56.61	2.43	2.60	0.74	47.40	2.43	115.02	4.00	Yes	No
591	50.88	2.55	3.53	0.77	42.17	3.06	129.13	4.00	Yes	No
592	37.94	2.81	5.84	0.85	30.66	4.85	148.53	4.00	Yes	Yes
593	29.86	3.02	8.97	0.91	23.52	6.98	164.11	1.33	No	Yes
594	32.42	2.99	8.86	0.91	25.69	6.64	170.47	4.00	Yes	Yes
595	43.55	2.79	6.38	0.85	35.36	4.71	166.57	4.00	Yes	Yes
596	54.96	2.64	4.93	0.80	45.33	3.55	161.13	4.00	Yes	Yes
597	79.06	2.39	3.28	0.73	66.55	2.28	151.83	4.00	Yes	No
598	112.09	2.16	2.22	0.66	95.87	1.58	151.10	4.00	Yes	No
599	155.52	1.99	1.79	0.61	134.45	1.29	173.41	4.00	Yes	No
600	188.12	1.91	1.66	0.58	163.40	1.20	195.95	4.00	Yes	No
601	208.82	1.89	1.68	0.57	181.59	1.18	213.56	4.00	Yes	No
602	228.82	1.83	1.53	0.56	199.41	1.13	224.96	4.00	Yes	No
603	235.56	1.79	1.41	0.55	205.45	1.10	226.39	4.00	Yes	No
604	237.08	1.77	1.31	0.54	206.80	1.08	224.08	4.00	Yes	No
605	220.25	1.79	1.32	0.55	191.64	1.10	210.73	4.00	No	No
606	204.39	1.80	1.28	0.55	177.42	1.11	196.83	4.00	Yes	No
607	185.33	1.82	1.24	0.56	160.42	1.12	180.31	4.00	Yes	No
608	166.94	1.86	1.24	0.57	143.97	1.15	165.68	4.00	Yes	No
609	142.69	1.96	1.49	0.60	122.12	1.25	153.15	4.00	Yes	No
610	120.98	2.11	2.02	0.64	102.49	1.47	151.10	4.00	Yes	No
611	104.97	2.24	2.61	0.68	88.10	1.76	155.26	4.00	Yes	No
612	99.96	2.31	3.15	0.70	83.45	1.99	166.31	4.00	Yes	No
613	95.72	2.36	3.50	0.72	79.57	2.16	171.95	4.00	Yes	No
614	90.27	2.42	4.00	0.73	74.65	2.41	179.67	4.00	Yes	No
615	83.24	2.49	4.52	0.75	68.41	2.71	185.31	4.00	Yes	No
616	77.21	2.55	5.06	0.77	63.06	3.02	190.64	4.00	Yes	No
617	73.57	2.58	5.30	0.78	59.82	3.19	191.07	4.00	Yes	No
618	72.32	2.57	5.11	0.78	58.69	3.16	185.39	4.00	No	No
619	70.52	2.57	5.01	0.78	57.10	3.17	180.76	4.00	No	No
620	68.02	2.59	5.03	0.78	54.89	3.24	177.91	4.00	No	No
621	64.20	2.63	5.37	0.80	51.53	3.49	179.69	2.85	No	Yes
622	59.27	2.68	5.85	0.81	47.24	3.84	181.49	2.62	No	Yes
623	52.60	2.74	6.39	0.83	41.53	4.33	179.79	2.31	No	Yes
624	45.87	2.82	7.16	0.86	35.78	5.00	178.76	2.00	No	Yes
625	40.02	2.91	8.11	0.88	30.81	5.78	178.04	1.73	No	Yes
626	35.42	2.98	8.99	0.90	26.91	6.54	175.93	1.51	No	Yes
627	29.29	3.08	10.21	0.93	21.78	7.73	168.46	1.23	No	Yes
628	23.46	3.20	11.50	0.97	16.95	9.21	156.15	0.96	No	Yes
629	18.13	3.34	13.53	1.00	12.57	11.33	142.35	0.72	No	Yes
630	15.88	3.40	14.26	1.00	10.76	12.38	133.22	0.61	No	Yes
631	14.78	3.43	14.06	1.00	9.87	12.77	126.04	0.56	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
632	14.20	3.42	12.94	1.00	9.39	12.61	118.44	0.54	No	Yes
633	13.78	3.39	11.37	1.00	9.04	12.17	110.10	0.52	No	Yes
634	13.61	3.35	9.75	1.00	8.89	11.54	102.57	0.51	No	Yes
635	13.68	3.31	8.49	1.00	8.93	10.89	97.25	0.51	No	Yes
636	14.04	3.26	7.24	0.98	9.23	10.05	92.73	0.53	No	Yes
637	14.75	3.20	6.26	0.97	9.81	9.18	90.08	0.56	No	Yes
638	15.64	3.14	5.61	0.95	10.53	8.45	89.00	0.60	No	Yes
639	17.43	3.06	4.96	0.93	11.99	7.48	89.73	0.68	No	Yes
640	19.28	2.99	4.46	0.91	13.49	6.69	90.26	0.76	No	Yes
641	21.15	2.93	4.03	0.89	15.03	6.01	90.31	0.84	No	Yes
642	22.54	2.89	3.86	0.88	16.15	5.65	91.19	0.90	No	Yes
643	23.69	2.86	3.68	0.87	17.08	5.35	91.31	0.95	No	Yes
644	24.53	2.85	3.72	0.86	17.74	5.25	93.15	0.99	No	Yes
645	24.93	2.86	3.90	0.87	18.03	5.32	95.94	1.00	No	Yes
646	25.26	2.88	4.27	0.87	18.25	5.52	100.73	1.02	No	Yes
647	24.97	2.92	4.79	0.88	17.96	5.89	105.71	1.00	No	Yes
648	24.30	2.96	5.35	0.90	17.36	6.33	109.85	0.97	No	Yes
649	23.26	3.01	5.99	0.91	16.46	6.87	113.11	0.92	No	Yes
650	22.82	3.03	6.27	0.92	16.07	7.11	114.32	0.90	No	Yes
651	22.57	3.04	6.37	0.92	15.85	7.22	114.36	0.89	No	Yes
652	22.54	3.04	6.29	0.92	15.81	7.18	113.56	0.89	No	Yes
653	22.65	3.03	6.14	0.92	15.88	7.09	112.50	0.89	No	Yes
654	22.34	3.03	6.11	0.92	15.61	7.14	111.38	0.88	No	Yes
655	21.82	3.04	6.12	0.92	15.17	7.25	109.94	0.85	No	Yes
656	20.93	3.07	6.26	0.93	14.44	7.52	108.55	0.81	No	Yes
657	20.31	3.08	6.33	0.93	13.92	7.70	107.18	0.78	No	Yes
658	19.33	3.11	6.55	0.94	13.11	8.07	105.79	0.74	No	Yes
659	18.11	3.15	6.91	0.95	12.11	8.60	104.19	0.69	No	Yes
660	16.95	3.19	7.27	0.97	11.17	9.16	102.30	0.63	No	Yes
661	16.16	3.21	7.21	0.97	10.53	9.40	98.96	0.60	No	Yes
662	15.93	3.20	6.69	0.97	10.35	9.19	95.05	0.59	No	Yes
663	15.83	3.17	5.98	0.96	10.28	8.79	90.38	0.58	No	Yes
664	15.78	3.14	5.48	0.95	10.24	8.49	86.98	0.58	No	Yes
665	15.66	3.13	5.16	0.95	10.14	8.33	84.43	0.57	No	Yes
666	15.57	3.12	4.88	0.94	10.06	8.17	82.19	0.57	No	Yes
667	15.67	3.10	4.52	0.94	10.14	7.88	79.94	0.57	No	Yes
668	15.85	3.07	4.18	0.93	10.28	7.57	77.80	0.58	No	Yes
669	15.97	3.06	3.99	0.92	10.37	7.39	76.58	0.58	No	Yes
670	16.34	3.04	3.85	0.92	10.65	7.17	76.39	0.60	No	Yes
671	16.97	3.01	3.68	0.91	11.14	6.86	76.44	0.62	No	Yes
672	17.74	2.98	3.52	0.90	11.74	6.53	76.67	0.66	No	Yes
673	18.28	2.97	3.49	0.90	12.15	6.38	77.49	0.68	No	Yes
674	18.62	2.96	3.53	0.90	12.40	6.33	78.50	0.69	No	Yes
675	19.13	2.95	3.57	0.89	12.78	6.25	79.88	0.71	No	Yes
676	19.50	2.95	3.62	0.89	13.05	6.21	81.04	0.73	No	Yes

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
677	19.49	2.96	3.78	0.90	13.01	6.34	82.56	0.73	No	Yes
678	18.83	3.00	4.11	0.91	12.46	6.74	84.03	0.70	No	Yes
679	17.88	3.05	4.57	0.92	11.68	7.32	85.52	0.66	No	Yes
680	16.96	3.10	5.01	0.94	10.92	7.90	86.30	0.61	No	Yes
681	16.43	3.13	5.38	0.95	10.48	8.33	87.25	0.59	No	Yes
682	16.46	3.14	5.59	0.95	10.48	8.46	88.72	0.59	No	Yes
683	16.77	3.14	5.71	0.95	10.70	8.45	90.43	0.60	No	Yes
684	17.09	3.13	5.69	0.95	10.93	8.34	91.15	0.62	No	Yes
685	17.30	3.11	5.42	0.94	11.09	8.10	89.88	0.62	No	Yes
686	17.88	3.08	4.94	0.93	11.54	7.62	88.01	0.65	No	Yes
687	18.89	3.02	4.42	0.91	12.33	7.01	86.41	0.69	No	Yes
688	20.44	2.97	4.02	0.90	13.55	6.37	86.28	0.76	No	Yes
689	21.66	2.93	3.82	0.89	14.49	5.98	86.73	0.81	No	Yes
690	22.69	2.90	3.73	0.88	15.29	5.74	87.70	0.85	No	Yes
691	23.34	2.89	3.74	0.88	15.77	5.65	89.04	0.87	No	Yes
692	24.48	2.87	3.71	0.87	16.64	5.45	90.64	0.92	No	Yes
693	25.35	2.87	3.80	0.87	17.29	5.38	93.09	0.96	No	Yes
694	24.93	2.89	4.07	0.88	16.92	5.64	95.36	0.94	No	Yes
695	23.83	2.94	4.53	0.89	16.01	6.12	97.90	0.89	No	Yes
696	22.47	2.99	5.02	0.91	14.90	6.68	99.48	0.83	No	Yes
697	21.85	3.02	5.31	0.91	14.38	6.98	100.46	0.80	No	Yes
698	21.34	3.03	5.38	0.92	13.97	7.14	99.73	0.78	No	Yes
699	21.09	3.04	5.36	0.92	13.76	7.18	98.86	0.77	No	Yes
700	20.86	3.05	5.40	0.92	13.57	7.27	98.63	0.76	No	Yes
701	20.68	3.06	5.52	0.92	13.41	7.38	99.01	0.75	No	Yes
702	20.54	3.06	5.51	0.93	13.28	7.41	98.47	0.74	No	Yes
703	21.74	3.02	5.16	0.91	14.20	6.94	98.61	0.79	No	Yes
704	22.49	3.00	5.02	0.91	14.76	6.71	99.08	0.82	No	Yes
705	23.06	2.99	4.98	0.90	15.18	6.59	100.00	0.85	No	Yes
706	22.89	2.99	5.01	0.91	15.03	6.64	99.77	0.84	No	Yes
707	23.50	2.97	4.75	0.90	15.49	6.37	98.64	0.86	No	Yes
708	24.56	2.91	4.12	0.88	16.33	5.78	94.46	0.90	No	Yes
709	25.16	2.86	3.62	0.87	16.83	5.35	90.03	0.93	No	Yes
710	25.62	2.83	3.23	0.86	17.20	5.01	86.10	0.95	No	Yes
711	26.27	2.80	3.08	0.85	17.70	4.81	85.17	0.97	No	Yes
712	26.76	2.79	3.02	0.85	18.06	4.71	85.03	0.99	No	Yes
713	26.83	2.79	3.03	0.85	18.09	4.71	85.15	0.99	No	Yes
714	26.59	2.80	3.10	0.85	17.88	4.80	85.73	0.98	No	Yes
715	27.40	2.78	3.03	0.84	18.48	4.65	85.88	4.00	Yes	Yes
716	31.96	2.68	2.57	0.81	22.06	3.85	84.87	4.00	Yes	Yes
717	38.43	2.57	2.21	0.78	27.17	3.14	85.17	4.00	Yes	No
718	45.86	2.48	2.05	0.75	33.02	2.67	88.22	4.00	Yes	No
719	51.87	2.47	2.29	0.75	37.63	2.61	98.13	0.17	No	No
720	57.77	2.46	2.56	0.75	42.13	2.58	108.65	0.20	No	No
721	63.66	2.45	2.79	0.74	46.62	2.55	118.65	0.24	No	No

:: Cyclic Resistance Ratio (CRR) calculation data :: (continued)

Point ID	q_t (tsf)	I_c	Fr (%)	n	q_{t1N}	K_c	$q_{t1N,cs}$	$CRR_{7.5}$	Belongs to transition layer	Clay-like behaviour
722	72.56	2.41	2.76	0.73	53.59	2.34	125.17	0.26	No	No
723	82.89	2.36	2.71	0.72	61.73	2.14	132.29	0.30	No	No
724	96.04	2.29	2.59	0.70	72.17	1.93	139.35	0.33	No	No
725	110.33	2.23	2.44	0.68	83.60	1.75	145.96	0.37	No	No
726	130.68	2.13	2.13	0.65	100.15	1.52	152.41	0.41	No	No
727	179.17	1.94	1.57	0.59	140.40	1.23	172.14	4.00	No	No
728	285.15	1.72	1.25	0.52	228.83	1.05	241.07	4.00	No	No
729	414.58	1.56	1.05	0.50	335.90	1.00	335.90	4.00	No	No
730	519.04	1.48	0.99	0.50	420.81	1.00	420.81	4.00	No	No
731	562.40	1.43	0.91	0.50	455.78	1.00	455.78	4.00	No	No
732	577.25	1.41	0.88	0.50	467.56	1.00	467.56	4.00	No	No
733	584.34	1.40	0.85	0.50	472.94	1.00	472.94	4.00	No	No
734	600.64	1.38	0.82	0.50	485.87	1.00	485.87	4.00	No	No

Abbreviations

q_t: Total cone resistance
I_c: Soil behavior type index
Fr: Normalized friction ratio (%)
n: Stress exponent
q_{t1N}: Normalized cone resistance
K_c: Cone resistance correction factor due to fines
$q_{t1N,cs}$: Normalized and adjusted cone resistance
$CRR_{7.5}$: Cyclic resistance ratio for M_w=7.5

:: Liquefaction Potential Index calculation data ::

Point ID	F_s	F_L	w_z	d_z	LPI
2	2.00	0.00	9.99	0.07	0.00
4	2.00	0.00	9.97	0.07	0.00
6	2.00	0.00	9.95	0.07	0.00
8	2.00	0.00	9.93	0.07	0.00
10	2.00	0.00	9.91	0.07	0.00
12	2.00	0.00	9.89	0.06	0.00
14	2.00	0.00	9.87	0.06	0.00
16	2.00	0.00	9.85	0.06	0.00
18	2.00	0.00	9.83	0.07	0.00
20	2.00	0.00	9.81	0.07	0.00
22	2.00	0.00	9.79	0.07	0.00
24	2.00	0.00	9.77	0.07	0.00
26	2.00	0.00	9.75	0.07	0.00
28	2.00	0.00	9.73	0.06	0.00
30	2.00	0.00	9.71	0.06	0.00
32	2.00	0.00	9.69	0.06	0.00
34	2.00	0.00	9.67	0.06	0.00
36	2.00	0.00	9.65	0.07	0.00
38	2.00	0.00	9.63	0.07	0.00
40	2.00	0.00	9.61	0.07	0.00
42	2.00	0.00	9.59	0.07	0.00
44	2.00	0.00	9.57	0.06	0.00
46	2.00	0.00	9.55	0.06	0.00
48	2.00	0.00	9.53	0.06	0.00
50	2.00	0.00	9.51	0.06	0.00
52	2.00	0.00	9.49	0.07	0.00
54	2.00	0.00	9.47	0.07	0.00
56	2.00	0.00	9.45	0.07	0.00
58	2.00	0.00	9.43	0.07	0.00
60	2.00	0.00	9.41	0.07	0.00
62	2.00	0.00	9.39	0.06	0.00
64	2.00	0.00	9.37	0.06	0.00
66	2.00	0.00	9.35	0.06	0.00
68	2.00	0.00	9.33	0.07	0.00
70	2.00	0.00	9.31	0.07	0.00
72	2.00	0.00	9.29	0.07	0.00
74	2.00	0.00	9.27	0.07	0.00
76	2.00	0.00	9.25	0.07	0.00
78	2.00	0.00	9.23	0.06	0.00
80	2.00	0.00	9.21	0.06	0.00
82	2.00	0.00	9.19	0.06	0.00
84	2.00	0.00	9.17	0.06	0.00
86	2.00	0.00	9.15	0.07	0.00
88	2.00	0.00	9.13	0.07	0.00
90	2.00	0.00	9.11	0.07	0.00
92	2.00	0.00	9.09	0.07	0.00
94	2.00	0.00	9.07	0.06	0.00
96	2.00	0.00	9.05	0.06	0.00

Point ID	F_s	F_L	w_z	d_z	LPI
3	2.00	0.00	9.98	0.06	0.00
5	2.00	0.00	9.96	0.06	0.00
7	2.00	0.00	9.94	0.06	0.00
9	2.00	0.00	9.92	0.06	0.00
11	2.00	0.00	9.90	0.07	0.00
13	2.00	0.00	9.88	0.07	0.00
15	2.00	0.00	9.86	0.07	0.00
17	2.00	0.00	9.84	0.07	0.00
19	2.00	0.00	9.82	0.06	0.00
21	2.00	0.00	9.80	0.06	0.00
23	2.00	0.00	9.78	0.06	0.00
25	2.00	0.00	9.76	0.06	0.00
27	2.00	0.00	9.74	0.07	0.00
29	2.00	0.00	9.72	0.07	0.00
31	2.00	0.00	9.70	0.07	0.00
33	2.00	0.00	9.68	0.07	0.00
35	2.00	0.00	9.66	0.07	0.00
37	2.00	0.00	9.64	0.06	0.00
39	2.00	0.00	9.62	0.06	0.00
41	2.00	0.00	9.60	0.06	0.00
43	2.00	0.00	9.58	0.07	0.00
45	2.00	0.00	9.56	0.07	0.00
47	2.00	0.00	9.54	0.07	0.00
49	2.00	0.00	9.52	0.07	0.00
51	2.00	0.00	9.50	0.07	0.00
53	2.00	0.00	9.48	0.06	0.00
55	2.00	0.00	9.46	0.06	0.00
57	2.00	0.00	9.44	0.06	0.00
59	2.00	0.00	9.42	0.06	0.00
61	2.00	0.00	9.40	0.07	0.00
63	2.00	0.00	9.38	0.07	0.00
65	2.00	0.00	9.36	0.07	0.00
67	2.00	0.00	9.34	0.07	0.00
69	2.00	0.00	9.32	0.06	0.00
71	2.00	0.00	9.30	0.06	0.00
73	2.00	0.00	9.28	0.06	0.00
75	2.00	0.00	9.26	0.06	0.00
77	2.00	0.00	9.24	0.07	0.00
79	2.00	0.00	9.22	0.07	0.00
81	2.00	0.00	9.20	0.07	0.00
83	2.00	0.00	9.18	0.07	0.00
85	2.00	0.00	9.16	0.07	0.00
87	2.00	0.00	9.14	0.06	0.00
89	2.00	0.00	9.12	0.06	0.00
91	2.00	0.00	9.10	0.06	0.00
93	2.00	0.00	9.08	0.07	0.00
95	2.00	0.00	9.06	0.07	0.00
97	2.00	0.00	9.04	0.07	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI
98	2.00	0.00	9.03	0.06	0.00
100	2.00	0.00	9.01	0.06	0.00
102	2.00	0.00	8.99	0.07	0.00
104	2.00	0.00	8.97	0.07	0.00
106	2.00	0.00	8.95	0.07	0.00
108	2.00	0.00	8.93	0.07	0.00
110	0.55	0.45	8.91	0.07	0.09
112	0.69	0.31	8.89	0.06	0.05
114	0.87	0.13	8.87	0.06	0.02
116	2.00	0.00	8.85	0.06	0.00
118	2.00	0.00	8.83	0.07	0.00
120	2.00	0.00	8.81	0.07	0.00
122	2.00	0.00	8.79	0.07	0.00
124	2.00	0.00	8.77	0.07	0.00
126	2.00	0.00	8.75	0.07	0.00
128	2.00	0.00	8.73	0.06	0.00
130	2.00	0.00	8.71	0.06	0.00
132	2.00	0.00	8.69	0.06	0.00
134	2.00	0.00	8.67	0.06	0.00
136	2.00	0.00	8.65	0.07	0.00
138	2.00	0.00	8.63	0.07	0.00
140	2.00	0.00	8.61	0.07	0.00
142	2.00	0.00	8.59	0.07	0.00
144	2.00	0.00	8.57	0.06	0.00
146	2.00	0.00	8.55	0.06	0.00
148	2.00	0.00	8.53	0.06	0.00
150	2.00	0.00	8.51	0.06	0.00
152	2.00	0.00	8.49	0.07	0.00
154	2.00	0.00	8.47	0.07	0.00
156	2.00	0.00	8.45	0.07	0.00
158	2.00	0.00	8.43	0.07	0.00
160	2.00	0.00	8.41	0.07	0.00
162	2.00	0.00	8.39	0.06	0.00
164	2.00	0.00	8.37	0.06	0.00
166	2.00	0.00	8.35	0.06	0.00
168	2.00	0.00	8.33	0.07	0.00
170	2.00	0.00	8.31	0.07	0.00
172	2.00	0.00	8.29	0.07	0.00
174	2.00	0.00	8.27	0.07	0.00
176	2.00	0.00	8.25	0.07	0.00
178	2.00	0.00	8.23	0.06	0.00
180	2.00	0.00	8.21	0.06	0.00
182	1.65	0.00	8.19	0.06	0.00
184	1.38	0.00	8.17	0.06	0.00
186	1.45	0.00	8.15	0.07	0.00
188	2.00	0.00	8.13	0.07	0.00
190	0.25	0.75	8.11	0.07	0.13
192	2.00	0.00	8.09	0.07	0.00

Point ID	F_s	F_L	w_z	d_z	LPI
99	2.00	0.00	9.02	0.07	0.00
101	2.00	0.00	9.00	0.07	0.00
103	2.00	0.00	8.98	0.06	0.00
105	2.00	0.00	8.96	0.06	0.00
107	2.00	0.00	8.94	0.06	0.00
109	0.55	0.45	8.92	0.06	0.07
111	0.61	0.39	8.90	0.07	0.07
113	0.80	0.20	8.88	0.07	0.04
115	2.00	0.00	8.86	0.07	0.00
117	2.00	0.00	8.84	0.07	0.00
119	2.00	0.00	8.82	0.06	0.00
121	2.00	0.00	8.80	0.06	0.00
123	2.00	0.00	8.78	0.06	0.00
125	2.00	0.00	8.76	0.06	0.00
127	2.00	0.00	8.74	0.07	0.00
129	2.00	0.00	8.72	0.07	0.00
131	2.00	0.00	8.70	0.07	0.00
133	2.00	0.00	8.68	0.07	0.00
135	2.00	0.00	8.66	0.07	0.00
137	2.00	0.00	8.64	0.06	0.00
139	2.00	0.00	8.62	0.06	0.00
141	2.00	0.00	8.60	0.06	0.00
143	2.00	0.00	8.58	0.07	0.00
145	2.00	0.00	8.56	0.07	0.00
147	2.00	0.00	8.54	0.07	0.00
149	2.00	0.00	8.52	0.07	0.00
151	2.00	0.00	8.50	0.07	0.00
153	2.00	0.00	8.48	0.06	0.00
155	2.00	0.00	8.46	0.06	0.00
157	2.00	0.00	8.44	0.06	0.00
159	2.00	0.00	8.42	0.06	0.00
161	2.00	0.00	8.40	0.07	0.00
163	2.00	0.00	8.38	0.07	0.00
165	2.00	0.00	8.36	0.07	0.00
167	2.00	0.00	8.34	0.07	0.00
169	2.00	0.00	8.32	0.06	0.00
171	2.00	0.00	8.30	0.06	0.00
173	2.00	0.00	8.28	0.06	0.00
175	2.00	0.00	8.26	0.06	0.00
177	2.00	0.00	8.24	0.07	0.00
179	2.00	0.00	8.22	0.07	0.00
181	1.82	0.00	8.20	0.07	0.00
183	1.51	0.00	8.18	0.07	0.00
185	1.29	0.00	8.16	0.07	0.00
187	1.82	0.00	8.14	0.06	0.00
189	2.00	0.00	8.12	0.06	0.00
191	2.00	0.00	8.10	0.06	0.00
193	2.00	0.00	8.08	0.07	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI	Point ID	F_s	F_L	w_z	d_z	LPI
194	2.00	0.00	8.07	0.06	0.00	195	2.00	0.00	8.06	0.07	0.00
196	0.38	0.62	8.05	0.06	0.09	197	0.44	0.56	8.04	0.07	0.10
198	0.49	0.51	8.03	0.06	0.08	199	0.55	0.45	8.02	0.07	0.08
200	0.62	0.38	8.01	0.06	0.06	201	0.70	0.30	8.00	0.07	0.05
202	0.60	0.40	7.99	0.07	0.07	203	0.52	0.48	7.98	0.06	0.07
204	0.44	0.56	7.97	0.07	0.09	205	0.50	0.50	7.96	0.06	0.07
206	0.55	0.45	7.95	0.07	0.08	207	0.63	0.37	7.94	0.06	0.05
208	0.71	0.29	7.93	0.07	0.05	209	0.80	0.20	7.92	0.06	0.03
210	0.86	0.14	7.91	0.07	0.02	211	0.89	0.11	7.90	0.07	0.02
212	0.89	0.11	7.89	0.06	0.02	213	0.85	0.15	7.88	0.07	0.02
214	0.80	0.20	7.87	0.06	0.03	215	0.75	0.25	7.86	0.07	0.04
216	0.68	0.32	7.85	0.06	0.05	217	0.64	0.36	7.84	0.07	0.06
218	0.64	0.36	7.83	0.07	0.06	219	0.70	0.30	7.82	0.06	0.04
220	0.75	0.25	7.81	0.07	0.04	221	0.80	0.20	7.80	0.06	0.03
222	0.84	0.16	7.79	0.07	0.03	223	0.84	0.16	7.78	0.06	0.02
224	0.84	0.16	7.77	0.07	0.03	225	0.80	0.20	7.76	0.06	0.03
226	0.75	0.25	7.75	0.07	0.04	227	0.67	0.33	7.74	0.07	0.05
228	0.59	0.41	7.73	0.06	0.06	229	0.50	0.50	7.72	0.07	0.08
230	0.44	0.56	7.71	0.06	0.08	231	0.40	0.60	7.70	0.07	0.10
232	0.40	0.60	7.69	0.06	0.08	233	0.42	0.58	7.68	0.07	0.09
234	0.47	0.53	7.67	0.06	0.07	235	0.51	0.49	7.66	0.07	0.08
236	0.54	0.46	7.65	0.07	0.08	237	0.54	0.46	7.64	0.06	0.06
238	0.52	0.48	7.63	0.07	0.08	239	0.47	0.53	7.62	0.06	0.07
240	0.44	0.56	7.61	0.07	0.09	241	0.42	0.58	7.60	0.06	0.08
242	0.38	0.62	7.59	0.07	0.10	243	0.39	0.61	7.58	0.07	0.10
244	0.41	0.59	7.57	0.06	0.08	245	0.45	0.55	7.56	0.07	0.09
246	0.51	0.49	7.55	0.06	0.07	247	0.57	0.43	7.54	0.07	0.07
248	0.65	0.35	7.53	0.06	0.05	249	0.76	0.24	7.52	0.07	0.04
250	0.96	0.04	7.51	0.06	0.01	251	2.00	0.00	7.50	0.07	0.00
252	2.00	0.00	7.49	0.07	0.00	253	2.00	0.00	7.48	0.06	0.00
254	2.00	0.00	7.47	0.07	0.00	255	2.00	0.00	7.46	0.06	0.00
256	2.00	0.00	7.45	0.07	0.00	257	2.00	0.00	7.44	0.06	0.00
258	2.00	0.00	7.43	0.07	0.00	259	2.00	0.00	7.42	0.06	0.00
260	2.00	0.00	7.41	0.07	0.00	261	2.00	0.00	7.40	0.07	0.00
262	2.00	0.00	7.39	0.06	0.00	263	2.00	0.00	7.38	0.07	0.00
264	2.00	0.00	7.37	0.06	0.00	265	2.00	0.00	7.36	0.07	0.00
266	2.00	0.00	7.35	0.06	0.00	267	2.00	0.00	7.34	0.07	0.00
268	2.00	0.00	7.33	0.07	0.00	269	2.00	0.00	7.32	0.06	0.00
270	2.00	0.00	7.31	0.07	0.00	271	2.00	0.00	7.30	0.06	0.00
272	2.00	0.00	7.29	0.07	0.00	273	2.00	0.00	7.28	0.06	0.00
274	2.00	0.00	7.27	0.07	0.00	275	2.00	0.00	7.26	0.06	0.00
276	2.00	0.00	7.25	0.07	0.00	277	2.00	0.00	7.24	0.07	0.00
278	2.00	0.00	7.23	0.06	0.00	279	2.00	0.00	7.22	0.07	0.00
280	2.00	0.00	7.21	0.06	0.00	281	2.00	0.00	7.20	0.07	0.00
282	2.00	0.00	7.19	0.06	0.00	283	2.00	0.00	7.18	0.07	0.00
284	2.00	0.00	7.17	0.06	0.00	285	2.00	0.00	7.16	0.07	0.00
286	2.00	0.00	7.15	0.07	0.00	287	2.00	0.00	7.14	0.06	0.00
288	2.00	0.00	7.13	0.07	0.00	289	2.00	0.00	7.12	0.06	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI
290	2.00	0.00	7.11	0.07	0.00
292	2.00	0.00	7.09	0.07	0.00
294	2.00	0.00	7.07	0.06	0.00
296	2.00	0.00	7.05	0.06	0.00
298	0.90	0.10	7.03	0.06	0.01
300	0.66	0.34	7.01	0.06	0.04
302	0.38	0.62	6.99	0.07	0.09
304	0.27	0.73	6.97	0.07	0.11
306	0.27	0.73	6.95	0.07	0.11
308	0.26	0.74	6.93	0.07	0.11
310	0.25	0.75	6.91	0.07	0.11
312	0.25	0.75	6.89	0.06	0.09
314	0.30	0.70	6.87	0.06	0.09
316	0.55	0.45	6.85	0.06	0.06
318	2.00	0.00	6.83	0.07	0.00
320	2.00	0.00	6.81	0.07	0.00
322	2.00	0.00	6.79	0.07	0.00
324	2.00	0.00	6.77	0.07	0.00
326	2.00	0.00	6.75	0.07	0.00
328	2.00	0.00	6.73	0.06	0.00
330	2.00	0.00	6.71	0.06	0.00
332	2.00	0.00	6.69	0.06	0.00
334	2.00	0.00	6.67	0.06	0.00
336	2.00	0.00	6.65	0.07	0.00
338	2.00	0.00	6.63	0.07	0.00
340	2.00	0.00	6.61	0.07	0.00
342	2.00	0.00	6.59	0.07	0.00
344	2.00	0.00	6.57	0.06	0.00
346	2.00	0.00	6.55	0.06	0.00
348	2.00	0.00	6.53	0.06	0.00
350	2.00	0.00	6.51	0.06	0.00
352	2.00	0.00	6.49	0.07	0.00
354	2.00	0.00	6.47	0.07	0.00
356	2.00	0.00	6.45	0.07	0.00
358	1.66	0.00	6.43	0.07	0.00
360	1.38	0.00	6.41	0.07	0.00
362	1.26	0.00	6.39	0.06	0.00
364	1.15	0.00	6.37	0.06	0.00
366	1.25	0.00	6.35	0.06	0.00
368	1.48	0.00	6.33	0.07	0.00
370	1.60	0.00	6.31	0.07	0.00
372	1.49	0.00	6.29	0.07	0.00
374	1.36	0.00	6.27	0.07	0.00
376	1.27	0.00	6.25	0.07	0.00
378	1.35	0.00	6.23	0.06	0.00
380	1.43	0.00	6.21	0.06	0.00
382	1.38	0.00	6.19	0.06	0.00
384	1.34	0.00	6.17	0.06	0.00

Point ID	F_s	F_L	w_z	d_z	LPI
291	2.00	0.00	7.10	0.06	0.00
293	2.00	0.00	7.08	0.07	0.00
295	2.00	0.00	7.06	0.07	0.00
297	2.00	0.00	7.04	0.07	0.00
299	0.74	0.26	7.02	0.07	0.04
301	0.49	0.51	7.00	0.07	0.08
303	0.29	0.71	6.98	0.06	0.09
305	0.28	0.72	6.96	0.06	0.09
307	0.26	0.74	6.94	0.06	0.09
309	0.25	0.75	6.92	0.06	0.09
311	0.25	0.75	6.90	0.07	0.11
313	0.27	0.73	6.88	0.07	0.11
315	0.34	0.66	6.86	0.07	0.10
317	2.00	0.00	6.84	0.07	0.00
319	2.00	0.00	6.82	0.06	0.00
321	2.00	0.00	6.80	0.06	0.00
323	2.00	0.00	6.78	0.06	0.00
325	2.00	0.00	6.76	0.06	0.00
327	2.00	0.00	6.74	0.07	0.00
329	2.00	0.00	6.72	0.07	0.00
331	2.00	0.00	6.70	0.07	0.00
333	2.00	0.00	6.68	0.07	0.00
335	2.00	0.00	6.66	0.07	0.00
337	2.00	0.00	6.64	0.06	0.00
339	2.00	0.00	6.62	0.06	0.00
341	2.00	0.00	6.60	0.06	0.00
343	2.00	0.00	6.58	0.07	0.00
345	2.00	0.00	6.56	0.07	0.00
347	2.00	0.00	6.54	0.07	0.00
349	2.00	0.00	6.52	0.07	0.00
351	2.00	0.00	6.50	0.07	0.00
353	2.00	0.00	6.48	0.06	0.00
355	2.00	0.00	6.46	0.06	0.00
357	2.00	0.00	6.44	0.06	0.00
359	1.44	0.00	6.42	0.06	0.00
361	1.34	0.00	6.40	0.07	0.00
363	1.18	0.00	6.38	0.07	0.00
365	1.18	0.00	6.36	0.07	0.00
367	1.37	0.00	6.34	0.07	0.00
369	1.56	0.00	6.32	0.06	0.00
371	1.56	0.00	6.30	0.06	0.00
373	1.42	0.00	6.28	0.06	0.00
375	1.30	0.00	6.26	0.06	0.00
377	1.30	0.00	6.24	0.07	0.00
379	1.41	0.00	6.22	0.07	0.00
381	1.42	0.00	6.20	0.07	0.00
383	1.33	0.00	6.18	0.07	0.00
385	1.34	0.00	6.16	0.07	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI
386	1.35	0.00	6.15	0.07	0.00
388	1.29	0.00	6.13	0.07	0.00
390	1.24	0.00	6.11	0.07	0.00
392	1.25	0.00	6.09	0.07	0.00
394	1.26	0.00	6.07	0.06	0.00
396	1.29	0.00	6.05	0.06	0.00
398	1.43	0.00	6.03	0.06	0.00
400	1.61	0.00	6.01	0.06	0.00
402	1.62	0.00	5.99	0.07	0.00
404	1.67	0.00	5.97	0.07	0.00
406	1.83	0.00	5.95	0.07	0.00
408	2.00	0.00	5.93	0.07	0.00
410	2.00	0.00	5.91	0.07	0.00
412	2.00	0.00	5.89	0.06	0.00
414	2.00	0.00	5.87	0.06	0.00
416	2.00	0.00	5.85	0.06	0.00
418	2.00	0.00	5.83	0.07	0.00
420	2.00	0.00	5.81	0.07	0.00
422	1.93	0.00	5.79	0.07	0.00
424	1.59	0.00	5.77	0.07	0.00
426	1.30	0.00	5.75	0.07	0.00
428	1.01	0.00	5.73	0.06	0.00
430	0.86	0.14	5.71	0.06	0.01
432	0.83	0.17	5.69	0.06	0.02
434	0.81	0.19	5.67	0.06	0.02
436	1.03	0.00	5.65	0.07	0.00
438	1.41	0.00	5.63	0.07	0.00
440	1.39	0.00	5.61	0.07	0.00
442	1.29	0.00	5.59	0.07	0.00
444	1.29	0.00	5.57	0.06	0.00
446	1.25	0.00	5.55	0.06	0.00
448	1.30	0.00	5.53	0.06	0.00
450	1.59	0.00	5.51	0.06	0.00
452	2.00	0.00	5.49	0.07	0.00
454	2.00	0.00	5.47	0.07	0.00
456	2.00	0.00	5.45	0.07	0.00
458	2.00	0.00	5.43	0.07	0.00
460	2.00	0.00	5.41	0.07	0.00
462	2.00	0.00	5.39	0.06	0.00
464	2.00	0.00	5.37	0.06	0.00
466	2.00	0.00	5.35	0.06	0.00
468	2.00	0.00	5.33	0.07	0.00
470	0.38	0.62	5.31	0.07	0.07
472	0.54	0.46	5.29	0.07	0.05
474	0.79	0.21	5.27	0.07	0.02
476	2.00	0.00	5.25	0.07	0.00
478	2.00	0.00	5.23	0.06	0.00
480	2.00	0.00	5.21	0.06	0.00

Point ID	F_s	F_L	w_z	d_z	LPI
387	1.32	0.00	6.14	0.06	0.00
389	1.25	0.00	6.12	0.06	0.00
391	1.24	0.00	6.10	0.06	0.00
393	1.24	0.00	6.08	0.07	0.00
395	1.27	0.00	6.06	0.07	0.00
397	1.33	0.00	6.04	0.07	0.00
399	1.53	0.00	6.02	0.07	0.00
401	1.61	0.00	6.00	0.07	0.00
403	1.63	0.00	5.98	0.06	0.00
405	1.71	0.00	5.96	0.06	0.00
407	1.99	0.00	5.94	0.06	0.00
409	2.00	0.00	5.92	0.06	0.00
411	2.00	0.00	5.90	0.07	0.00
413	2.00	0.00	5.88	0.07	0.00
415	2.00	0.00	5.86	0.07	0.00
417	2.00	0.00	5.84	0.07	0.00
419	2.00	0.00	5.82	0.06	0.00
421	2.00	0.00	5.80	0.06	0.00
423	1.75	0.00	5.78	0.06	0.00
425	1.43	0.00	5.76	0.06	0.00
427	1.15	0.00	5.74	0.07	0.00
429	0.89	0.11	5.72	0.07	0.01
431	0.84	0.16	5.70	0.07	0.02
433	0.80	0.20	5.68	0.07	0.02
435	0.88	0.12	5.66	0.07	0.01
437	1.25	0.00	5.64	0.06	0.00
439	1.47	0.00	5.62	0.06	0.00
441	1.32	0.00	5.60	0.06	0.00
443	1.28	0.00	5.58	0.07	0.00
445	1.27	0.00	5.56	0.07	0.00
447	1.25	0.00	5.54	0.07	0.00
449	1.40	0.00	5.52	0.07	0.00
451	1.79	0.00	5.50	0.07	0.00
453	2.00	0.00	5.48	0.06	0.00
455	2.00	0.00	5.46	0.06	0.00
457	2.00	0.00	5.44	0.06	0.00
459	2.00	0.00	5.42	0.06	0.00
461	2.00	0.00	5.40	0.07	0.00
463	2.00	0.00	5.38	0.07	0.00
465	2.00	0.00	5.36	0.07	0.00
467	2.00	0.00	5.34	0.07	0.00
469	2.00	0.00	5.32	0.06	0.00
471	0.44	0.56	5.30	0.06	0.05
473	0.68	0.32	5.28	0.06	0.03
475	2.00	0.00	5.26	0.06	0.00
477	2.00	0.00	5.24	0.07	0.00
479	2.00	0.00	5.22	0.07	0.00
481	2.00	0.00	5.20	0.07	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI	Point ID	F_s	F_L	w_z	d_z	LPI
482	2.00	0.00	5.19	0.06	0.00	483	2.00	0.00	5.18	0.07	0.00
484	1.92	0.00	5.17	0.06	0.00	485	1.53	0.00	5.16	0.07	0.00
486	1.34	0.00	5.15	0.07	0.00	487	1.28	0.00	5.14	0.06	0.00
488	1.27	0.00	5.13	0.07	0.00	489	1.31	0.00	5.12	0.06	0.00
490	1.46	0.00	5.11	0.07	0.00	491	1.69	0.00	5.10	0.06	0.00
492	1.99	0.00	5.09	0.07	0.00	493	2.00	0.00	5.08	0.07	0.00
494	2.00	0.00	5.07	0.06	0.00	495	2.00	0.00	5.06	0.07	0.00
496	1.91	0.00	5.05	0.06	0.00	497	1.65	0.00	5.04	0.07	0.00
498	1.43	0.00	5.03	0.06	0.00	499	1.27	0.00	5.02	0.07	0.00
500	1.14	0.00	5.01	0.06	0.00	501	1.04	0.00	5.00	0.07	0.00
502	1.01	0.00	4.99	0.07	0.00	503	1.01	0.00	4.98	0.06	0.00
504	1.06	0.00	4.97	0.07	0.00	505	1.13	0.00	4.96	0.06	0.00
506	1.31	0.00	4.95	0.07	0.00	507	0.25	0.75	4.94	0.06	0.07
508	0.24	0.76	4.93	0.07	0.08	509	0.27	0.73	4.92	0.06	0.07
510	2.00	0.00	4.91	0.07	0.00	511	2.00	0.00	4.90	0.07	0.00
512	2.00	0.00	4.89	0.06	0.00	513	2.00	0.00	4.88	0.07	0.00
514	2.00	0.00	4.87	0.06	0.00	515	2.00	0.00	4.86	0.07	0.00
516	2.00	0.00	4.85	0.06	0.00	517	2.00	0.00	4.84	0.07	0.00
518	2.00	0.00	4.83	0.07	0.00	519	2.00	0.00	4.82	0.06	0.00
520	2.00	0.00	4.81	0.07	0.00	521	2.00	0.00	4.80	0.06	0.00
522	2.00	0.00	4.79	0.07	0.00	523	2.00	0.00	4.78	0.06	0.00
524	2.00	0.00	4.77	0.07	0.00	525	2.00	0.00	4.76	0.06	0.00
526	2.00	0.00	4.75	0.07	0.00	527	2.00	0.00	4.74	0.07	0.00
528	2.00	0.00	4.73	0.06	0.00	529	2.00	0.00	4.72	0.07	0.00
530	2.00	0.00	4.71	0.06	0.00	531	2.00	0.00	4.70	0.07	0.00
532	2.00	0.00	4.69	0.06	0.00	533	0.92	0.08	4.68	0.07	0.01
534	2.00	0.00	4.67	0.06	0.00	535	2.00	0.00	4.66	0.07	0.00
536	2.00	0.00	4.65	0.07	0.00	537	1.74	0.00	4.64	0.06	0.00
538	1.40	0.00	4.63	0.07	0.00	539	1.18	0.00	4.62	0.06	0.00
540	1.10	0.00	4.61	0.07	0.00	541	1.11	0.00	4.60	0.06	0.00
542	1.15	0.00	4.59	0.07	0.00	543	1.19	0.00	4.58	0.07	0.00
544	1.21	0.00	4.57	0.06	0.00	545	1.21	0.00	4.56	0.07	0.00
546	1.18	0.00	4.55	0.06	0.00	547	1.12	0.00	4.54	0.07	0.00
548	1.07	0.00	4.53	0.06	0.00	549	1.04	0.00	4.52	0.07	0.00
550	1.05	0.00	4.51	0.06	0.00	551	1.07	0.00	4.50	0.07	0.00
552	1.11	0.00	4.49	0.07	0.00	553	1.15	0.00	4.48	0.06	0.00
554	1.19	0.00	4.47	0.07	0.00	555	1.22	0.00	4.46	0.06	0.00
556	1.24	0.00	4.45	0.07	0.00	557	1.23	0.00	4.44	0.06	0.00
558	1.22	0.00	4.43	0.07	0.00	559	1.21	0.00	4.42	0.06	0.00
560	1.22	0.00	4.41	0.07	0.00	561	1.25	0.00	4.40	0.07	0.00
562	1.28	0.00	4.39	0.06	0.00	563	1.32	0.00	4.38	0.07	0.00
564	1.35	0.00	4.37	0.06	0.00	565	1.36	0.00	4.36	0.07	0.00
566	1.33	0.00	4.35	0.06	0.00	567	1.27	0.00	4.34	0.07	0.00
568	1.20	0.00	4.33	0.07	0.00	569	1.13	0.00	4.32	0.06	0.00
570	1.04	0.00	4.31	0.07	0.00	571	0.95	0.05	4.30	0.06	0.00
572	0.87	0.13	4.29	0.07	0.01	573	0.84	0.16	4.28	0.06	0.01
574	0.81	0.19	4.27	0.07	0.02	575	0.80	0.20	4.26	0.06	0.02
576	0.84	0.16	4.25	0.07	0.01	577	0.91	0.09	4.24	0.07	0.01

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI	Point ID	F_s	F_L	w_z	d_z	LPI
578	0.99	0.01	4.23	0.06	0.00	579	1.10	0.00	4.22	0.07	0.00
580	1.24	0.00	4.21	0.06	0.00	581	2.00	0.00	4.20	0.07	0.00
582	2.00	0.00	4.19	0.06	0.00	583	2.00	0.00	4.18	0.07	0.00
584	2.00	0.00	4.17	0.06	0.00	585	2.00	0.00	4.16	0.07	0.00
586	2.00	0.00	4.15	0.07	0.00	587	2.00	0.00	4.14	0.06	0.00
588	2.00	0.00	4.13	0.07	0.00	589	2.00	0.00	4.12	0.06	0.00
590	2.00	0.00	4.11	0.07	0.00	591	2.00	0.00	4.10	0.06	0.00
592	2.00	0.00	4.09	0.07	0.00	593	2.00	0.00	4.08	0.07	0.00
594	2.00	0.00	4.07	0.06	0.00	595	2.00	0.00	4.06	0.07	0.00
596	2.00	0.00	4.05	0.06	0.00	597	2.00	0.00	4.04	0.07	0.00
598	2.00	0.00	4.03	0.06	0.00	599	2.00	0.00	4.02	0.07	0.00
600	2.00	0.00	4.01	0.06	0.00	601	2.00	0.00	4.00	0.07	0.00
602	2.00	0.00	3.99	0.07	0.00	603	2.00	0.00	3.98	0.06	0.00
604	2.00	0.00	3.97	0.07	0.00	605	2.00	0.00	3.96	0.06	0.00
606	2.00	0.00	3.95	0.07	0.00	607	2.00	0.00	3.94	0.06	0.00
608	2.00	0.00	3.93	0.07	0.00	609	2.00	0.00	3.92	0.06	0.00
610	2.00	0.00	3.91	0.07	0.00	611	2.00	0.00	3.90	0.07	0.00
612	2.00	0.00	3.89	0.06	0.00	613	2.00	0.00	3.88	0.07	0.00
614	2.00	0.00	3.87	0.06	0.00	615	2.00	0.00	3.86	0.07	0.00
616	2.00	0.00	3.85	0.06	0.00	617	2.00	0.00	3.84	0.07	0.00
618	2.00	0.00	3.83	0.07	0.00	619	2.00	0.00	3.82	0.06	0.00
620	2.00	0.00	3.81	0.07	0.00	621	2.00	0.00	3.80	0.06	0.00
622	2.00	0.00	3.79	0.07	0.00	623	2.00	0.00	3.78	0.06	0.00
624	2.00	0.00	3.77	0.07	0.00	625	2.00	0.00	3.76	0.06	0.00
626	2.00	0.00	3.75	0.07	0.00	627	2.00	0.00	3.74	0.07	0.00
628	1.88	0.00	3.73	0.06	0.00	629	1.40	0.00	3.72	0.07	0.00
630	1.20	0.00	3.71	0.06	0.00	631	1.10	0.00	3.70	0.07	0.00
632	1.05	0.00	3.69	0.06	0.00	633	1.01	0.00	3.68	0.07	0.00
634	0.99	0.01	3.67	0.06	0.00	635	1.00	0.00	3.66	0.07	0.00
636	1.03	0.00	3.65	0.07	0.00	637	1.09	0.00	3.64	0.06	0.00
638	1.16	0.00	3.63	0.07	0.00	639	1.32	0.00	3.62	0.06	0.00
640	1.48	0.00	3.61	0.07	0.00	641	1.64	0.00	3.60	0.06	0.00
642	1.76	0.00	3.59	0.07	0.00	643	1.86	0.00	3.58	0.07	0.00
644	1.93	0.00	3.57	0.06	0.00	645	1.96	0.00	3.56	0.07	0.00
646	1.99	0.00	3.55	0.06	0.00	647	1.96	0.00	3.54	0.07	0.00
648	1.90	0.00	3.53	0.06	0.00	649	1.81	0.00	3.52	0.07	0.00
650	1.77	0.00	3.51	0.06	0.00	651	1.74	0.00	3.50	0.07	0.00
652	1.74	0.00	3.49	0.07	0.00	653	1.75	0.00	3.48	0.06	0.00
654	1.72	0.00	3.47	0.07	0.00	655	1.67	0.00	3.46	0.06	0.00
656	1.59	0.00	3.45	0.07	0.00	657	1.54	0.00	3.44	0.06	0.00
658	1.45	0.00	3.43	0.07	0.00	659	1.34	0.00	3.42	0.06	0.00
660	1.24	0.00	3.41	0.07	0.00	661	1.17	0.00	3.40	0.07	0.00
662	1.15	0.00	3.39	0.06	0.00	663	1.14	0.00	3.38	0.07	0.00
664	1.14	0.00	3.37	0.06	0.00	665	1.13	0.00	3.36	0.07	0.00
666	1.12	0.00	3.35	0.06	0.00	667	1.12	0.00	3.34	0.07	0.00
668	1.14	0.00	3.33	0.07	0.00	669	1.15	0.00	3.32	0.06	0.00
670	1.18	0.00	3.31	0.07	0.00	671	1.23	0.00	3.30	0.06	0.00
672	1.29	0.00	3.29	0.07	0.00	673	1.34	0.00	3.28	0.06	0.00

:: Lateral displacement index calculation :: (continued)

Point ID	F_s	F_L	w_z	d_z	LPI	Point ID	F_s	F_L	w_z	d_z	LPI
674	1.36	0.00	3.27	0.07	0.00	675	1.40	0.00	3.26	0.06	0.00
676	1.43	0.00	3.25	0.07	0.00	677	1.43	0.00	3.24	0.07	0.00
678	1.37	0.00	3.23	0.06	0.00	679	1.29	0.00	3.22	0.07	0.00
680	1.21	0.00	3.21	0.06	0.00	681	1.17	0.00	3.20	0.07	0.00
682	1.17	0.00	3.19	0.06	0.00	683	1.19	0.00	3.18	0.07	0.00
684	1.22	0.00	3.17	0.06	0.00	685	1.24	0.00	3.16	0.07	0.00
686	1.28	0.00	3.15	0.07	0.00	687	1.37	0.00	3.14	0.06	0.00
688	1.49	0.00	3.13	0.07	0.00	689	1.59	0.00	3.12	0.06	0.00
690	1.68	0.00	3.11	0.07	0.00	691	1.73	0.00	3.10	0.06	0.00
692	1.82	0.00	3.09	0.07	0.00	693	1.89	0.00	3.08	0.07	0.00
694	1.86	0.00	3.07	0.06	0.00	695	1.77	0.00	3.06	0.07	0.00
696	1.65	0.00	3.05	0.06	0.00	697	1.60	0.00	3.04	0.07	0.00
698	1.55	0.00	3.03	0.06	0.00	699	1.53	0.00	3.02	0.07	0.00
700	1.51	0.00	3.01	0.06	0.00	701	1.49	0.00	3.00	0.07	0.00
702	1.48	0.00	2.99	0.07	0.00	703	1.58	0.00	2.98	0.06	0.00
704	1.64	0.00	2.97	0.07	0.00	705	1.68	0.00	2.96	0.06	0.00
706	1.67	0.00	2.95	0.07	0.00	707	1.72	0.00	2.94	0.06	0.00
708	1.80	0.00	2.93	0.07	0.00	709	1.85	0.00	2.92	0.06	0.00
710	1.89	0.00	2.91	0.07	0.00	711	1.94	0.00	2.90	0.07	0.00
712	1.98	0.00	2.89	0.06	0.00	713	1.98	0.00	2.88	0.07	0.00
714	1.96	0.00	2.87	0.06	0.00	715	2.00	0.00	2.86	0.07	0.00
716	2.00	0.00	2.85	0.06	0.00	717	2.00	0.00	2.84	0.07	0.00
718	2.00	0.00	2.83	0.07	0.00	719	0.36	0.64	2.82	0.06	0.03
720	0.43	0.57	2.81	0.07	0.03	721	0.51	0.49	2.80	0.06	0.03
722	0.57	0.43	2.79	0.07	0.03	723	0.64	0.36	2.78	0.06	0.02
724	0.72	0.28	2.77	0.07	0.02	725	0.80	0.20	2.76	0.06	0.01
726	0.88	0.12	2.75	0.07	0.01	727	2.00	0.00	2.74	0.07	0.00
728	2.00	0.00	2.73	0.06	0.00	729	2.00	0.00	2.72	0.07	0.00
730	2.00	0.00	2.71	0.06	0.00	731	2.00	0.00	2.70	0.07	0.00
732	2.00	0.00	2.69	0.06	0.00	733	2.00	0.00	2.68	0.07	0.00
734	2.00	0.00	2.67	0.06	0.00						

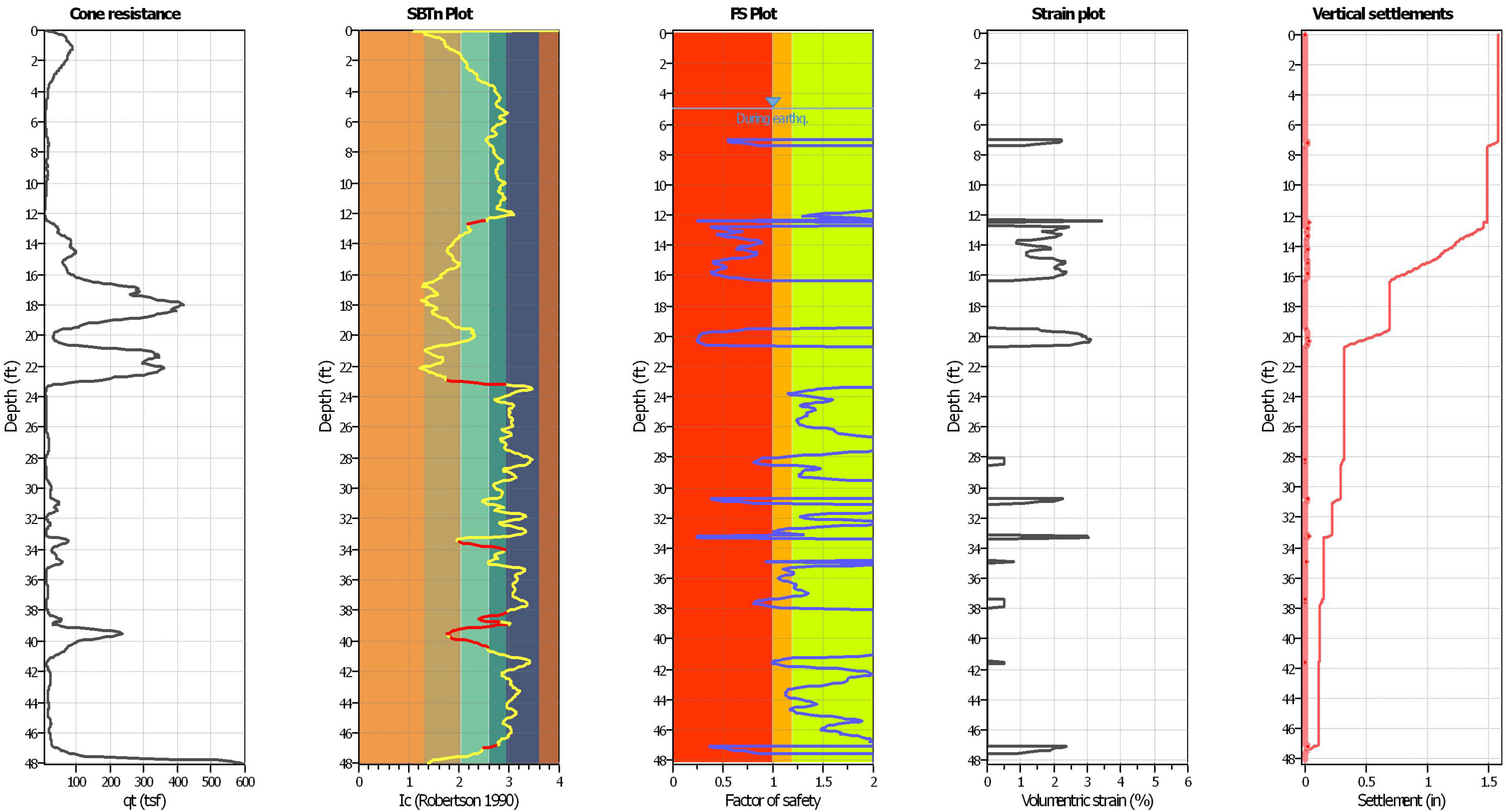
Overall liquefaction potential: 6.24

LPI = 0.00 - Liquefaction risk very low
LPI between 0.00 and 5.00 - Liquefaction risk low
LPI between 5.00 and 15.00 - Liquefaction risk high
LPI > 15.00 - Liquefaction risk very high

Abbreviations

F_s: Calculated factor of safety for test point
F_L: F_L:
w_z: Function value of the extend of soil liquefaction according to depth
d_z: Layer thickness (ft)

Estimation of liquefaction-induced ground settlements



Abbreviations

q_t:	Total cone resistance (cone resistance q_c corrected for pore water effects)
I_c:	Soil Behaviour Type Index
FS:	Calculated Factor of Safety against liquefaction
Volumentric strain:	Post-liquefaction volumentric strain

:: Settlements for saturated sands ::

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
2	368.88	2.00	0.00	0.00
4	374.89	2.00	0.00	0.00
6	424.49	2.00	0.00	0.00
8	402.71	2.00	0.00	0.00
10	379.64	2.00	0.00	0.00
12	391.39	2.00	0.00	0.00
14	390.30	2.00	0.00	0.00
16	392.63	2.00	0.00	0.00
18	404.54	2.00	0.00	0.00
20	415.19	2.00	0.00	0.00
22	432.17	2.00	0.00	0.00
24	438.36	2.00	0.00	0.00
26	425.31	2.00	0.00	0.00
28	413.90	2.00	0.00	0.00
30	396.15	2.00	0.00	0.00
32	388.31	2.00	0.00	0.00
34	377.06	2.00	0.00	0.00
36	349.82	2.00	0.00	0.00
38	305.94	2.00	0.00	0.00
40	288.70	2.00	0.00	0.00
42	287.04	2.00	0.00	0.00
44	278.96	2.00	0.00	0.00
46	264.47	2.00	0.00	0.00
48	245.70	2.00	0.00	0.00
50	219.66	2.00	0.00	0.00
52	219.57	2.00	0.00	0.00
54	233.56	2.00	0.00	0.00
56	245.62	2.00	0.00	0.00
58	254.23	2.00	0.00	0.00
60	245.36	2.00	0.00	0.00
62	237.12	2.00	0.00	0.00
64	238.55	2.00	0.00	0.00
66	237.29	2.00	0.00	0.00
68	230.93	2.00	0.00	0.00
70	213.95	2.00	0.00	0.00
72	190.00	2.00	0.00	0.00
74	170.67	2.00	0.00	0.00
76	162.49	2.00	0.00	0.00
78	157.73	2.00	0.00	0.00
80	149.61	2.00	0.00	0.00
82	132.24	2.00	0.00	0.00
84	141.05	2.00	0.00	0.00
86	126.65	2.00	0.00	0.00
88	119.07	2.00	0.00	0.00
90	129.81	2.00	0.00	0.00
92	127.53	2.00	0.00	0.00
94	116.93	2.00	0.00	0.00
96	101.22	2.00	0.00	0.00

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
3	348.34	2.00	0.00	0.00
5	414.95	2.00	0.00	0.00
7	423.62	2.00	0.00	0.00
9	386.12	2.00	0.00	0.00
11	383.37	2.00	0.00	0.00
13	392.94	2.00	0.00	0.00
15	388.23	2.00	0.00	0.00
17	399.17	2.00	0.00	0.00
19	412.50	2.00	0.00	0.00
21	424.81	2.00	0.00	0.00
23	441.20	2.00	0.00	0.00
25	432.73	2.00	0.00	0.00
27	420.80	2.00	0.00	0.00
29	405.14	2.00	0.00	0.00
31	390.66	2.00	0.00	0.00
33	383.04	2.00	0.00	0.00
35	369.57	2.00	0.00	0.00
37	330.20	2.00	0.00	0.00
39	296.82	2.00	0.00	0.00
41	287.71	2.00	0.00	0.00
43	284.18	2.00	0.00	0.00
45	271.12	2.00	0.00	0.00
47	255.93	2.00	0.00	0.00
49	230.62	2.00	0.00	0.00
51	214.35	2.00	0.00	0.00
53	226.72	2.00	0.00	0.00
55	238.69	2.00	0.00	0.00
57	251.24	2.00	0.00	0.00
59	251.40	2.00	0.00	0.00
61	239.71	2.00	0.00	0.00
63	237.66	2.00	0.00	0.00
65	238.18	2.00	0.00	0.00
67	234.61	2.00	0.00	0.00
69	224.37	2.00	0.00	0.00
71	202.74	2.00	0.00	0.00
73	180.00	2.00	0.00	0.00
75	165.37	2.00	0.00	0.00
77	158.23	2.00	0.00	0.00
79	155.11	2.00	0.00	0.00
81	137.29	2.00	0.00	0.00
83	136.48	2.00	0.00	0.00
85	136.91	2.00	0.00	0.00
87	118.61	2.00	0.00	0.00
89	124.20	2.00	0.00	0.00
91	129.44	2.00	0.00	0.00
93	123.32	2.00	0.00	0.00
95	107.59	2.00	0.00	0.00
97	97.23	2.00	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
98	96.90	2.00	0.00	0.00	99	96.73	2.00	0.00	0.00
100	97.61	2.00	0.00	0.00	101	99.72	2.00	0.00	0.00
102	104.19	2.00	0.00	0.00	103	109.17	2.00	0.00	0.00
104	113.33	2.00	0.00	0.00	105	114.50	2.00	0.00	0.00
106	113.10	2.00	0.00	0.00	107	109.89	2.00	0.00	0.00
108	105.97	2.00	0.00	0.00	109	104.72	0.55	2.25	0.02
110	104.81	0.55	2.25	0.02	111	111.49	0.61	2.14	0.02
112	118.77	0.69	1.93	0.01	113	127.71	0.80	1.42	0.01
114	133.23	0.87	1.03	0.01	115	139.33	2.00	0.00	0.00
116	145.25	2.00	0.00	0.00	117	150.90	2.00	0.00	0.00
118	153.01	2.00	0.00	0.00	119	155.16	2.00	0.00	0.00
120	154.88	2.00	0.00	0.00	121	155.00	2.00	0.00	0.00
122	151.97	2.00	0.00	0.00	123	150.75	2.00	0.00	0.00
124	153.52	2.00	0.00	0.00	125	159.22	2.00	0.00	0.00
126	163.50	2.00	0.00	0.00	127	163.88	2.00	0.00	0.00
128	160.72	2.00	0.00	0.00	129	157.32	2.00	0.00	0.00
130	157.02	2.00	0.00	0.00	131	159.01	2.00	0.00	0.00
132	159.61	2.00	0.00	0.00	133	157.49	2.00	0.00	0.00
134	151.72	2.00	0.00	0.00	135	147.51	2.00	0.00	0.00
136	145.18	2.00	0.00	0.00	137	145.05	2.00	0.00	0.00
138	141.28	2.00	0.00	0.00	139	133.14	2.00	0.00	0.00
140	125.34	2.00	0.00	0.00	141	122.56	2.00	0.00	0.00
142	125.98	2.00	0.00	0.00	143	130.96	2.00	0.00	0.00
144	134.76	2.00	0.00	0.00	145	133.95	2.00	0.00	0.00
146	133.68	2.00	0.00	0.00	147	133.66	2.00	0.00	0.00
148	134.70	2.00	0.00	0.00	149	133.97	2.00	0.00	0.00
150	137.65	2.00	0.00	0.00	151	142.33	2.00	0.00	0.00
152	148.85	2.00	0.00	0.00	153	149.55	2.00	0.00	0.00
154	147.75	2.00	0.00	0.00	155	141.64	2.00	0.00	0.00
156	134.06	2.00	0.00	0.00	157	128.16	2.00	0.00	0.00
158	124.00	2.00	0.00	0.00	159	124.04	2.00	0.00	0.00
160	123.60	2.00	0.00	0.00	161	121.75	2.00	0.00	0.00
162	119.45	2.00	0.00	0.00	163	118.37	2.00	0.00	0.00
164	118.94	2.00	0.00	0.00	165	117.17	2.00	0.00	0.00
166	114.61	2.00	0.00	0.00	167	115.60	2.00	0.00	0.00
168	118.41	2.00	0.00	0.00	169	117.94	2.00	0.00	0.00
170	110.79	2.00	0.00	0.00	171	99.98	2.00	0.00	0.00
172	90.94	2.00	0.00	0.00	173	85.07	2.00	0.00	0.00
174	82.20	2.00	0.00	0.00	175	79.93	2.00	0.00	0.00
176	79.97	2.00	0.00	0.00	177	81.88	2.00	0.00	0.00
178	80.51	2.00	0.00	0.00	179	76.29	2.00	0.00	0.00
180	69.78	2.00	0.00	0.00	181	71.31	1.82	0.00	0.00
182	75.53	1.65	0.00	0.00	183	78.72	1.51	0.00	0.00
184	78.29	1.38	0.00	0.00	185	76.00	1.29	0.00	0.00
186	71.95	1.45	0.00	0.00	187	67.40	1.82	0.00	0.00
188	62.05	2.00	0.00	0.00	189	61.31	2.00	0.00	0.00
190	62.02	0.25	3.46	0.03	191	66.38	2.00	0.00	0.00
192	69.75	2.00	0.00	0.00	193	73.69	2.00	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
194	77.70	2.00	0.00	0.00	195	85.40	2.00	0.00	0.00
196	94.36	0.38	2.45	0.02	197	103.59	0.44	2.27	0.02
198	110.76	0.49	2.15	0.02	199	118.34	0.55	2.04	0.02
200	125.29	0.62	1.94	0.01	201	132.23	0.70	1.65	0.01
202	122.94	0.60	1.97	0.02	203	114.38	0.52	2.09	0.02
204	105.19	0.44	2.24	0.02	205	112.20	0.50	2.13	0.02
206	118.96	0.55	2.03	0.02	207	126.97	0.63	1.92	0.01
208	134.13	0.71	1.62	0.01	209	141.01	0.80	1.23	0.01
210	145.51	0.86	0.90	0.01	211	148.19	0.89	0.88	0.01
212	147.91	0.89	0.88	0.01	213	145.70	0.85	0.90	0.01
214	141.84	0.80	1.22	0.01	215	137.56	0.75	1.56	0.01
216	131.57	0.68	1.67	0.01	217	128.38	0.64	1.90	0.02
218	128.26	0.64	1.91	0.02	219	133.61	0.70	1.63	0.01
220	138.36	0.75	1.26	0.01	221	142.50	0.80	1.21	0.01
222	145.07	0.84	1.18	0.01	223	145.50	0.84	1.18	0.01
224	145.00	0.84	1.18	0.01	225	142.45	0.80	1.21	0.01
226	138.55	0.75	1.26	0.01	227	131.73	0.67	1.66	0.01
228	123.78	0.59	1.96	0.01	229	114.38	0.50	2.09	0.02
230	106.54	0.44	2.22	0.02	231	100.34	0.40	2.33	0.02
232	100.54	0.40	2.33	0.02	233	104.03	0.42	2.26	0.02
234	110.57	0.47	2.15	0.02	235	115.62	0.51	2.07	0.02
236	119.19	0.54	2.02	0.02	237	119.47	0.54	2.02	0.01
238	116.71	0.52	2.06	0.02	239	111.23	0.47	2.14	0.02
240	107.09	0.44	2.21	0.02	241	103.86	0.42	2.27	0.02
242	97.97	0.38	2.38	0.02	243	100.04	0.39	2.34	0.02
244	103.33	0.41	2.27	0.02	245	108.54	0.45	2.18	0.02
246	116.18	0.51	2.07	0.01	247	123.48	0.57	1.97	0.02
248	130.97	0.65	1.87	0.01	249	140.71	0.76	1.23	0.01
250	155.19	0.96	0.59	0.00	251	174.93	2.00	0.00	0.00
252	192.56	2.00	0.00	0.00	253	211.04	2.00	0.00	0.00
254	229.11	2.00	0.00	0.00	255	255.48	2.00	0.00	0.00
256	285.10	2.00	0.00	0.00	257	329.34	2.00	0.00	0.00
258	344.32	2.00	0.00	0.00	259	356.00	2.00	0.00	0.00
260	347.58	2.00	0.00	0.00	261	356.31	2.00	0.00	0.00
262	357.11	2.00	0.00	0.00	263	350.72	2.00	0.00	0.00
264	337.03	2.00	0.00	0.00	265	321.88	2.00	0.00	0.00
266	332.86	2.00	0.00	0.00	267	362.80	2.00	0.00	0.00
268	395.81	2.00	0.00	0.00	269	408.05	2.00	0.00	0.00
270	419.49	2.00	0.00	0.00	271	443.48	2.00	0.00	0.00
272	469.12	2.00	0.00	0.00	273	495.88	2.00	0.00	0.00
274	502.41	2.00	0.00	0.00	275	512.18	2.00	0.00	0.00
276	497.15	2.00	0.00	0.00	277	489.72	2.00	0.00	0.00
278	470.23	2.00	0.00	0.00	279	464.70	2.00	0.00	0.00
280	463.17	2.00	0.00	0.00	281	477.93	2.00	0.00	0.00
282	464.01	2.00	0.00	0.00	283	445.03	2.00	0.00	0.00
284	412.66	2.00	0.00	0.00	285	407.73	2.00	0.00	0.00
286	394.75	2.00	0.00	0.00	287	371.21	2.00	0.00	0.00
288	354.09	2.00	0.00	0.00	289	327.77	2.00	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
290	302.43	2.00	0.00	0.00	291	268.80	2.00	0.00	0.00
292	243.84	2.00	0.00	0.00	293	219.32	2.00	0.00	0.00
294	187.25	2.00	0.00	0.00	295	173.84	2.00	0.00	0.00
296	161.78	2.00	0.00	0.00	297	161.18	2.00	0.00	0.00
298	152.81	0.90	0.84	0.01	299	140.36	0.74	1.52	0.01
300	134.00	0.66	1.62	0.01	301	115.51	0.49	2.08	0.02
302	100.49	0.38	2.33	0.02	303	83.11	0.29	2.72	0.02
304	78.81	0.27	2.84	0.02	305	79.39	0.28	2.82	0.02
306	77.99	0.27	2.86	0.02	307	74.84	0.26	2.96	0.02
308	74.77	0.26	2.97	0.02	309	72.42	0.25	3.04	0.02
310	70.80	0.25	3.10	0.03	311	71.54	0.25	3.08	0.03
312	73.15	0.25	3.02	0.02	313	77.97	0.27	2.87	0.02
314	86.66	0.30	2.63	0.02	315	94.45	0.34	2.45	0.02
316	123.36	0.55	1.97	0.01	317	171.18	2.00	0.00	0.00
318	210.99	2.00	0.00	0.00	319	253.47	2.00	0.00	0.00
320	292.29	2.00	0.00	0.00	321	338.34	2.00	0.00	0.00
322	367.74	2.00	0.00	0.00	323	376.07	2.00	0.00	0.00
324	375.97	2.00	0.00	0.00	325	389.69	2.00	0.00	0.00
326	390.20	2.00	0.00	0.00	327	390.81	2.00	0.00	0.00
328	386.18	2.00	0.00	0.00	329	377.65	2.00	0.00	0.00
330	363.40	2.00	0.00	0.00	331	349.86	2.00	0.00	0.00
332	337.74	2.00	0.00	0.00	333	332.70	2.00	0.00	0.00
334	341.52	2.00	0.00	0.00	335	360.44	2.00	0.00	0.00
336	379.08	2.00	0.00	0.00	337	395.33	2.00	0.00	0.00
338	403.33	2.00	0.00	0.00	339	399.58	2.00	0.00	0.00
340	386.86	2.00	0.00	0.00	341	379.87	2.00	0.00	0.00
342	374.94	2.00	0.00	0.00	343	366.75	2.00	0.00	0.00
344	342.20	2.00	0.00	0.00	345	328.05	2.00	0.00	0.00
346	296.73	2.00	0.00	0.00	347	278.97	2.00	0.00	0.00
348	250.97	2.00	0.00	0.00	349	235.40	2.00	0.00	0.00
350	208.72	2.00	0.00	0.00	351	187.05	2.00	0.00	0.00
352	170.84	2.00	0.00	0.00	353	187.11	2.00	0.00	0.00
354	196.76	2.00	0.00	0.00	355	223.35	2.00	0.00	0.00
356	221.03	2.00	0.00	0.00	357	216.47	2.00	0.00	0.00
358	192.27	1.66	0.00	0.00	359	170.96	1.44	0.00	0.00
360	138.43	1.38	0.00	0.00	361	115.30	1.34	0.00	0.00
362	89.35	1.26	0.00	0.00	363	76.41	1.18	0.00	0.00
364	71.88	1.15	0.00	0.00	365	72.86	1.18	0.00	0.00
366	71.65	1.25	0.00	0.00	367	67.97	1.37	0.00	0.00
368	62.33	1.48	0.00	0.00	369	56.68	1.56	0.00	0.00
370	54.63	1.60	0.00	0.00	371	58.88	1.56	0.00	0.00
372	65.77	1.49	0.00	0.00	373	73.74	1.42	0.00	0.00
374	81.70	1.36	0.00	0.00	375	86.43	1.30	0.00	0.00
376	87.74	1.27	0.00	0.00	377	86.25	1.30	0.00	0.00
378	84.74	1.35	0.00	0.00	379	83.73	1.41	0.00	0.00
380	83.36	1.43	0.00	0.00	381	83.29	1.42	0.00	0.00
382	82.67	1.38	0.00	0.00	383	81.13	1.33	0.00	0.00
384	79.52	1.34	0.00	0.00	385	79.45	1.34	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
386	80.29	1.35	0.00	0.00	387	81.48	1.32	0.00	0.00
388	83.22	1.29	0.00	0.00	389	84.01	1.25	0.00	0.00
390	82.77	1.24	0.00	0.00	391	80.34	1.24	0.00	0.00
392	79.07	1.25	0.00	0.00	393	80.23	1.24	0.00	0.00
394	81.97	1.26	0.00	0.00	395	85.06	1.27	0.00	0.00
396	87.21	1.29	0.00	0.00	397	86.34	1.33	0.00	0.00
398	80.37	1.43	0.00	0.00	399	74.68	1.53	0.00	0.00
400	72.68	1.61	0.00	0.00	401	81.87	1.61	0.00	0.00
402	91.62	1.62	0.00	0.00	403	101.57	1.63	0.00	0.00
404	106.52	1.67	0.00	0.00	405	110.20	1.71	0.00	0.00
406	111.76	1.83	0.00	0.00	407	109.85	1.99	0.00	0.00
408	106.78	2.00	0.00	0.00	409	104.22	2.00	0.00	0.00
410	105.52	2.00	0.00	0.00	411	107.46	2.00	0.00	0.00
412	111.94	2.00	0.00	0.00	413	116.36	2.00	0.00	0.00
414	121.52	2.00	0.00	0.00	415	123.79	2.00	0.00	0.00
416	122.72	2.00	0.00	0.00	417	120.20	2.00	0.00	0.00
418	119.38	2.00	0.00	0.00	419	122.48	2.00	0.00	0.00
420	126.73	2.00	0.00	0.00	421	129.93	2.00	0.00	0.00
422	131.51	1.93	0.00	0.00	423	131.67	1.75	0.00	0.00
424	130.47	1.59	0.00	0.00	425	128.45	1.43	0.00	0.00
426	125.38	1.30	0.00	0.00	427	120.77	1.15	0.00	0.00
428	114.49	1.01	0.00	0.00	429	107.39	0.89	0.50	0.00
430	100.97	0.86	0.50	0.00	431	95.66	0.84	0.50	0.00
432	91.79	0.83	0.50	0.00	433	89.42	0.80	0.50	0.00
434	87.32	0.81	0.50	0.00	435	84.54	0.88	0.50	0.00
436	84.45	1.03	0.00	0.00	437	84.57	1.25	0.00	0.00
438	83.14	1.41	0.00	0.00	439	75.17	1.47	0.00	0.00
440	66.87	1.39	0.00	0.00	441	67.70	1.32	0.00	0.00
442	75.05	1.29	0.00	0.00	443	83.43	1.28	0.00	0.00
444	87.49	1.29	0.00	0.00	445	90.32	1.27	0.00	0.00
446	92.80	1.25	0.00	0.00	447	95.41	1.25	0.00	0.00
448	96.36	1.30	0.00	0.00	449	94.65	1.40	0.00	0.00
450	91.44	1.59	0.00	0.00	451	88.63	1.79	0.00	0.00
452	85.74	2.00	0.00	0.00	453	86.08	2.00	0.00	0.00
454	88.44	2.00	0.00	0.00	455	93.47	2.00	0.00	0.00
456	97.47	2.00	0.00	0.00	457	101.41	2.00	0.00	0.00
458	106.07	2.00	0.00	0.00	459	110.39	2.00	0.00	0.00
460	113.29	2.00	0.00	0.00	461	114.13	2.00	0.00	0.00
462	113.71	2.00	0.00	0.00	463	112.58	2.00	0.00	0.00
464	110.45	2.00	0.00	0.00	465	107.57	2.00	0.00	0.00
466	106.97	2.00	0.00	0.00	467	106.41	2.00	0.00	0.00
468	105.39	2.00	0.00	0.00	469	102.49	2.00	0.00	0.00
470	102.98	0.38	2.28	0.02	471	111.69	0.44	2.13	0.02
472	124.56	0.54	1.95	0.02	473	138.15	0.68	1.55	0.01
474	147.69	0.79	1.15	0.01	475	159.36	2.00	0.00	0.00
476	172.72	2.00	0.00	0.00	477	180.77	2.00	0.00	0.00
478	179.17	2.00	0.00	0.00	479	172.50	2.00	0.00	0.00
480	169.57	2.00	0.00	0.00	481	172.50	2.00	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
482	174.59	2.00	0.00	0.00
483	173.01	2.00	0.00	0.00
484	166.40	1.92	0.00	0.00
485	152.67	1.53	0.00	0.00
486	138.49	1.34	0.00	0.00
487	124.46	1.28	0.00	0.00
488	116.41	1.27	0.00	0.00
489	109.58	1.31	0.00	0.00
490	103.46	1.46	0.00	0.00
491	97.91	1.69	0.00	0.00
492	95.58	1.99	0.00	0.00
493	98.79	2.00	0.00	0.00
494	106.81	2.00	0.00	0.00
495	114.92	2.00	0.00	0.00
496	121.06	1.91	0.00	0.00
497	123.49	1.65	0.00	0.00
498	122.34	1.43	0.00	0.00
499	118.62	1.27	0.00	0.00
500	113.13	1.14	0.00	0.00
501	107.55	1.04	0.00	0.00
502	101.90	1.01	0.00	0.00
503	96.37	1.01	0.00	0.00
504	90.36	1.06	0.00	0.00
505	85.67	1.13	0.00	0.00
506	82.03	1.31	0.00	0.00
507	73.89	0.25	2.99	0.02
508	72.47	0.24	3.04	0.03
509	81.22	0.27	2.77	0.02
510	88.07	2.00	0.00	0.00
511	91.65	2.00	0.00	0.00
512	93.88	2.00	0.00	0.00
513	92.03	2.00	0.00	0.00
514	92.81	2.00	0.00	0.00
515	95.71	2.00	0.00	0.00
516	102.64	2.00	0.00	0.00
517	114.56	2.00	0.00	0.00
518	127.08	2.00	0.00	0.00
519	134.72	2.00	0.00	0.00
520	135.24	2.00	0.00	0.00
521	138.42	2.00	0.00	0.00
522	143.78	2.00	0.00	0.00
523	148.58	2.00	0.00	0.00
524	148.42	2.00	0.00	0.00
525	150.17	2.00	0.00	0.00
526	154.75	2.00	0.00	0.00
527	162.68	2.00	0.00	0.00
528	168.53	2.00	0.00	0.00
529	172.32	2.00	0.00	0.00
530	171.78	2.00	0.00	0.00
531	170.72	2.00	0.00	0.00
532	164.70	2.00	0.00	0.00
533	157.25	0.92	0.80	0.01
534	147.25	2.00	0.00	0.00
535	142.70	2.00	0.00	0.00
536	136.72	2.00	0.00	0.00
537	129.85	1.74	0.00	0.00
538	120.47	1.40	0.00	0.00
539	114.50	1.18	0.00	0.00
540	109.90	1.10	0.00	0.00
541	108.52	1.11	0.00	0.00
542	105.70	1.15	0.00	0.00
543	101.80	1.19	0.00	0.00
544	95.53	1.21	0.00	0.00
545	90.71	1.21	0.00	0.00
546	87.32	1.18	0.00	0.00
547	86.62	1.12	0.00	0.00
548	85.71	1.07	0.00	0.00
549	84.68	1.04	0.00	0.00
550	83.41	1.05	0.00	0.00
551	82.67	1.07	0.00	0.00
552	82.12	1.11	0.00	0.00
553	82.01	1.15	0.00	0.00
554	82.27	1.19	0.00	0.00
555	82.95	1.22	0.00	0.00
556	84.88	1.24	0.00	0.00
557	87.13	1.23	0.00	0.00
558	89.07	1.22	0.00	0.00
559	89.99	1.21	0.00	0.00
560	90.18	1.22	0.00	0.00
561	90.60	1.25	0.00	0.00
562	91.03	1.28	0.00	0.00
563	91.65	1.32	0.00	0.00
564	91.86	1.35	0.00	0.00
565	91.82	1.36	0.00	0.00
566	92.30	1.33	0.00	0.00
567	92.85	1.27	0.00	0.00
568	93.26	1.20	0.00	0.00
569	93.15	1.13	0.00	0.00
570	92.90	1.04	0.00	0.00
571	92.36	0.95	0.50	0.00
572	91.32	0.87	0.50	0.00
573	89.55	0.84	0.50	0.00
574	87.35	0.81	0.50	0.00
575	84.77	0.80	0.50	0.00
576	82.84	0.84	0.50	0.00
577	80.81	0.91	0.50	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
578	78.73	0.99	0.50	0.00	579	77.85	1.10	0.00	0.00
580	79.19	1.24	0.00	0.00	581	80.98	2.00	0.00	0.00
582	82.24	2.00	0.00	0.00	583	83.15	2.00	0.00	0.00
584	83.53	2.00	0.00	0.00	585	83.99	2.00	0.00	0.00
586	86.19	2.00	0.00	0.00	587	88.51	2.00	0.00	0.00
588	97.00	2.00	0.00	0.00	589	105.68	2.00	0.00	0.00
590	115.02	2.00	0.00	0.00	591	129.13	2.00	0.00	0.00
592	148.53	2.00	0.00	0.00	593	164.11	2.00	0.00	0.00
594	170.47	2.00	0.00	0.00	595	166.57	2.00	0.00	0.00
596	161.13	2.00	0.00	0.00	597	151.83	2.00	0.00	0.00
598	151.10	2.00	0.00	0.00	599	173.41	2.00	0.00	0.00
600	195.95	2.00	0.00	0.00	601	213.56	2.00	0.00	0.00
602	224.96	2.00	0.00	0.00	603	226.39	2.00	0.00	0.00
604	224.08	2.00	0.00	0.00	605	210.73	2.00	0.00	0.00
606	196.83	2.00	0.00	0.00	607	180.31	2.00	0.00	0.00
608	165.68	2.00	0.00	0.00	609	153.15	2.00	0.00	0.00
610	151.10	2.00	0.00	0.00	611	155.26	2.00	0.00	0.00
612	166.31	2.00	0.00	0.00	613	171.95	2.00	0.00	0.00
614	179.67	2.00	0.00	0.00	615	185.31	2.00	0.00	0.00
616	190.64	2.00	0.00	0.00	617	191.07	2.00	0.00	0.00
618	185.39	2.00	0.00	0.00	619	180.76	2.00	0.00	0.00
620	177.91	2.00	0.00	0.00	621	179.69	2.00	0.00	0.00
622	181.49	2.00	0.00	0.00	623	179.79	2.00	0.00	0.00
624	178.76	2.00	0.00	0.00	625	178.04	2.00	0.00	0.00
626	175.93	2.00	0.00	0.00	627	168.46	2.00	0.00	0.00
628	156.15	1.88	0.00	0.00	629	142.35	1.40	0.00	0.00
630	133.22	1.20	0.00	0.00	631	126.04	1.10	0.00	0.00
632	118.44	1.05	0.00	0.00	633	110.10	1.01	0.00	0.00
634	102.57	0.99	0.50	0.00	635	97.25	1.00	0.50	0.00
636	92.73	1.03	0.00	0.00	637	90.08	1.09	0.00	0.00
638	89.00	1.16	0.00	0.00	639	89.73	1.32	0.00	0.00
640	90.26	1.48	0.00	0.00	641	90.31	1.64	0.00	0.00
642	91.19	1.76	0.00	0.00	643	91.31	1.86	0.00	0.00
644	93.15	1.93	0.00	0.00	645	95.94	1.96	0.00	0.00
646	100.73	1.99	0.00	0.00	647	105.71	1.96	0.00	0.00
648	109.85	1.90	0.00	0.00	649	113.11	1.81	0.00	0.00
650	114.32	1.77	0.00	0.00	651	114.36	1.74	0.00	0.00
652	113.56	1.74	0.00	0.00	653	112.50	1.75	0.00	0.00
654	111.38	1.72	0.00	0.00	655	109.94	1.67	0.00	0.00
656	108.55	1.59	0.00	0.00	657	107.18	1.54	0.00	0.00
658	105.79	1.45	0.00	0.00	659	104.19	1.34	0.00	0.00
660	102.30	1.24	0.00	0.00	661	98.96	1.17	0.00	0.00
662	95.05	1.15	0.00	0.00	663	90.38	1.14	0.00	0.00
664	86.98	1.14	0.00	0.00	665	84.43	1.13	0.00	0.00
666	82.19	1.12	0.00	0.00	667	79.94	1.12	0.00	0.00
668	77.80	1.14	0.00	0.00	669	76.58	1.15	0.00	0.00
670	76.39	1.18	0.00	0.00	671	76.44	1.23	0.00	0.00
672	76.67	1.29	0.00	0.00	673	77.49	1.34	0.00	0.00

:: Settlements for saturated sands :: (continued)

Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)	Point ID	$q_{c1N,cs}$	F_s	e_v	Settlement (in)
674	78.50	1.36	0.00	0.00	675	79.88	1.40	0.00	0.00
676	81.04	1.43	0.00	0.00	677	82.56	1.43	0.00	0.00
678	84.03	1.37	0.00	0.00	679	85.52	1.29	0.00	0.00
680	86.30	1.21	0.00	0.00	681	87.25	1.17	0.00	0.00
682	88.72	1.17	0.00	0.00	683	90.43	1.19	0.00	0.00
684	91.15	1.22	0.00	0.00	685	89.88	1.24	0.00	0.00
686	88.01	1.28	0.00	0.00	687	86.41	1.37	0.00	0.00
688	86.28	1.49	0.00	0.00	689	86.73	1.59	0.00	0.00
690	87.70	1.68	0.00	0.00	691	89.04	1.73	0.00	0.00
692	90.64	1.82	0.00	0.00	693	93.09	1.89	0.00	0.00
694	95.36	1.86	0.00	0.00	695	97.90	1.77	0.00	0.00
696	99.48	1.65	0.00	0.00	697	100.46	1.60	0.00	0.00
698	99.73	1.55	0.00	0.00	699	98.86	1.53	0.00	0.00
700	98.63	1.51	0.00	0.00	701	99.01	1.49	0.00	0.00
702	98.47	1.48	0.00	0.00	703	98.61	1.58	0.00	0.00
704	99.08	1.64	0.00	0.00	705	100.00	1.68	0.00	0.00
706	99.77	1.67	0.00	0.00	707	98.64	1.72	0.00	0.00
708	94.46	1.80	0.00	0.00	709	90.03	1.85	0.00	0.00
710	86.10	1.89	0.00	0.00	711	85.17	1.94	0.00	0.00
712	85.03	1.98	0.00	0.00	713	85.15	1.98	0.00	0.00
714	85.73	1.96	0.00	0.00	715	85.88	2.00	0.00	0.00
716	84.87	2.00	0.00	0.00	717	85.17	2.00	0.00	0.00
718	88.22	2.00	0.00	0.00	719	98.13	0.36	2.37	0.02
720	108.65	0.43	2.18	0.02	721	118.65	0.51	2.03	0.01
722	125.17	0.57	1.94	0.02	723	132.29	0.64	1.86	0.01
724	139.35	0.72	1.53	0.01	725	145.96	0.80	1.17	0.01
726	152.41	0.88	0.84	0.01	727	172.14	2.00	0.00	0.00
728	241.07	2.00	0.00	0.00	729	335.90	2.00	0.00	0.00
730	420.81	2.00	0.00	0.00	731	455.78	2.00	0.00	0.00
732	467.56	2.00	0.00	0.00	733	472.94	2.00	0.00	0.00
734	485.87	2.00	0.00	0.00					

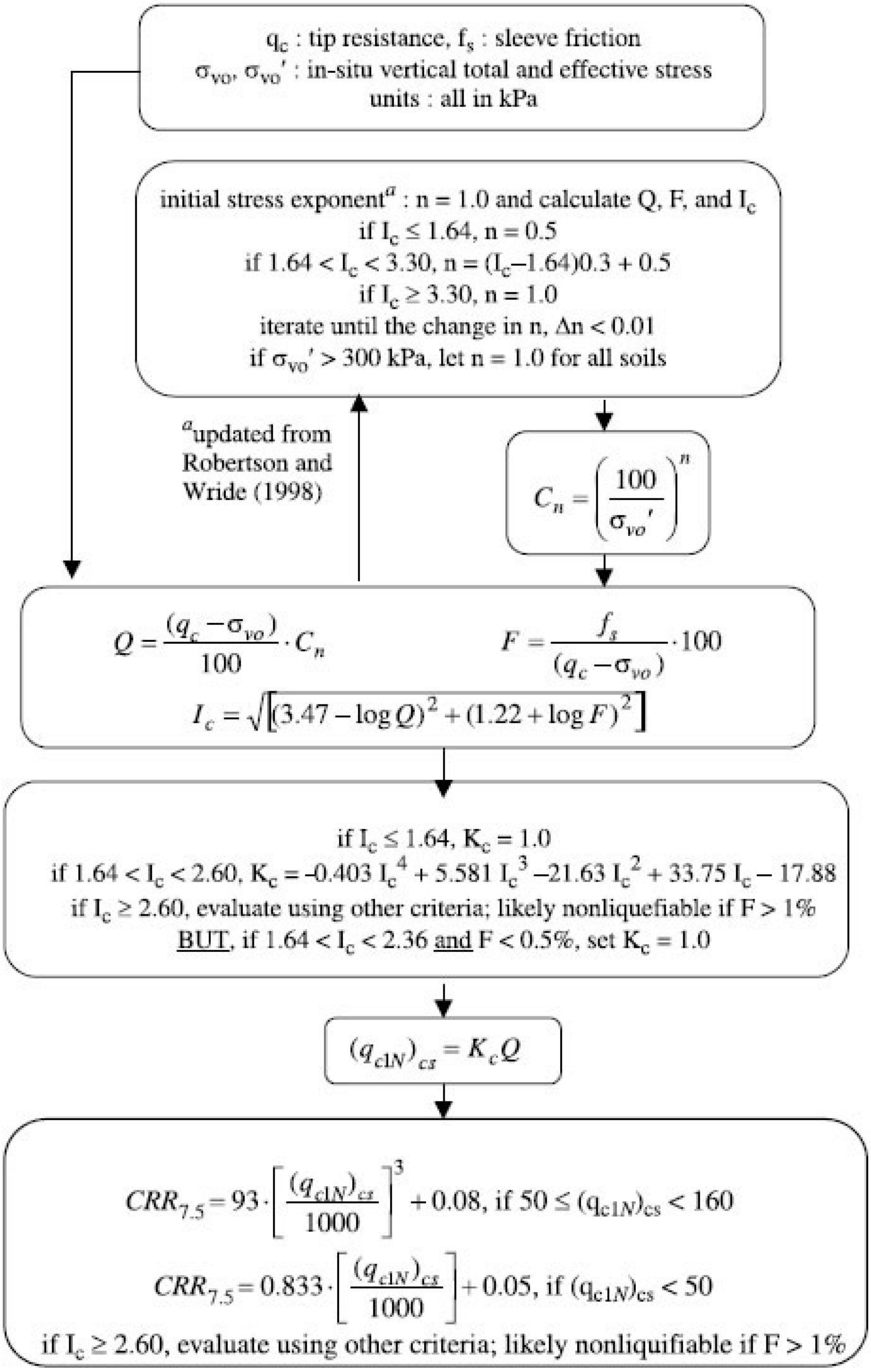
Total estimated settlement: 1.58

Abbreviations

$q_{c1N,cs}$: Equivalent clean sand normalized cone reistance
F_s: Factor of safety against liquefaction
e_v: Post-liquefaction volumentric strain
Settlement: Calculated settlement

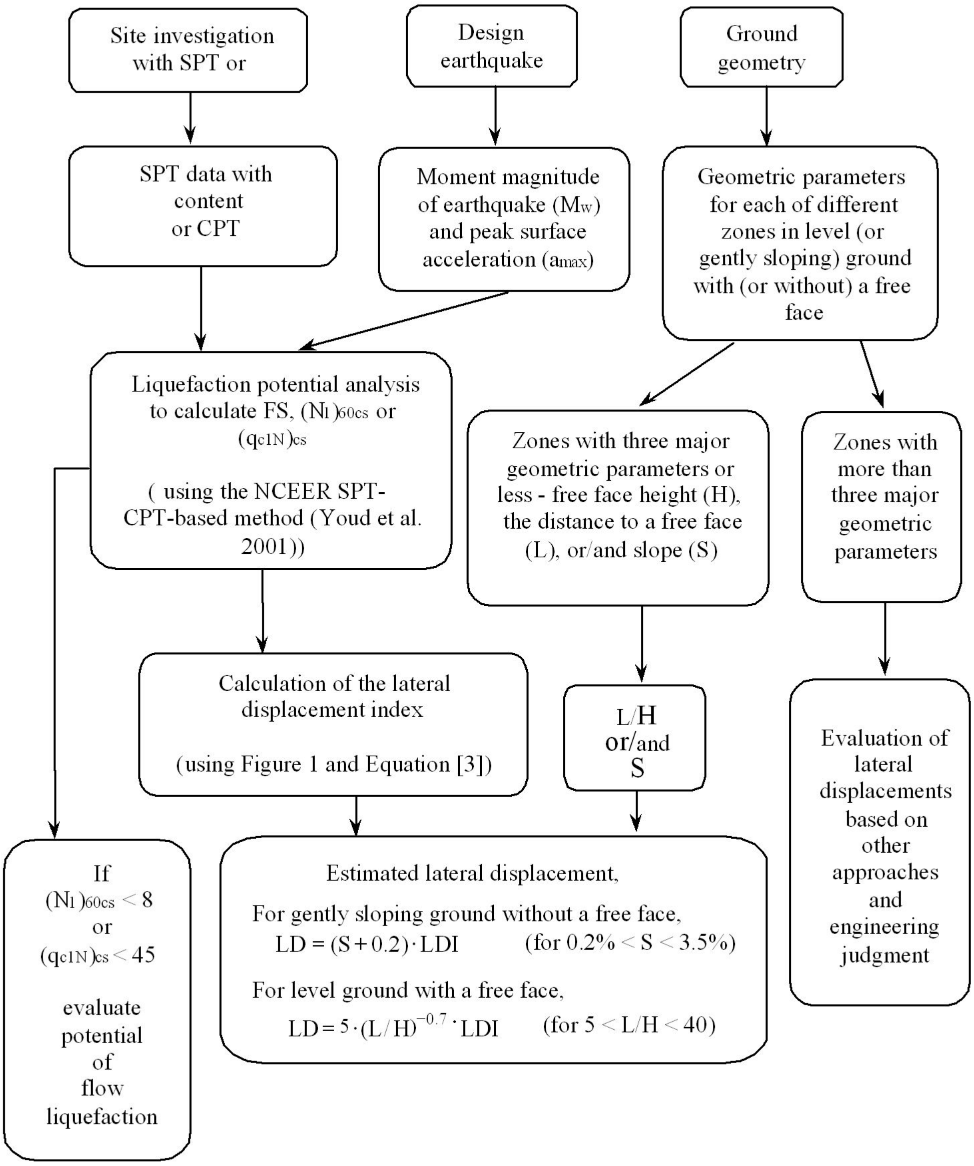
Procedure for the evaluation of soil liquefaction resistance

Calculation of soil resistance against liquefaction is performed according to the Robertson & Wride (1998) procedure. This procedure used in the software, slightly differs from the one originally published in NCEER-97-0022 (Proceedings of the NCEER Workshop on Evaluation of Liquefaction Resistance of Soils). The revised procedure is presented below in the form of a flowchart[1]:

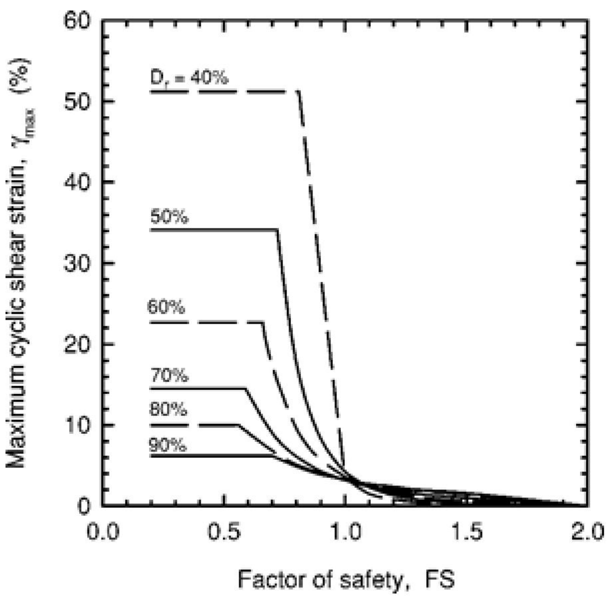


[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Procedure for the evaluation of liquefaction-induced lateral spreading displacements



Flow chart illustrating major steps in estimating liquefaction-induced lateral spreading displacements using the proposed approach



[1] **Figure 1**

$$\mathrm{LDI} = \int_0^{Z_{\max}} \gamma_{\max}\, dz$$

[1] **Equation [3]**

[1] "Estimating liquefaction-induced ground settlements from CPT for level ground", G. Zhang, P.K. Robertson, and R.W.I. Brachman

Liquefaction Potential Index (LPI) calculation procedure

Calculation of the Liquefaction Potential Index (LPI) is used to interpret the liquefaction assessment calculations in terms of severity over depth. The calculation procedure is based on the methology developed by Iwasaki (1982) and is adopted by AFPS.

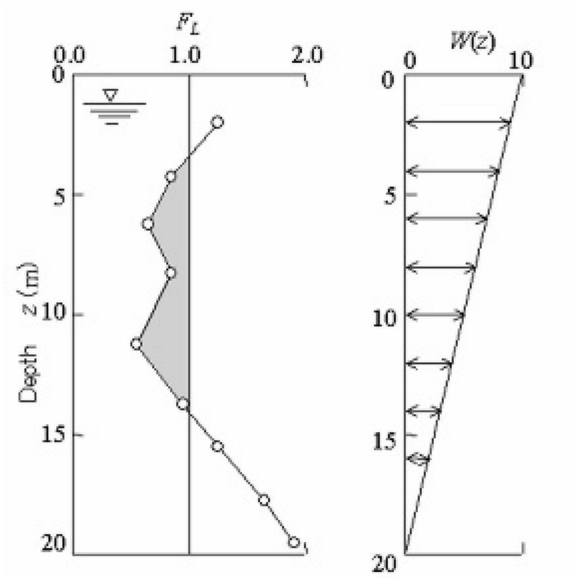
To estimate the severity of liquefaction extent at a given site, LPI is calculated based on the following equation:

$$\textbf{LPI} = \int_0^{20} (10 - 0{,}5_z) \times F_L \times d_z$$

where:
F_L = 1 - F.S. when F.S. less than 1
F_L = 0 when F.S. greater than 1
z depth of measurment in meters

Values of LPI range between zero (0) when no test point is characterized as liquefiable and 100 when all points are characterized as susceptible to liquefaction. Iwasaki proposed four (4) discrete categories based on the numeric value of LPI:

- LPI = 0 : Liquefaction risk is very low
- 0 < LPI <= 5 : Liquefaction risk is low
- 5 < LPI <= 15 : Liquefaction risk is high
- LPI > 15 : Liquefaction risk is very high



Graphical presentation of the LPI calculation procedure

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APPENDIX E

CALIFORNIA GEOLOGICAL SURVEY

Note 48

Sutter Medical Center of Santa Rosa

California Geological Survey - Note 48 Checklist	
Project Location	**Section of ENGEO Report Where This Information is Located**
1. Site Location Map, Street Address, County Name	Discussed on Page 2 of report and shown in Figures 1 and 2
2. Plot Plan with Exploration Data with Building Footprint	Shown on Figure 3
3. Site Coordinates	Discussed on Page 2 of report and shown in Figure 1
Engineering Geology / Site Characterization	**Section of ENGEO Report Where This Information is Located**
4. Regional Geology and Regional Fault Maps	Discussed on Pages 7 and 8 of report and shown on Figures 4 and 5
5. Geologic Map of Site	Shown on Figure 3
6. Subsurface Geology	Discussed on Pages 7 and 8 of report
7. Geologic Cross Sections	Shown on Figure 7
8. Active Faulting and Coseismic Deformation Across Site	Shown on Figure 5A
9. Geologic Hazard Zones (Liquefaction and Landslides)	Shown on Figure 6
10. Geotechnical Testing of Representative Samples	Appendices B1 and B2
11. Geologic Consideration of Grading Plans and Foundation Plans	Discussed on Pages 14 through 24 of report
Seismology and Calculation of Earthquake Ground Motion	**Section of ENGEO Report Where This Information is Located**
12. Evaluation of Historical Seismicity	Discussed on Pages 8 and 9 of Report and shown on Figure 8
13. Mapped Spectral Acceleration Parameters	Discussed on Page 10 and 11 of the Report and Site Specific Design Spectra shown on Figure 9
14. Classify the Geologic Subgrade (Site Class)	Discussed on Page 10
15. Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters	Discussed on Pages 10 and 11 of report
16. Design Spectral Acceleration Parameters	Discussed on Pages 10 and 11 of the report
17. Seismic Design Category	Discussed on Pages 10 and 11 of the report
18. Deaggregated Seismic Source Parameters	Discussed on Pages 10 and 11 of the report
19. Site-Specific Ground Motion Analysis	Discussed on Pages 10 and 11 of the report
20. Time-Histories of Earthquake Ground Motion	Discussed on Pages 10 and 11 of the report

California Geological Survey - Note 48

Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings
October 2007

Note 48 is used by the California Geological Survey (CGS) to review the geology, seismology, and geologic hazards evaluated in reports that are prepared under California Code of Regulations (CCR), Title 24, California Building Code. CCR Title 24 applies to California Public Schools, Hospitals, Skilled Nursing Facilities, and Essential Services Buildings. The Building Official for public schools is the Division of the State Architect (DSA). Hospitals and Skilled Nursing Facilities in California are under the jurisdiction of the Office of Statewide Health Planning & Development (OSHPD). The California Geological Survey serves under contract with these two state agencies.

Project Name: ____________________________ Location: ____________________________________

OSHPD or DSA File #: ____________________ Reviewed By: ________________________________

Date Reviewed: __________________________ California Certified Engineering Geologist #: _______

Checklist Item or Topic Within Consulting Report **NA = not applicable** **NR = not addressed by consultant and therefore not reviewed at this time**	Adequately Described; Satisfactory	Additional Data Needed; Not Satisfactory

Project Location

1. Site Location Map, Street Address, County Name: Correctly plot site on a 7½-minute USGS quadrangle base-map.		
2. Plot Plan with Exploration Data with Building Footprint: 1 boring or exploration shaft per 5000 ft^2, with minimum of 2 for any one building. Exploratory trench locations.		
3. Site Coordinates: (Latitude & Longitude)		

Engineering Geology/Site Characterization

4. Regional Geology and Regional Fault Maps: Concise page-sized illustrations with site plotted.		
5. Geologic Map of Site: Detailed (large-scale) geologic map with proper symbols and geologic legend.		
6. Subsurface Geology: Engineering geology description summarized from boreholes or trench logs. Summarize ground water conditions.		
7. Geologic Cross Sections: Two or more detailed geologic sections with pertinent foundations and site grading.		
8. Active Faulting & Coseismic Deformation Across Site: Prepare page-sized extract map of Alquist-Priolo Earthquake Fault Zones and/or any potential fault rupture hazard identified from the Safety Element of the local agency (city or county); show location of fault investigation trenches; 50-foot setbacks perpendicular from fault plane and proposed building footprints.		
9. Geologic Hazard Zones (Liquefaction & Landslides): (*If applicable*) Prepare page-sized extract of CGS official map showing zones of required investigation for liquefaction and landslide, and/or any pertinent geologic map from the Safety Element of the local agency (city or county).		
10. Geotechnical Testing of Representative Samples: Broad suite of appropriate geotechnical tests.		
11. Geologic Consideration of Grading Plans and Foundation Plans: (*If applicable*) Discussion of engineering geologic aspects of excavation/grading/fill activities, foundation and support structures, and deep foundations. Include geologic and geotechnical inspections and problems anticipated during grading. Special design and construction provisions for footings or foundations founded on expansive soils. Consideration of seismic compression of fills; cut/fill differential settlement.		

Seismology & Calculation of Earthquake Ground Motion

12. Evaluation of Historical Seismicity: Prepare a short description of how historical earthquakes have affected the site.		
13. Mapped Spectral Acceleration Parameters: S_S, S_1. Maps found at http://earthquake.usgs.gov/research/hazmaps/design/ recommended for establishing design values.		
14. Classify the Geologic Subgrade (Site Class): 2007 CBC Table 1613A.5.2 and Section 1613A.5.5.		
15. Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameters: F_a, F_v and S_{MS}, S_{M1}.		
16. Design Spectral Acceleration Parameters: S_{DS} and S_{D1}.		

Checklist Item or Topic Within Consulting Report **NA = not applicable NR = not addressed by consultant and therefore not reviewed at this time**	Adequately Described; Satisfactory	Additional Data Needed; Not Satisfactory
17. Seismic Design Category: Report if $S_1 > 0.75$.		
18. Deaggregated Seismic Source Parameters: (*If applicable*) Provide modal magnitude (M_w), and modal distance (km) to fault.		
19. Site-Specific Ground Motion Analysis: (*If applicable*) Required for sites where conditions described in 2007 CBC § 1614A.1.2 apply. Provide probabilistic MCE, deterministic MCE and deterministic lower limit, and design response spectra. Justify analytical choices.		
20. Time-Histories of Earthquake Ground Motion: (*If applicable*) Compute target spectra, justify selected earthquake records, scale to target, and show initial and scaled records.		

Liquefaction/Seismic Settlement Analysis

21. Geologic Setting for Occurrence of Seismically Induced Liquefaction: Perform screening analysis to exclude areas where liquefaction investigation not required. ♦ applicable where ground water surface <50 ft. depth; use historical high ground water for calculations. ♦ low-density, non-plastic alluvium, typically *SPT* $(N_1)_{60}$<30.		
22. Liquefaction Calculations: Based on several detailed geologic cross-sections. Provide calculations (no estimates) including all input parameters.		
23. Seismic Settlement of Entire Soil Column: For two or more locations within the site, evaluate both saturated and unsaturated layers of the entire soil column. Provide calculations (no estimates) including all input parameters. Evaluated with peak ground acceleration based on site-specific study or peak ground acceleration equal to $S_{DS}/2.5$.		
24. Potential for Lateral Spreading		
25. Mitigation Options for Liquefaction: Discuss effectiveness of options to mitigate liquefaction effects. Acceptance criteria for ground-improvement schemes.		

Slope Stability Analyses

26. Landslide Mapping: Characterize the potential for landsliding both on and off-site affecting proposed project.		
27. Determination of Static And Dynamic Strength Parameters: Conduct appropriate laboratory tests to determine material strength considering both static and dynamic conditions.		
28. Determination of Pseudo-Static Coefficient (K_{eq}): Recommended procedure available from http://www.scec.org/resources/catalog/hazardmitigation.html.		
29. Identify Critical Slip Surfaces for Static and Dynamic Analyses: Failure surfaces should be modeled to include existing slip surfaces, discontinuities, geologic structure and stratigraphy; include appropriate ground water conditions.		
30. Dynamic Site Conditions: Site response analysis and topographic effects should be considered, if appropriate.		
31. Mitigation Options for Landsliding/Other Slope Failure: Discuss effectiveness of options to mitigate landsliding/slope failure effects. Acceptance criteria for ground-improvement schemes.		

Other Geologic Hazards or Adverse Site Conditions

These exceptional geologic hazards do not occur statewide. However, they may be pertinent to a particular site. Use prudent analysis to avoid predicaments and expensive delays in construction. This list will help to avoid misunderstandings and back-checks when additional information is required by the reviewing agency.

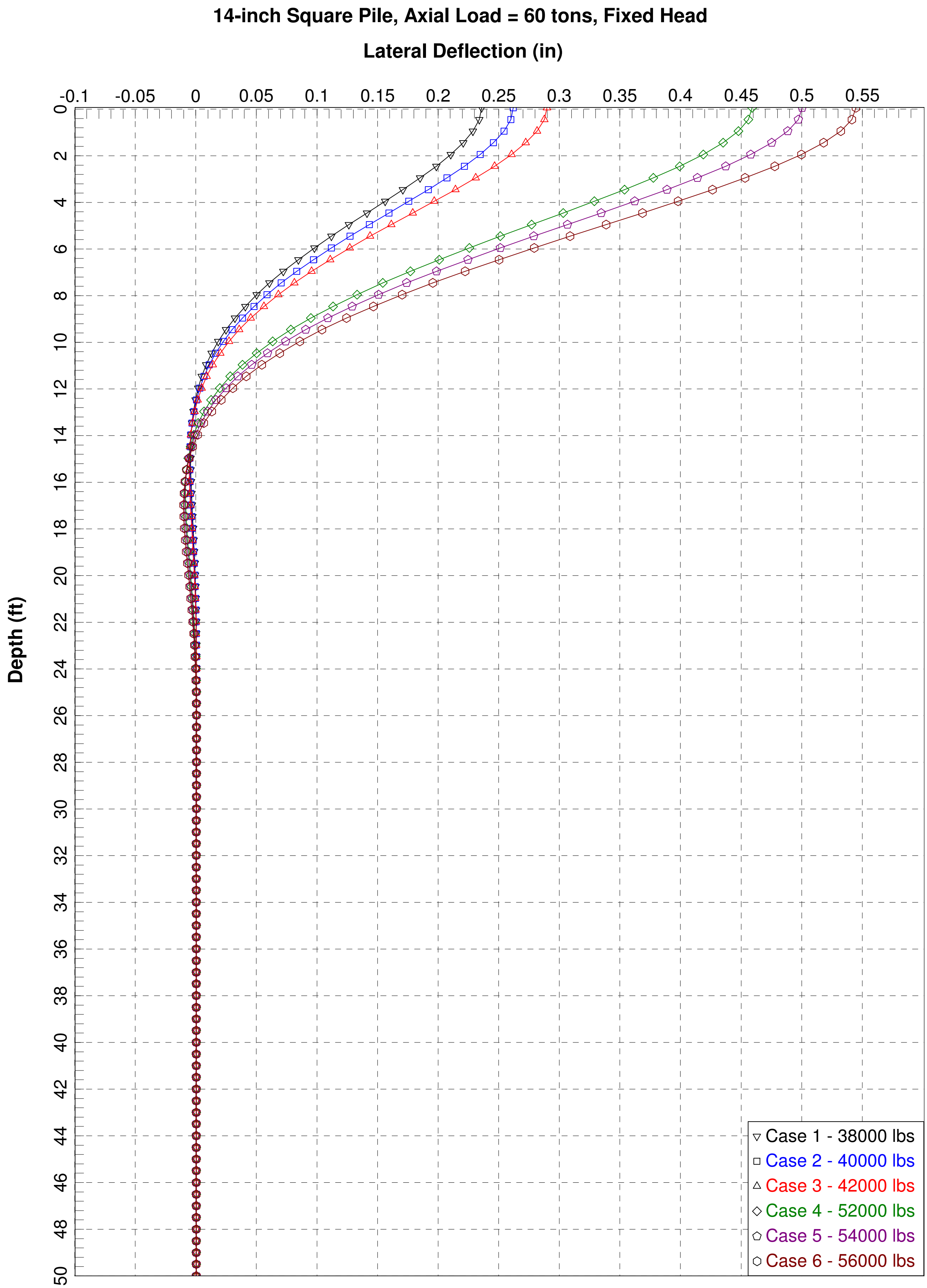
32. Expansive Soils		
33. Corrosive/Reactive Geochemistry of Geologic Subgrade: Soluble sulfates and corrosive soils.		
34. Conditional Geologic Assessment: Including but not limited to - **A. Hazardous materials** (methane gas, hydrogen-sulfide gas, tar seeps); **B. Volcanic eruption**; **C. Flooding** FEMA FIRM's for 100-year flood, is the site protected by a levee; **D. Tsunami and seiche inundation**; **E. Radon-222 gas** (typically within organic-rich marine-shale of the California Coast Ranges); **F. Naturally occurring asbestos** (in geologic formations associated with serpentine; refer to CGS SP 124); **G. Hydrocollapse** of alluvial fan soils due to anthropic use of water; **H. Regional subsidence**; **I. Clays and cyclic softening.**		

Report Documentation

35. Geology, Seismology, and Geotechnical References		
36. Certified Engineering Geologist: (2007 CBC § 1802.7.2)		
37. Registered Geotechnical Engineer: (2007 CBC § 1802.8.1)		

APPENDIX F

L-Pile Analysis



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Lateral Deflection (in)
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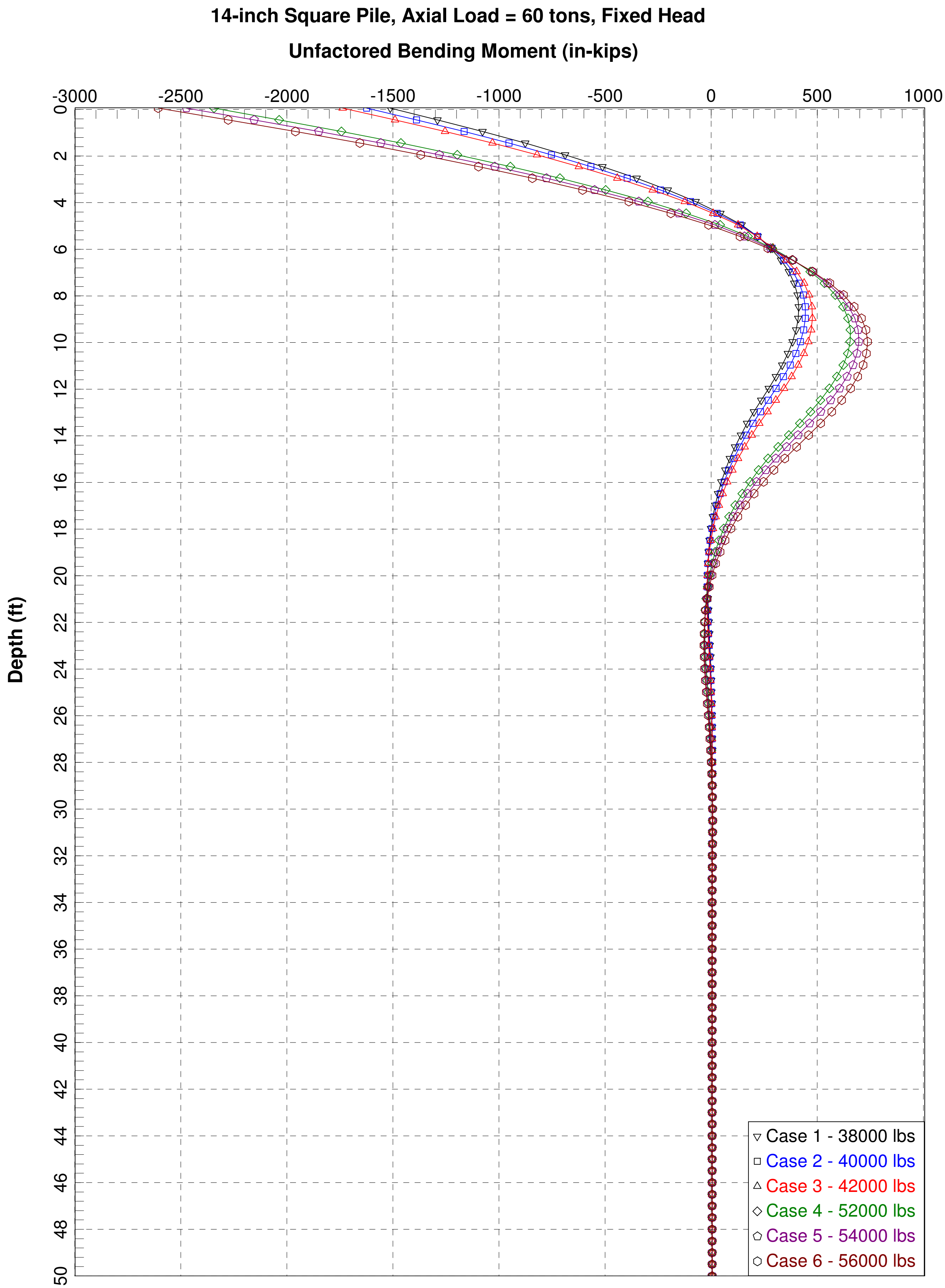
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Case 1 - 38000 lbs
Case 2 - 40000 lbs
Case 3 - 42000 lbs
Case 4 - 52000 lbs
Case 5 - 54000 lbs
Case 6 - 56000 lbs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Unfactored Bending Moment (in-kips)
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-2500
-2000
-1500
-1000
-500
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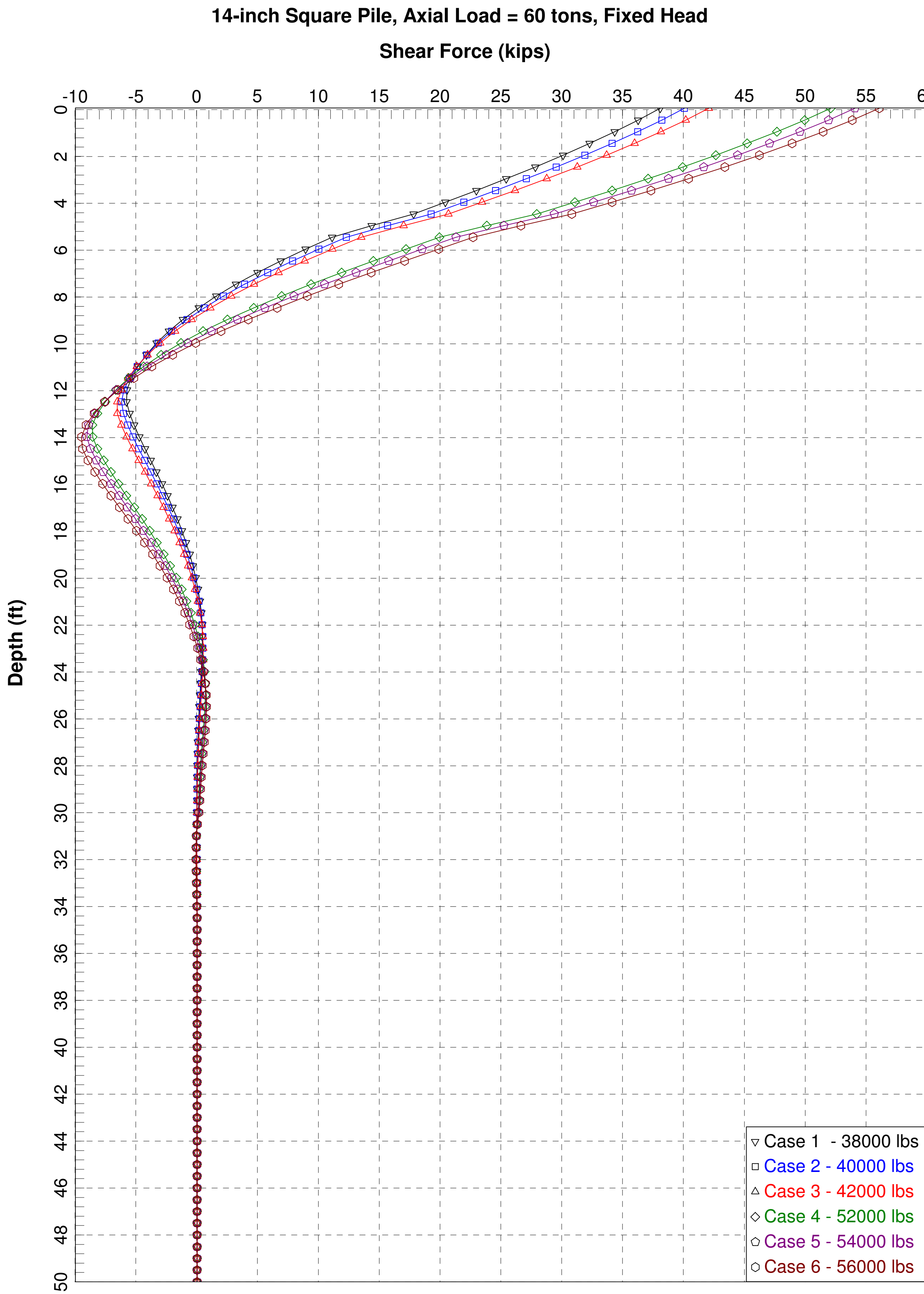
1000
Depth (ft)
Case 1 - 38000 lbs
Case 2 - 40000 lbs
Case 3 - 42000 lbs
Case 4 - 52000 lbs
Case 5 - 54000 lbs
Case 6 - 56000 lbs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Shear Force (kips)
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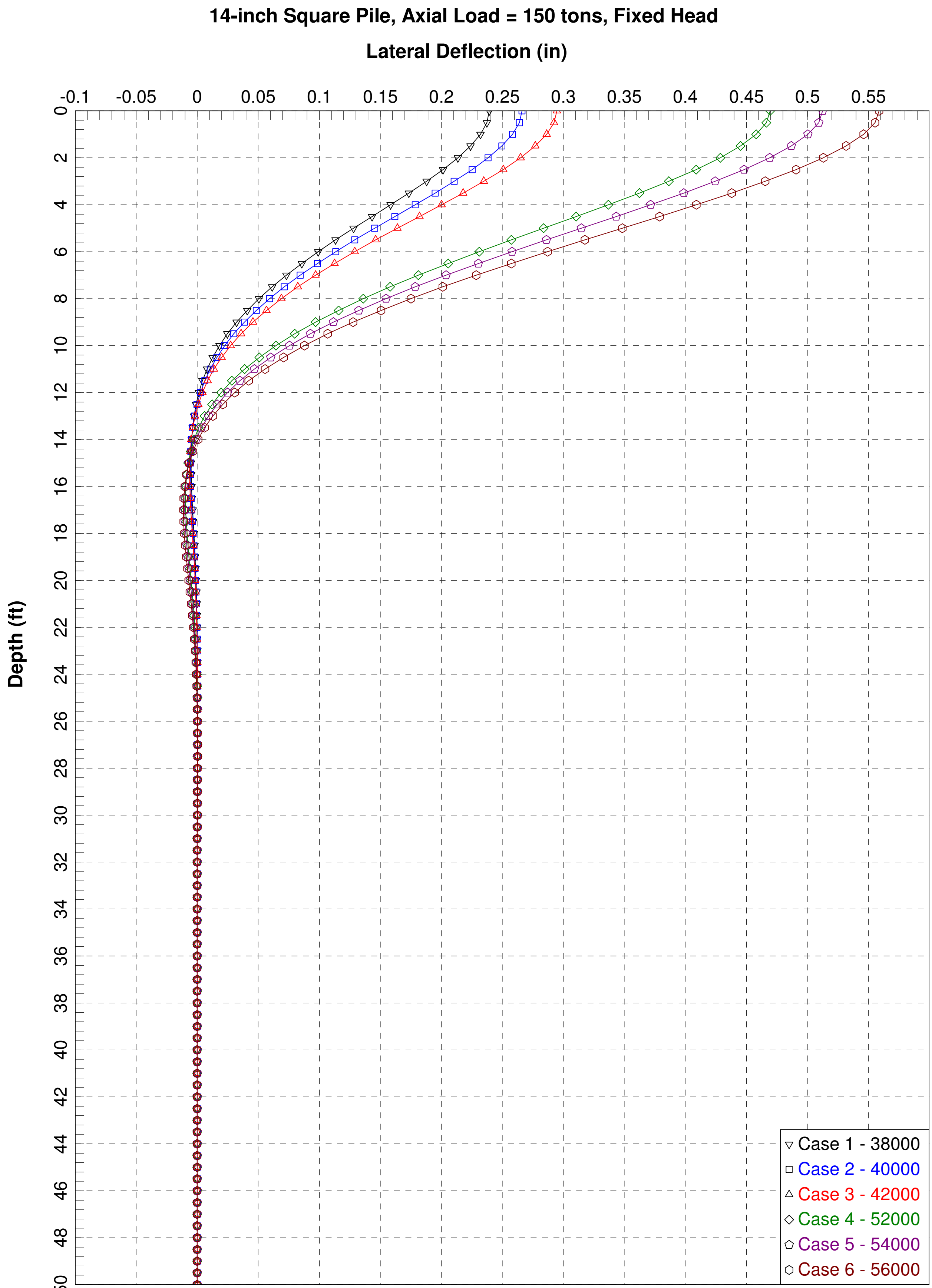
5
10
15
20
25
30
35
40
45
50
55
60
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Case 1 - 38000 lbs
Case 2 - 40000 lbs
Case 3 - 42000 lbs
Case 4 - 52000 lbs
Case 5 - 54000 lbs
Case 6 - 56000 lbs



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Lateral Deflection (in)
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0.05
0.1
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0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
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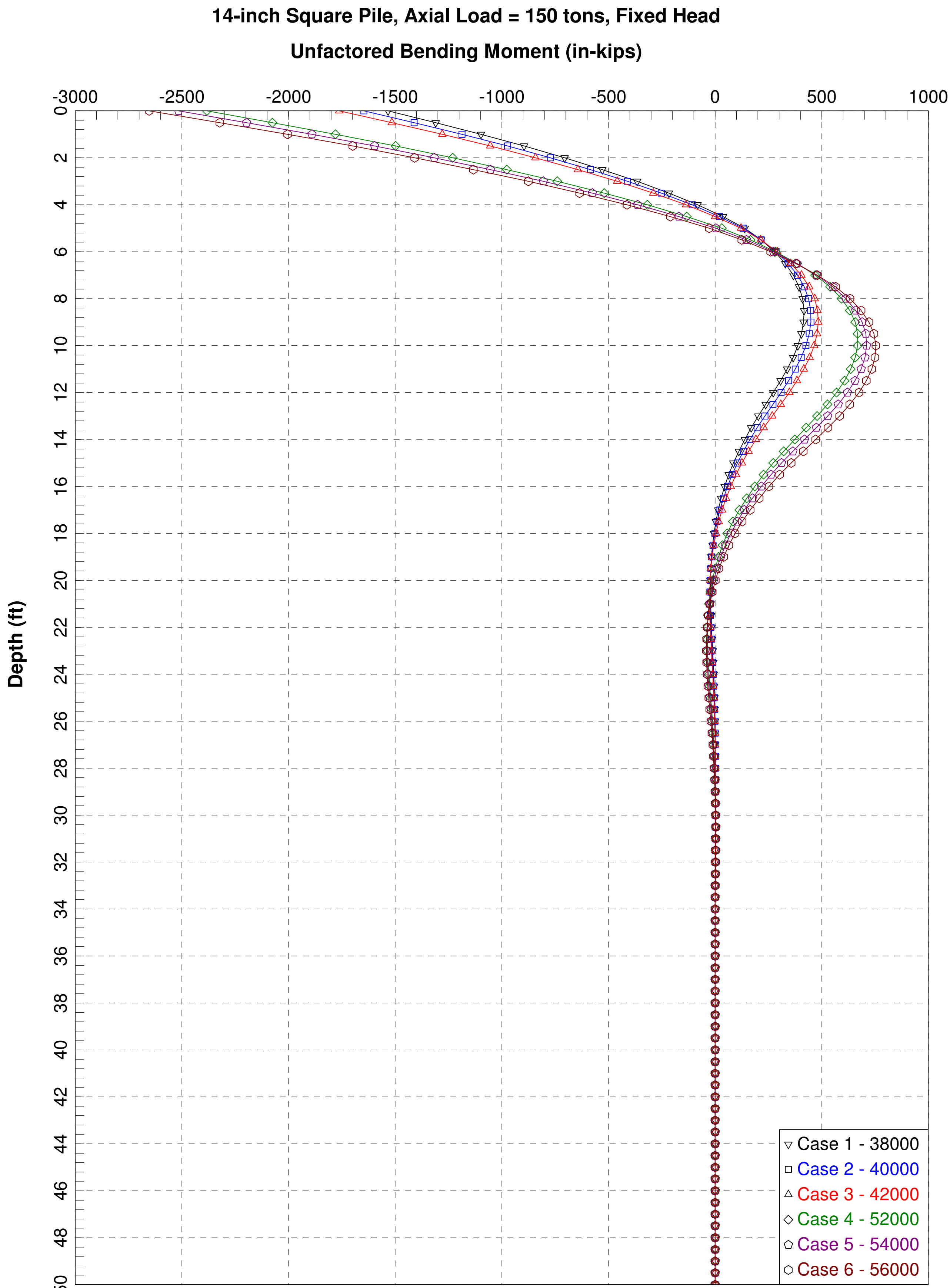
Case 1 - 38000
Case 2 - 40000
Case 3 - 42000
Case 4 - 52000
Case 5 - 54000
Case 6 - 56000



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Unfactored Bending Moment (in-kips)
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-2500
-2000
-1500
-1000
-500
0
500
1000
Depth (ft)
0
2
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6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
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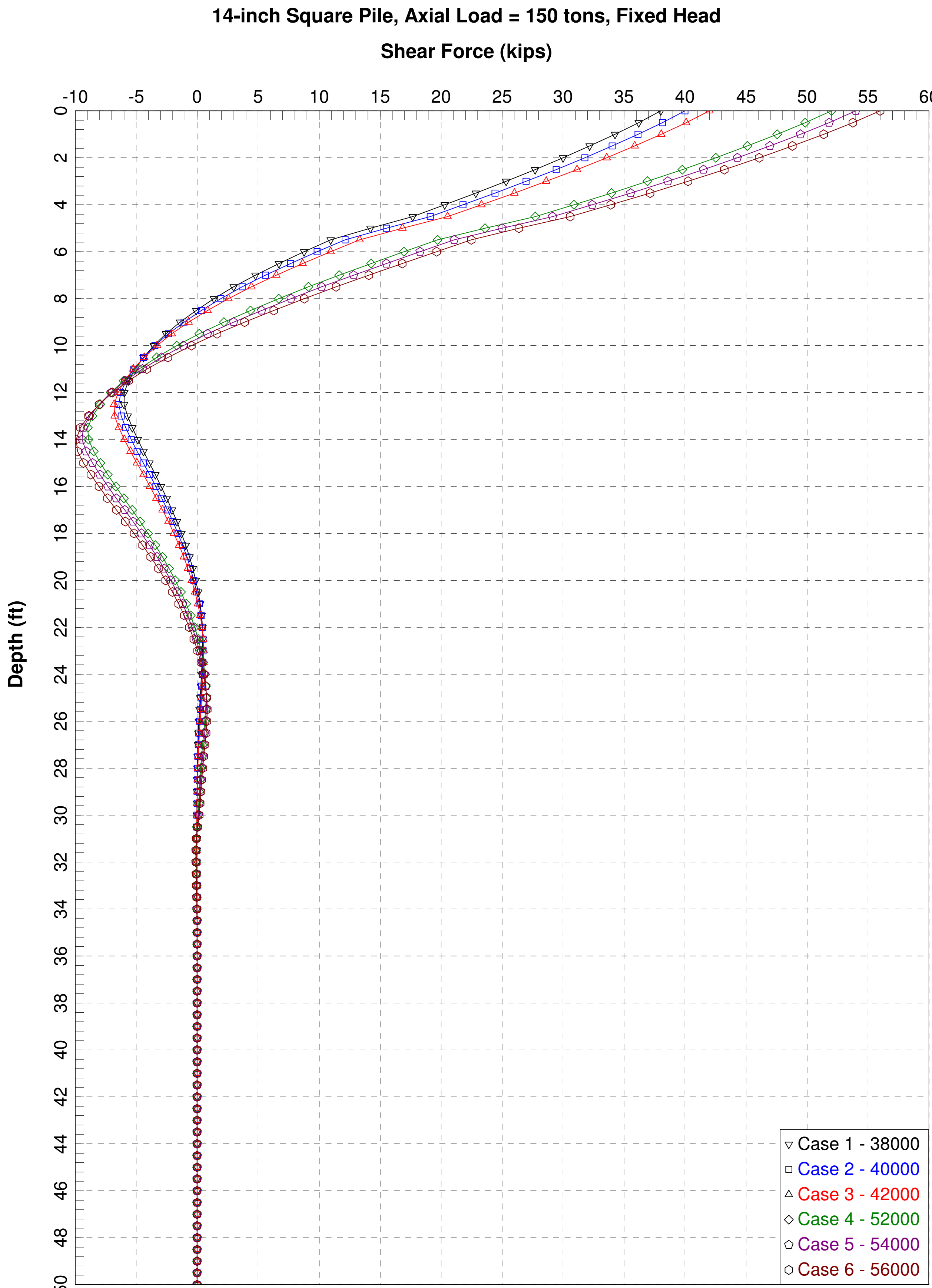
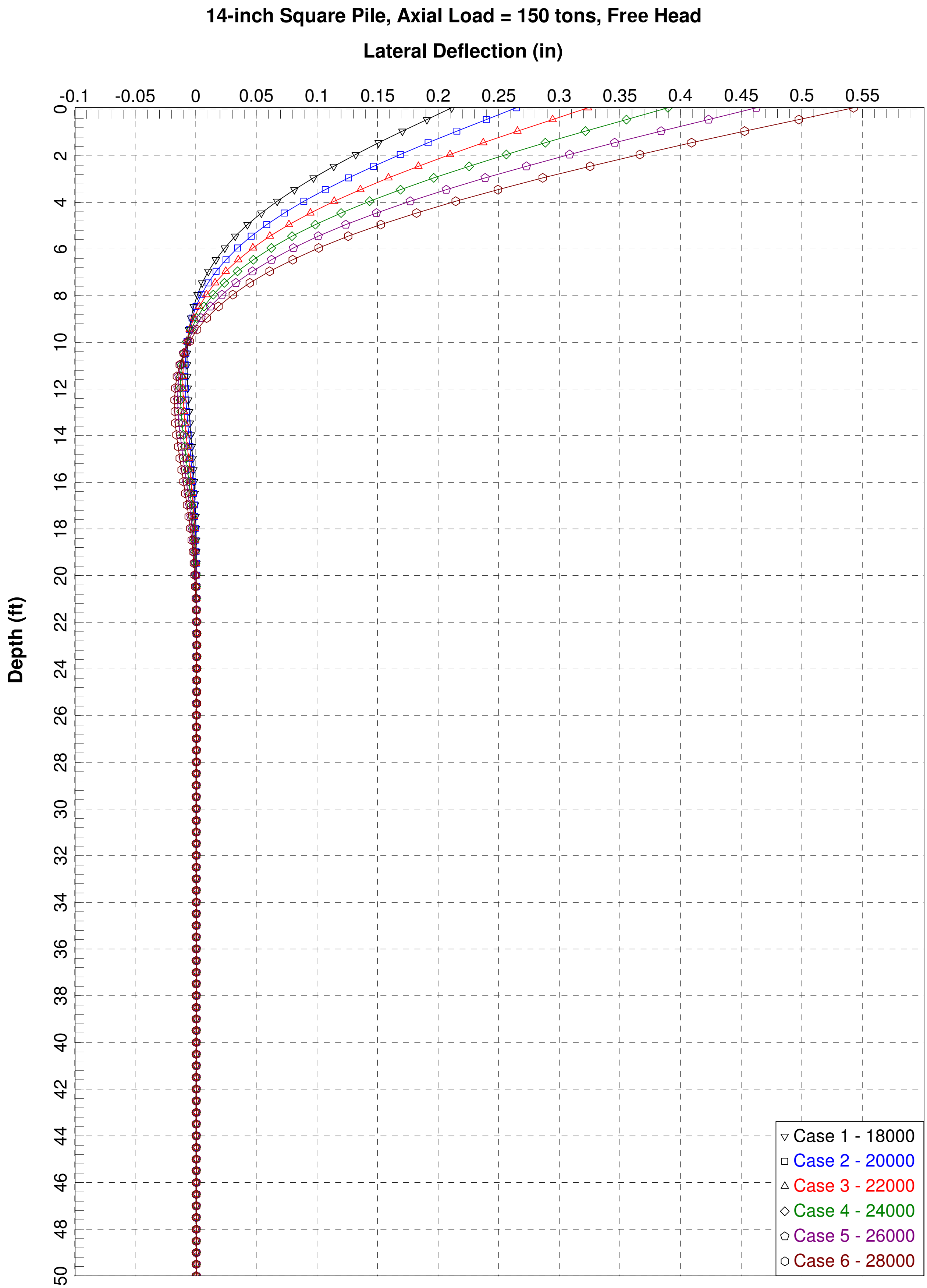
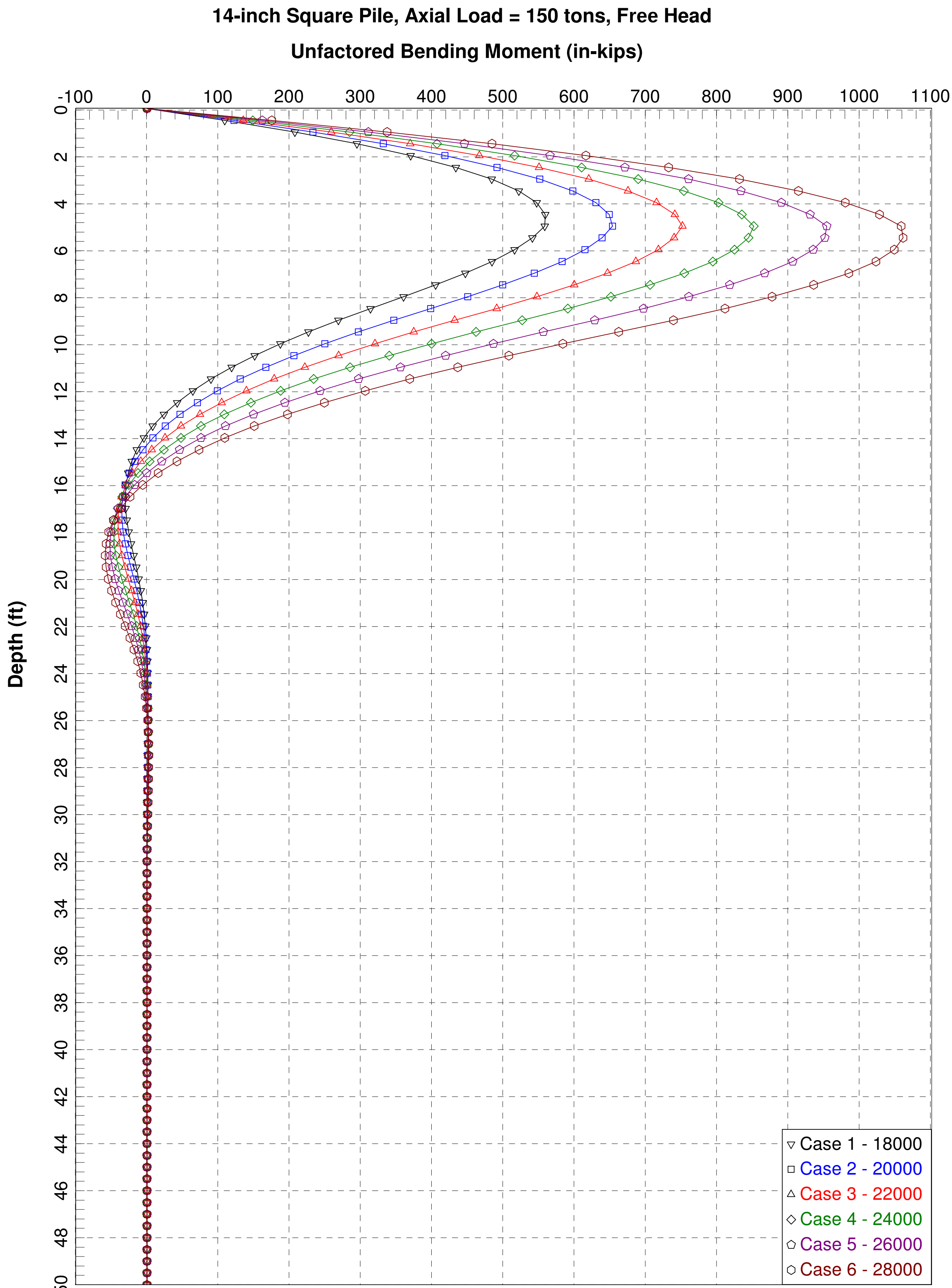
46
48
50
Case 1 - 38000
Case 2 - 40000
Case 3 - 42000
Case 4 - 52000
Case 5 - 54000
Case 6 - 56000



14-inch Square Pile, Axial Load = 150 tons, Fixed Head
Shear Force (kips)
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Case 1 - 38000
Case 2 - 40000
Case 3 - 42000
Case 4 - 52000
Case 5 - 54000
Case 6 - 56000


14-inch Square Pile, Axial Load = 150 tons, Free Head
Lateral Deflection (in)
-0.1
-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Case 1 - 18000
Case 2 - 20000
Case 3 - 22000
Case 4 - 24000
Case 5 - 26000
Case 6 - 28000


14-inch Square Pile, Axial Load = 150 tons, Free Head
Unfactored Bending Moment (in-kips)
Depth (ft)
-100
0
100
200
300
400
500
600
700
800
900
1000
1100
0
2
4
6
8
10
12
14
16
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24
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32
34
36
38
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42
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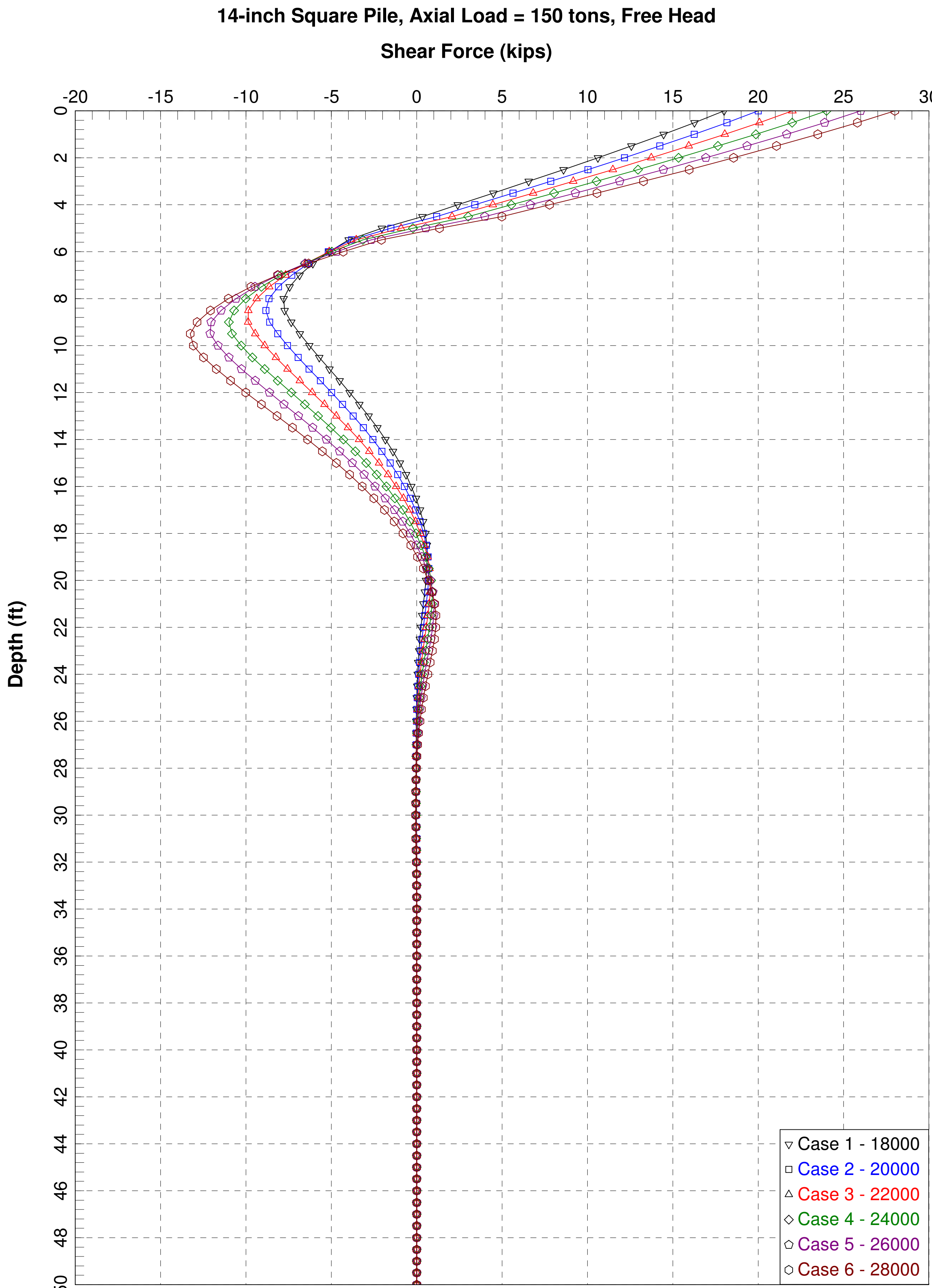
46
48
50
Case 1 - 18000
Case 2 - 20000
Case 3 - 22000
Case 4 - 24000
Case 5 - 26000
Case 6 - 28000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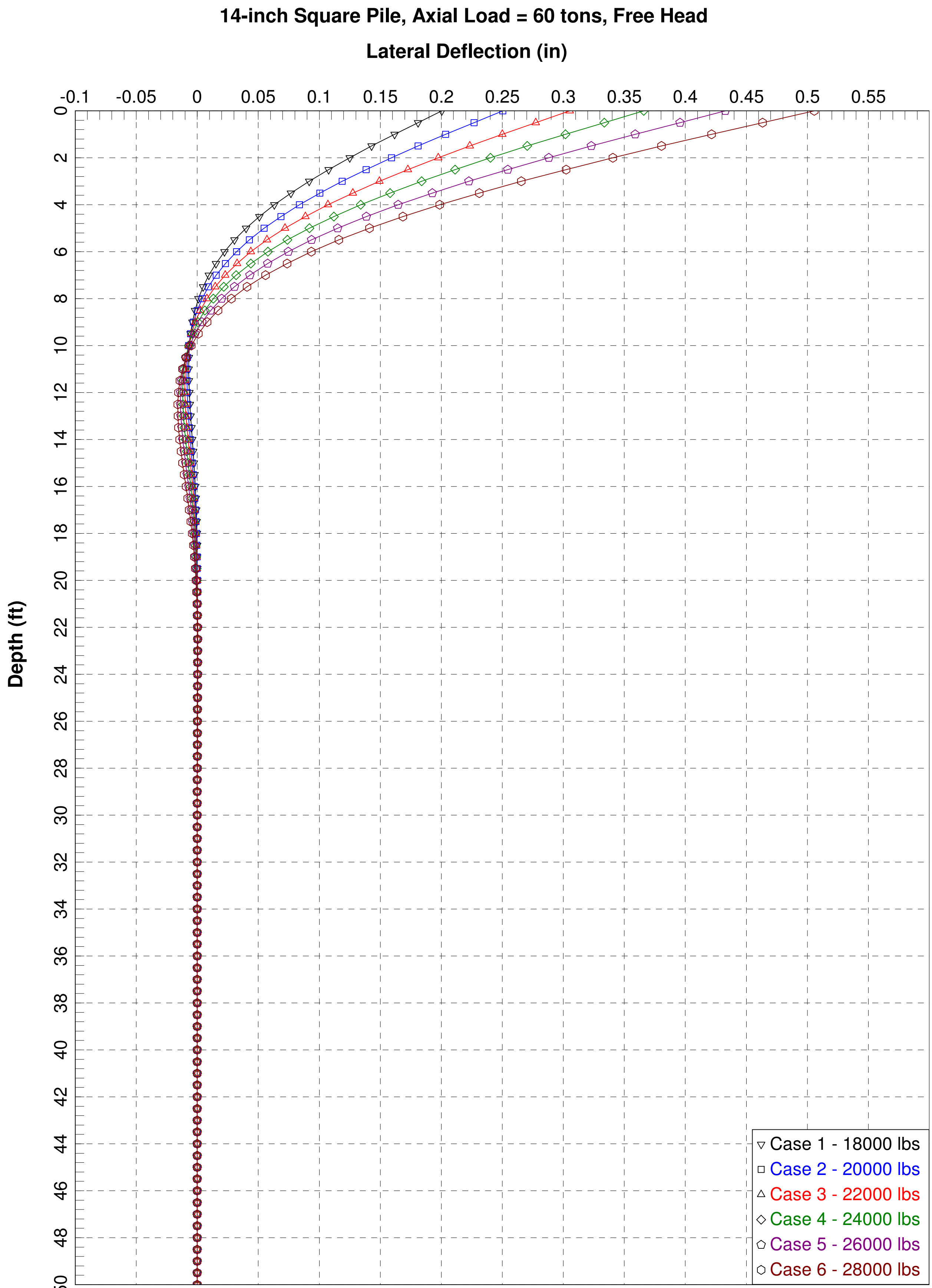
Shear Force (kips)
Depth (ft)
Case 1 - 18000
Case 2 - 20000
Case 3 - 22000
Case 4 - 24000
Case 5 - 26000
Case 6 - 28000



14-inch Square Pile, Axial Load = 60 tons, Free Head
Lateral Deflection (in)
Depth (ft)
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-0.05
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0.55
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
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Case 1 - 18000 lbs
Case 2 - 20000 lbs
Case 3 - 22000 lbs
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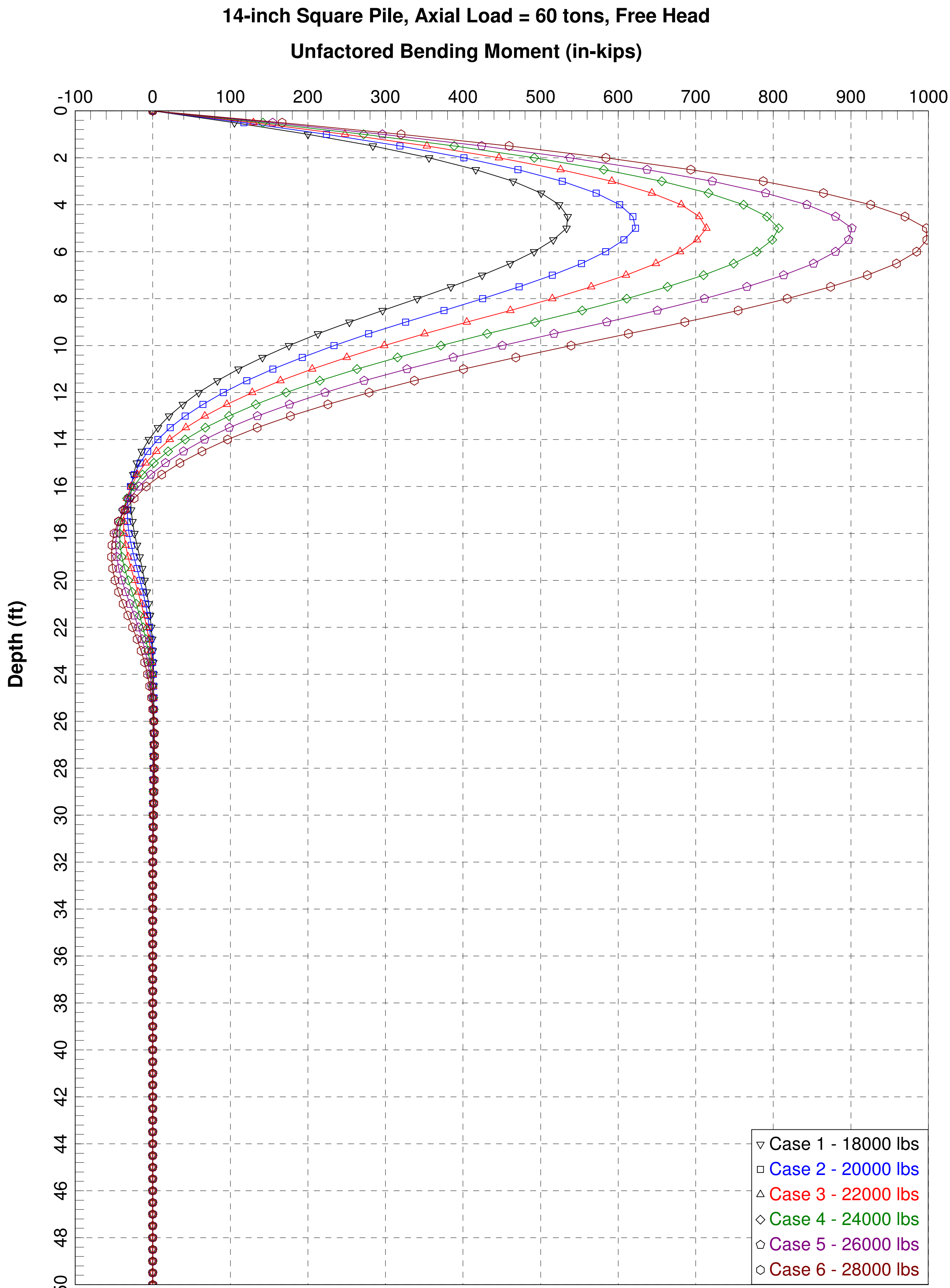
Case 5 - 26000 lbs
Case 6 - 28000 lbs



14-inch Square Pile, Axial Load = 60 tons, Free Head
Unfactored Bending Moment (in-kips)
-100
0
100
200
300
400
500
600
700
800
900
1000
Depth (ft)
0
2
4
6
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12
14
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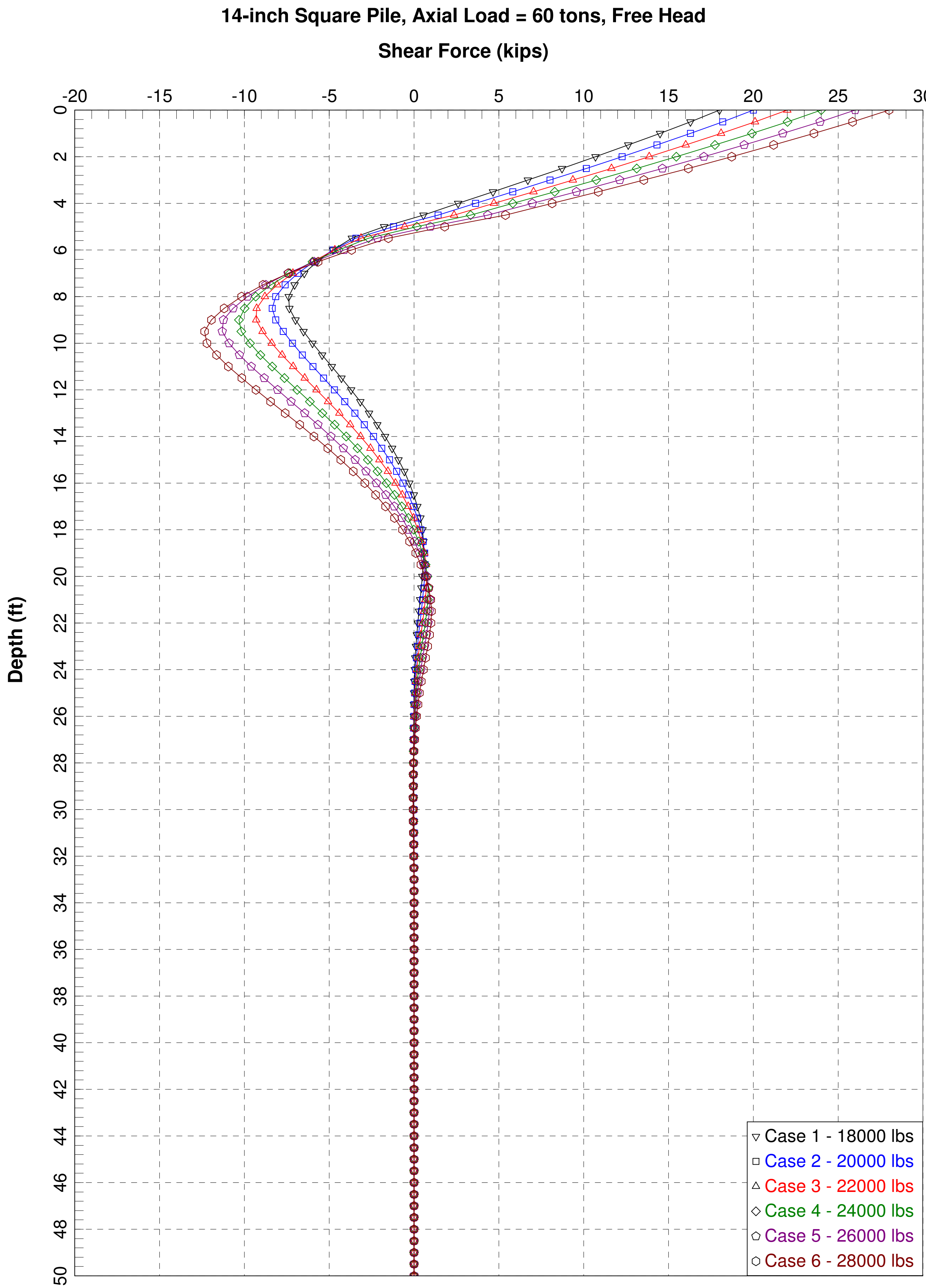
Case 1 - 18000 lbs
Case 2 - 20000 lbs
Case 3 - 22000 lbs
Case 4 - 24000 lbs
Case 5 - 26000 lbs
Case 6 - 28000 lbs


14-inch Square Pile, Axial Load = 60 tons, Free Head
Shear Force (kips)
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-15
-10
-5
0
5
10
15
20
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30
Depth (ft)
0
2
4
6
8
10
12
14
16
18
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Case 1 - 18000 lbs
Case 2 - 20000 lbs
Case 3 - 22000 lbs
Case 4 - 24000 lbs
Case 5 - 26000 lbs
Case 6 - 28000 lbs

APPENDIX G

Guide Contract Specifications

6486.200.601
November 24, 2008

GUIDE CONTRACT SPECIFICATIONS

PART I - EARTHWORK

PREFACE

These specifications are intended as a guide for the earthwork performed at the subject development project. If there is a conflict between these specifications (including the recommendations of the geotechnical report) and agency or code requirements, it should be brought to the attention of ENGEO and Owner prior to contract bidding.

PART 1 - GENERAL

1.01 WORK COVERED

A. Grading, excavating, filling and backfilling, including trenching and backfilling for utilities as necessary to complete the Project as indicated on the Drawings.

B. Subsurface drainage as indicated on the Drawings.

1.02 CODES AND STANDARDS

A. Excavating, trenching, filling, backfilling, and grading work shall meet the applicable requirements of the Uniform Building Code and the standards and ordinances of state and local governing authorities.

1.03 SUBSURFACE SOIL CONDITIONS

A. The Owners' Geotechnical Exploration report is available for inspection by bidder or Contractor. The Contractor shall refer to the findings and recommendations of the Geotechnical Exploration report in planning and executing his work.

1.04 DEFINITIONS

A. Fill: All soil, rock, or soil-rock materials placed to raise the grades of the site or to backfill excavations.

B. Backfill: All soil, rock or soil-rock material used to fill excavations and trenches.

C. On-Site Material: Soil and/or rock material which is obtained from the site.

D. Imported Material: Soil and/or rock material which is brought to the site from off-site areas.

E. Select Material: On-site and/or imported material which is approved by ENGEO as a specific-purpose fill.

F. Engineered Fill: Fill upon which ENGEO has made sufficient observations and tests to confirm that the fill has been placed and compacted in accordance with specifications and requirements.

G. Degree of Compaction or Relative Compaction: The ratio, expressed as a percentage, of the in-place dry density of the fill and backfill material as compacted in the field to the maximum dry density of the same material as determined by ASTM D-1557 or California 216 compaction test method.

H. Optimum Moisture: Water content, percentage by dry weight, corresponding to the maximum dry density as determined by ASTM D-1557.

I. ENGEO: The project geotechnical engineering consulting firm, its employees or its designated representatives.

J. Drawings: All documents, approved for construction, which describe the Work.

1.05 OBSERVATION AND TESTING

A. All site preparation, cutting and shaping, excavating, filling, and backfilling shall be carried out under the observation of ENGEO, employed and paid for by the Owners. ENGEO will perform appropriate field and laboratory tests to evaluate the suitability of fill material, the proper moisture content for compaction, and the degree of compaction achieved. Any fill that does not meet the specification requirements shall be removed and/or reworked until the requirements are satisfied.

B. Cutting and shaping, excavating, conditioning, filling, and compacting procedures require approval of ENGEO as they are performed. Any work found unsatisfactory or any work disturbed by subsequent operations before approval is granted shall be corrected in an approved manner as recommended by ENGEO.

C. Tests for compaction will be made in accordance with test procedures outlined in ASTM D-1557, as applicable. Field testing of soils or compacted fill shall conform with the applicable requirements of ASTM D-2922.

D. All authorized observation and testing will be paid for by the Owners.

1.06 SITE CONDITIONS

A. Excavating, filling, backfilling, and grading work shall not be performed during unfavorable weather conditions. When the work is interrupted by rain, excavating, filling, backfilling, and grading work shall not be resumed until the site and soil conditions are suitable.

B. Contractor shall take the necessary measures to prevent erosion of freshly filled, backfilled, and graded areas until such time as permanent drainage and erosion control measures have been installed.

PART 2 - PRODUCTS

2.01 GENERAL

A. Contractor shall furnish all materials, tools, equipment, facilities, and services as required for performing the required excavating, filling, backfilling, and grading work, and trenching and backfilling for utilities.

2.02 SOIL MATERIALS

A. Fill

1. Material to be used for engineered fill and backfill shall be free from organic matter and other deleterious substances, and of such quality that it will compact thoroughly without excessive voids when watered and rolled. Excavated on-site material will be considered suitable for engineered fill and backfill if it contains no more than 3 percent organic matter, is free of debris and other deleterious substances and conforms to the requirements specified above. Rocks of maximum dimension in excess of two-thirds of the lift thickness shall be removed from any fill material to the satisfaction of ENGEO.

2. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled as required for later filling and backfilling operations. Conditioning shall consist of spreading material in layers not to exceed 8 inches and raking free of debris and rubble. Rocks and aggregate exceeding the allowed largest dimension, and deleterious material shall be removed from the site and disposed off site in a legal manner.

3. ENGEO shall be immediately notified if potential hazardous materials or suspect soils exhibiting staining or odor are encountered. Work activities shall be discontinued within the area of potentially hazardous materials. ENGEO

environmental personnel will conduct an assessment of the suspect hazardous material to determine the appropriate response and mitigation. Regulatory agencies may also be contacted to request concurrence and oversight. *ENGEO will rely on the Owner, or a designated Owner's representative, to make necessary notices to the appropriate regulatory agencies. The Owner may request ENGEO's assistance in notifying regulatory agencies, provided ENGEO receives Owner's written authorization to expand its scope of services.*

4. ENGEO shall be notified at least 48 hours prior to the start of filling and backfilling operations so that it may evaluate samples of the material intended for use as fill and backfill. All materials to be used for filling and backfilling require the approval of ENGEO.

B. Import Material: Where conditions require the importation of fill material, the material shall be an inert, nonexpansive soil or soil-rock material free of organic matter and meeting the following requirements unless otherwise approved by ENGEO.

Gradation (ASTM D-421):	Sieve Size	Percent Passing
	2-inch	100
	#200	15 - 70
Plasticity (ASTM D-4318):	Liquid Limit	Plasticity Index
	< 30	< 12
Swell Potential (ASTM D-4546B): (at optimum moisture)	Percent Heave	Swell Pressure
	< 2 percent	< 300 psf
Resistance Value (ASTM D-2844):	Minimum 25	
Organic Content (ASTM D-2974):	Less than 2 percent	

A sample of the proposed import material should be submitted to ENGEO for evaluation prior to delivery at the site.

2.03 SAND

A. Sand for sand cushion under slabs and for bedding of pipe in utility trenches shall be a clean and graded, washed sand, free from clay or organic material, suitable for the intended purpose with 90 to 100 percent passing a No. 4 U.S. Standard Sieve, not more than 5 percent passing a No. 200 U.S. Standard Sieve, and generally conforming to ASTM C33 for fine aggregate.

2.04 AGGREGATE DRAINAGE FILL

A. Aggregate drainage fill under concrete slabs and paving shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof. The aggregate shall be free from fines, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed 3 percent of the oven dry weight of the samples.

B. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U. S. Series) will conform to the following grading:

Sieve Size	Percentage Passing Sieve
1½-inches	100
1-inch	90 - 100
#4	0 - 5

2.05 SUBDRAINS

A. Perforated subdrain pipe of the required diameter shall be installed as shown on the drawings. The pipe(s) shall also conform to these specifications unless otherwise specified by ENGEO in the field.

Subdrain pipe shall be manufactured in accordance with one of the following requirements:

Design depths less than 30 feet

- Perforated ABS Solid Wall SDR 35 (ASTM D-2751)
- Perforated PVC Solid Wall SDR 35 (ASTM D-3034)
- Perforated PVC A-2000 (ASTM F949)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 50 psi minimum stiffness)

Design depths less than 50 feet

- Perforated PVC SDR 23.5 Solid Wall (ASTM D-3034)
- Perforated Sch. 40 PVC Solid Wall (ASTM-1785)

- Perforated ABS SDR 23.5 Solid Wall (ASTM D-2751)
- Perforated ABS DWV/Sch. 40 (ASTM D-2661 and D-1527)
- Perforated Corrugated HDPE double-wall (AASHTO M-252 or M-294, Caltrans Type S, 70 psi minimum stiffness)

Design depths less than 70 feet

- Perforated ABS Solid Wall SDR 15.3 (ASTM D-2751)
- Perforated Sch. 80 PVC (ASTM D-1785)
- Perforated Corrugated Aluminum (ASTM B-745)

B. Permeable Material (Class 2): Class 2 permeable material for filling trenches under, around, and over subdrains, behind building and retaining walls, and for pervious blankets shall consist of clean, coarse sand and gravel or crushed stone, conforming to the following grading requirements:

Sieve Size	Percentage Passing Sieve
1-inch	100
¾-inch	90 - 100
⅜-inch	40 - 100
#4	25 - 40
#8	18 - 33
#30	5 - 15
#50	0 - 7
#200	0 - 3

C. Filter Fabric: All filter fabric shall meet the following Minimum Average Roll Values unless otherwise specified by ENGEO.

Grab Strength (ASTM D-4632)..180 lbs
Mass Per Unit Area (ASTM D-4751).................................6 oz/yd^2
Apparent Opening Size (ASTM D-4751)...........................70-100 U.S. Std. Sieve
Flow Rate (ASTM D-4491)..80 gal/min/ft^2
Puncture Strength (ASTM D-4833)...................................80 lbs

D. Vapor Retarder: Vapor Retarders shall consist of PVC, LDPE or HDPE impermeable sheeting at least 10 mils thick.

2.06 PERMEABLE MATERIAL (Class 1; Type A)

A. Class 1 permeable material to be used in conjunction with filter fabric for backfilling of subdrain excavations shall conform to the following grading requirements:

Sieve Size	Percentage Passing Sieve
¾-inch	100
½-inch	95 - 100
⅜-inch	70 - 100
#4	0 - 55
#8	0 - 10
#200	0 - 3

PART 3 - EXECUTION

3.01 STAKING AND GRADES

A. Contractor shall lay out all his work, establish all necessary markers, bench marks, grading stakes, and other stakes as required to achieve design grades.

3.02 EXISTING UTILITIES

A. Contractor shall verify the location and depth (elevation) of all existing utilities and services before performing any excavation work.

3.03 EXCAVATION

A. Contractor shall perform excavating as indicated and required for concrete footings, drilled piers, foundations, floor slabs, concrete walks, and site leveling and grading, and provide shoring, bracing, underpinning, cribbing, pumping, and planking as required. The bottoms of excavations shall be firm undisturbed earth, clean and free from loose material, debris, and foreign matter.

B. Excavations shall be kept free from water at all times. Adequate dewatering equipment shall be maintained at the site to handle emergency situations until concrete or backfill is placed.

C. Unauthorized excavations for footings shall be filled with concrete to required elevations, unless other methods of filling are authorized by ENGEO.

D. Excavated earth material which is suitable for engineered fill or backfill, as determined by ENGEO, shall be conditioned for reuse and properly stockpiled for later filling and backfilling operations as specified under Section 2.02, "Soil Materials."

E. Abandoned sewers, piping, and other utilities encountered during excavating shall be removed and the resulting excavations shall be backfilled with engineered fill as required by ENGEO.

F. Any active utility lines encountered shall be reported immediately to the Owner's Representative and authorities involved. The Owner and proper authorities shall be permitted free access to take the measures deemed necessary to repair, relocate, or remove the obstruction as determined by the responsible authority or Owner's Representative.

3.04 SUBGRADE PREPARATION

A. All brush and other rubbish, as well as trees and root systems not marked for saving, shall be removed from the site and legally disposed of.

B. Any existing structures, foundations, underground storage tanks, or debris must be removed from the site prior to any building, grading, or fill operations. Septic tanks, including all drain fields and other lines, if encountered, must be totally removed. The resulting depressions shall be properly prepared and filled to the satisfaction of ENGEO.

C. Vegetation and organic topsoil shall be removed from the surface upon which the fill is to be placed and either removed and legally disposed of or stockpiled for later use in approved landscape areas. The surface shall then be scarified to a depth of at least eight inches until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used.

D. After the foundation for the fill has been cleared and scarified, it shall be made uniform and free from large clods. The proper moisture content must be obtained by adding water or aerating. The foundation for the fill shall be compacted at the proper moisture content to a relative compaction as specified herein.

3.05 ENGINEERED FILL

A. Select Material: Fill material shall be "Select" or "Imported Material" as previously specified.

B. Placing and Compacting: Engineered fill shall be constructed by approved and accepted methods. Fill material shall be spread in uniform lifts not exceeding 8 inches in uncompacted thickness. Each layer shall be spread evenly, and thoroughly blade-mixed to obtain uniformity of material. Fill material which does not contain sufficient moisture as specified by ENGEO shall be sprinkled with water; if it contains excess moisture it shall be aerated or blended with drier material to achieve the proper water content. Select material and water shall then be thoroughly mixed before being compacted.

C. Unless otherwise specified in the Geotechnical Exploration report, each layer of spread select material shall be compacted to at least 90 percent relative compaction at a moisture content of at least three percentage points above the optimum moisture content. Minimum compaction in all keyways shall be a minimum of 95 percent with a minimum moisture content of at least 1 percentage point above optimum.

D. Unless otherwise specified in the Geotechnical Exploration report or otherwise required by the local authorities, the upper 6 inches of engineered fill in areas to receive pavement shall be compacted to at least 95 percent relative compaction with a minimum moisture content of at least 3 percentage points above optimum.

E. Testing and Observation of Fill: The work shall consist of field observation and testing to determine that each layer has been compacted to the required density and that the required moisture is being obtained. Any layer or portion of a layer that does not attain the compaction required shall be reworked until the required density is obtained.

F. Compaction: Compaction shall be by sheepsfoot rollers, multiple-wheel steel or pneumatic-tired rollers or other types of acceptable compaction equipment. Rollers shall be of such design that they will be able to compact the fill to the specified compaction. Rolling shall be accomplished while the fill material is within the specified moisture content range. Rolling of each layer must be continuous so that the required compaction may be obtained uniformly throughout each layer.

G. Fill slopes shall be constructed by overfilling the design slopes and later cutting back the slopes to the design grades. No loose soil will be permitted on the faces of the finished slopes.

H. Strippings and topsoil shall be stockpiled as approved by Owner, then placed in accordance with ENGEO's recommendations to a minimum thickness of 6 inches and a maximum thickness of 12 inches over exposed open space cut slopes which are 3:1 or flatter, and track walked to the satisfaction of ENGEO.

I. Final Prepared Subgrade: Finish blading and smoothing shall be performed as necessary to produce the required density, with a uniform surface, smooth and true to grade.

3.06 BACKFILLING

A. Backfill shall not be placed against footings, building walls, or other structures until approved by ENGEO.

B. Backfill material shall be Select Material as specified for engineered fill.

C. Backfill shall be placed in 6-inch layers, leveled, rammed, and tamped in place. Each layer shall be compacted with suitable compaction equipment to 90 percent relative compaction at a moisture content of at least 3 percent above optimum.

3.07 TRENCHING AND BACKFILLING FOR UTILITIES

A. Trenching:

1. Trenching shall include the removal of material and obstructions, the installation and removal of sheeting and bracing and the control of water as necessary to provide the required utilities and services.

2. Trenches shall be excavated to the lines, grades, and dimensions indicated on the Drawings. Maximum allowable trench width shall be the outside diameter of the pipe plus 24 inches, inclusive of any trench bracing.

3. When the trench bottom is a soft or unstable material as determined by ENGEO, it shall be made firm and solid by removing said unstable material to a sufficient depth and replacing it with on-site material compacted to 90 percent minimum relative compaction.

4. Where water is encountered in the trench, the contractor must provide materials necessary to drain the water and stabilize the bed.

B. Backfilling:

1. Trenches must be backfilled within 2 days of excavation to minimize desiccation.

2. Bedding material shall be sand and shall not extend more than 6 inches above any utility lines.

3. Backfill material shall be select material.

4. Trenches shall be backfilled as indicated or required and compacted with suitable equipment to 90 percent minimum relative compaction at the required moisture content.

3.08 SUBDRAINS

A. Trenches for subdrain pipe shall be excavated to a minimum width equal to the outside diameter of the pipe plus at least 12 inches and to a depth of approximately 2 inches below the grade established for the invert of the pipe, or as indicated on the Drawings.

B. The space below the pipe invert shall be filled with a layer of Class 2 permeable material, upon which the pipe shall be laid with perforations down. Sections shall be joined as recommended by the pipe manufacturer.

C. Rocks, bricks, broken concrete, or other hard material shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

D. Excavations for subdrains shall be filled as required to fill voids and prevent settlement without damaging the subdrain pipe. Alternatively, excavations for subdrains may be filled with Class 1 permeable material (as defined in Section 2.06) wrapped in Filter Fabric (as defined in Section 2.05).

3.09 AGGREGATE DRAINAGE FILL

A. ENGEO shall approve finished subgrades before aggregate drainage fill is installed.

B. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.

C. Aggregate drainage fill under slabs and concrete paving shall be the minimum uniform thickness after compaction of dimensions indicated on Drawings. Where not indicated, minimum thickness after compaction shall be 4 inches.

D. Aggregate drainage fill shall be rolled to form a well-compacted bed.

E. The finished aggregate drainage fill must be observed and approved by ENGEO before proceeding with any subsequent construction over the compacted base or fill.

3.10 SAND CUSHION

A. A sand cushion shall be placed over the vapor retarder membrane under concrete slabs on grade. Sand cushion shall be placed in uniform thickness as indicated on the Drawings. Where not indicated, the thickness shall be 2 inches.

3.11 FINISH GRADING

A. All areas must be finish graded to elevations and grades indicated on the Drawings. In areas to receive topsoil and landscape planting, finish grading shall be performed to a uniform 6 inches below the grades and elevations indicated on the Drawings, and brought to final grade with topsoil.

3.12 DISPOSAL OF WASTE MATERIALS

A. Excess earth materials and debris shall be removed from the site and disposed of in a legal manner. Location of dump site and length of haul are the Contractor's responsibility.

PART II - GEOGRID SOIL REINFORCEMENT

1. DESCRIPTION:

Work shall consist of furnishing geogrid soil reinforcement for use in construction of reinforced soil slopes and retention systems.

2. GEOGRID MATERIAL:

2.1 The specific geogrid material shall be preapproved by ENGEO.

2.2 The geogrid shall be a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock. The geogrid structure shall be dimensionally stable and able to retain its geometry under construction stresses and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

2.3 The geogrids shall have an Allowable Strength (T_a) and Pullout Resistance, for the soil type(s) indicated, as listed in Table I.

2.4 Certifications: The Contractor shall submit a manufacturer's certification that the geogrids supplied meet the respective index criteria set when geogrid was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply test data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geogrid upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geogrid shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geogrid will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geogrid damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geogrid material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geogrid reinforcement may be joined with mechanical connections or overlaps as recommended and approved by the Manufacturer. Joints shall not be placed within 6 feet of the slope face, within 4 feet below top of slope, nor horizontally or vertically adjacent to another joint.

3.4 Geogrid Placement: The geogrid reinforcement shall be installed in accordance with the manufacturer's recommendations. The geogrid reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geogrid reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. However, if the Contractor is unable to complete a required length with a single continuous length of geogrid, a joint may be made with the Manufacturer's approval. Only one joint per length of geogrid shall be allowed. This joint shall be made for the full width of the strip by using a similar material with similar strength. Joints in geogrid reinforcement shall be pulled and held taut during fill placement.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geogrid reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geogrid reinforcement required for immediately pending work to prevent undue damage. After a layer of geogrid reinforcement has been placed, the next succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geogrid reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geogrid reinforcement and soil.

Geogrid reinforcement shall be placed to lay flat and pulled tight prior to backfilling. After a layer of geogrid reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geogrid reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geogrid reinforcement before at least six inches of soil have been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geogrid reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geosynthetic reinforcement at slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geogrid reinforcement shall be placed directly on the compacted horizontal fill surface. Geogrid reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geogrid reinforcement shall be verified by ENGEO.

Table I
Allowable Geogrid Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geogrid Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE	MINIMUM ALLOWABLE STRENGTH, T_a (lb/ft)*		
	GEOGRID Type I	GEOGRID Type II	GEOGRID Type III
A. Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B. Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C. Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D. Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

* All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.

** Unified Soil Classifications.

PART III - GEOTEXTILE SOIL REINFORCEMENT

1. DESCRIPTION:

   Work shall consist of furnishing geotextile soil reinforcement for use in construction of reinforced soil slopes.

2. GEOTEXTILE MATERIAL:

   2.1 The specific geotextile material and supplier shall be preapproved by ENGEO.

   2.2 The geotextile shall have a high tensile modulus and shall have high resistance to damage during construction, to ultraviolet degradation, and to all forms of chemical and biological degradation encountered in the soil being reinforced.

   2.3 The geotextiles shall have an Allowable Strength (T_a) and Pullout Resistance, for the soil type(s) indicated as listed in Table II.

   2.4 Certification: The Contractor shall submit a manufacturer's certification that the geotextiles supplied meet the respective index criteria set when geotextile was approved by ENGEO, measured in full accordance with all test methods and standards specified. In case of dispute over validity of values, the Contractor will supply the data from an ENGEO-approved laboratory to support the certified values submitted.

3. CONSTRUCTION:

   3.1 Delivery, Storage and Handling: Contractor shall check the geotextile upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geotextile shall be protected from temperatures greater than 140 °F, mud, dirt, dust, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the geotextile will be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be repaired by placing a patch over the damaged area. Any geotextile damaged during storage or installation shall be replaced by the Contractor at no additional cost to the owner.

3.2 On-Site Representative: Geotextile material suppliers shall provide a qualified and experienced representative on site at the initiation of the project, for a minimum of three days, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criterion will apply to construction of the initial slope only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Geotextile Placement: The geotextile reinforcement shall be installed in accordance with the manufacturer's recommendations. The geotextile reinforcement shall be placed within the layers of the compacted soil as shown on the plans or as directed.

The geotextile reinforcement shall be placed in continuous longitudinal strips in the direction of main reinforcement. Joints shall not be used with geotextiles.

Adjacent strips, in the case of 100 percent coverage in plan view, need not be overlapped. The minimum horizontal coverage is 50 percent, with horizontal spacings between reinforcement no greater than 40 inches. Horizontal coverage of less than 100 percent shall not be allowed unless specifically detailed in the construction drawings.

Adjacent rolls of geotextile reinforcement shall be overlapped or mechanically connected where exposed in a wrap around face system, as applicable.

The Contractor may place only that amount of geotextile reinforcement required for immediately pending work to prevent undue damage. After a layer of geotextile reinforcement has been placed, the succeeding layer of soil shall be placed and compacted as appropriate. After the specified soil layer has been placed, the next geotextile reinforcement layer shall be installed. The process shall be repeated for each subsequent layer of geotextile reinforcement and soil.

Geosynthetic reinforcement shall be placed to lay flat and be pulled tight prior to backfilling. After a layer of geotextile reinforcement has been placed, suitable means, such as pins or small piles of soil, shall be used to hold the geotextile reinforcement in position until the subsequent soil layer can be placed.

Under no circumstances shall a track-type vehicle be allowed on the geotextile reinforcement before at least six inches of soil has been placed. Turning of tracked vehicles should be kept to a minimum to prevent tracks from displacing the fill and the geotextile reinforcement. If approved by the Manufacturer, rubber-tired equipment may pass over the geotextile reinforcement as slow speeds, less than 10 mph. Sudden braking and sharp turning shall be avoided.

During construction, the surface of the fill should be kept approximately horizontal. Geotextile reinforcement shall be placed directly on the compacted horizontal fill surface.

Geotextile reinforcements are to be placed within three inches of the design elevations and extend the length as shown on the elevation view unless otherwise directed by ENGEO. Correct orientation of the geotextile reinforcement shall be verified by ENGEO.

Table II
Allowable Geotextile Strength
With Various Soil Types
For Geosynthetic Reinforcement In
Mechanically Stabilized Earth Slopes

(Geotextile Pullout Resistance and Allowable Strengths vary with reinforced backfill used due to soil anchorage and site damage factors. Guidelines are provided below.)

SOIL TYPE	MINIMUM ALLOWABLE STRENGTH, T_a (lb/ft)*		
	GEOTEXTILE Type I	GEOTEXTILE Type II	GEOTEXTILE Type III
A. Gravels, sandy gravels, and gravel-sand-silt mixtures (GW, GP, GC, GM & SP)**	2400	4800	7200
B. Well graded sands, gravelly sands, and sand-silt mixtures (SW & SM)**	2000	4000	6000
C. Silts, very fine sands, clayey sands and clayey silts (SC & ML)**	1000	2000	3000
D. Gravelly clays, sandy clays, silty clays, and lean clays (CL)**	1600	3200	4800

* All partial Factors of Safety for reduction of design strength are included in listed values. Additional factors of safety may be required to further reduce these design strengths based on site conditions.

** Unified Soil Classifications.

PART IV - EROSION CONTROL MAT OR BLANKET

1. DESCRIPTION:

   Work shall consist of furnishing and placing a synthetic erosion control mat and/or degradable erosion control blanket for slope face protection and lining of runoff channels.

2. EROSION CONTROL MATERIALS:

   2.1 The specific erosion control material and supplier shall be pre-approved by ENGEO.

   2.2 Certification: The Contractor shall submit a manufacturer's certification that the erosion mat/blanket supplied meets the criteria specified when the material was approved by ENGEO. The manufacturer's certification shall include a submittal package of documented test results that confirm the property values. In case of a dispute over validity of values, the Contractor will supply property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for conformance determinations.

3. CONSTRUCTION:

   3.1 Delivery, Storage, and Handling: Contractor shall check the erosion control material upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the erosion mat shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regard to protection from direct sunlight must also be followed. At the time of installation, the erosion mat/blanket shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed by cutting OUT a section of the mat. The remaining ends should be overlapped and secured with ground anchors. Any erosion mat/blanket damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

   3.2 On-Site Representative: Erosion control material suppliers shall provide a qualified and experienced representative on site, for a minimum of one day, to assist the Contractor and ENGEO personnel at the start of construction. If there is more than one slope on a project, this criteria will apply to construction of the initial slope only. The representative shall be available on an as-needed basis, as requested by ENGEO, during construction of the remaining slope(s).

3.3 Placement: The erosion control material shall be placed and anchored on a smooth graded, firm surface approved by the Engineer. Anchoring terminal ends of the erosion control material shall be accomplished through use of key trenches. The material in the trenches shall be anchored to the soil on maximum 1½ foot centers. Topsoil, if required by construction drawings, placed over final grade prior to installation of the erosion control material shall be limited to a depth not exceeding 3 inches.

3.4 Erosion control material shall be anchored, overlapped, and otherwise constructed to ensure performance until vegetation is well established. Anchors shall be as designated on the construction drawings, with a minimum of 12 inches length, and shall be spaced as designated on the construction drawings, with a maximum spacing of 4 feet.

3.5 Soil Filling: If noted on the construction drawings, the erosion control mat shall be filled with a fine grained topsoil, as recommended by the manufacturer. Soil shall be lightly raked or brushed on/into the mat to fill the mat voids or to a maximum depth of 1 inch.

PART V - GEOSYNTHETIC DRAINAGE COMPOSITE

1. DESCRIPTION:

   Work shall consist of furnishing and placing a geosynthetic drainage system as a subsurface drainage medium for reinforced soil slopes.

2. DRAINAGE COMPOSITE MATERIALS:

   2.1 The specific drainage composite material and supplier shall be preapproved by ENGEO.

   2.2 The drain shall be of composite construction consisting of a supporting structure or drainage core material surrounded by a geotextile. The geotextile shall encapsulate the drainage core and prevent random soil intrusion into the drainage structure. The drainage core material shall consist of a three dimensional polymeric material with a structure that permits flow along the core laterally. The core structure shall also be constructed to permit flow regardless of the water inlet surface. The drainage core shall provide support to the geotextile. The fabric shall meet the minimum property requirements for filter fabric listed in Section 2.05C of the Guide Earthwork Specifications.

   2.3 A geotextile flap shall be provided along all drainage core edges. This flap shall be of sufficient width for sealing the geotextile to the adjacent drainage structure edge to prevent soil intrusion into the structure during and after installation. The geotextile shall cover the full length of the core.

   2.4 The geocomposite core shall be furnished with an approved method of constructing and connecting with outlet pipes or weepholes as shown on the plans. Any fittings shall allow entry of water from the core but prevent intrusion of backfill material into the core material.

   2.5 Certification and Acceptance: The Contractor shall submit a manufacturer's certification that the geosynthetic drainage composite meets the design properties and respective index criteria measured in full accordance with all test methods and standards specified. The manufacturer's certification shall include a submittal package of documented test results that confirm the design values. In case of dispute over validity of design values, the Contractor will supply design property test data from an ENGEO-approved laboratory, to support the certified values submitted. Minimum average roll values, per ASTM D 4759, shall be used for determining conformance.

3. CONSTRUCTION:

3.1 Delivery, Storage, and Handling: Contractor shall check the geosynthetic drainage composite upon delivery to ensure that the proper material has been received. During all periods of shipment and storage, the geosynthetic drainage composite shall be protected from temperatures greater than 140 °F, mud, dirt, and debris. Manufacturer's recommendations in regards to protection from direct sunlight must also be followed. At the time of installation, the geosynthetic drainage composite shall be rejected if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, transportation, or storage. If approved by ENGEO, torn or punctured sections may be removed or repaired. Any geosynthetic drainage composite damaged during storage or installation shall be replaced by the Contractor at no additional cost to the Owner.

3.2 On-Site Representative: Geosynthetic drainage composite material suppliers shall provide a qualified and experienced representative on site, for a minimum of one half day, to assist the Contractor and ENGEO personnel at the start of construction with directions on the use of drainage composite. If there is more than one application on a project, this criterion will apply to construction of the initial application only. The representative shall also be available on an as-needed basis, as requested by ENGEO, during construction of the remaining applications.

3.3 Placement: The soil surface against which the geosynthetic drainage composite is to be placed shall be free of debris and inordinate irregularities that will prevent intimate contact between the soil surface and the drain.

3.4 Seams: Edge seams shall be formed by utilizing the flap of the geotextile extending from the geocomposite's edge and lapping over the top of the fabric of the adjacent course. The fabric flap shall be securely fastened to the adjacent fabric by means of plastic tape or non-water-soluble construction adhesive, as recommended by the supplier. Where vertical splices are necessary at the end of a geocomposite roll or panel, an 8-inch-wide continuous strip of geotextile may be placed, centering over the seam and continuously fastened on both sides with plastic tape or non-water-soluble construction adhesive. As an alternative, rolls of geocomposite drain material may be joined together by turning back the fabric at the roll edges and interlocking the cuspidations approximately 2 inches. For overlapping in this manner, the fabric shall be lapped and tightly taped beyond the seam with tape or adhesive. Interlocking of the core shall always be made with the upstream edge on top in the direction of water flow. To prevent soil intrusion, all exposed edges of the geocomposite drainage core edge must be covered. Alternatively, a 12-inch-wide strip of fabric may be utilized in the same manner, fastening it to the exposed fabric 8 inches in from the edge and folding the remaining flap over the core edge.

3.5 Soil Fill Placement: Structural backfill shall be placed immediately over the geocomposite drain. Care shall be taken during the backfill operation not to damage the geotextile surface of the drain. Care shall also be taken to avoid excessive settlement of the backfill material. The geocomposite drain, once installed, shall not be exposed for more than seven days prior to backfilling.

APPENDIX G

HAZARDOUS MATERIALS TECHNICAL REPORTS

Appendix G1

Phase One Environmental Site Assessment, Sutter Medical Center (2004)

PHASE ONE
ENVIRONMENTAL SITE ASSESSMENT

SUTTER MEDICAL CENTER OF SANTA ROSA /
LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

SUBMITTED

TO

SUTTER MEDICAL CENTER OF SANTA ROSA

SANTA ROSA, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 6486.2.001.01

DECEMBER 28 2004

ENGEO INCORPORATED

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Project No.
6486.2.001.01

December 28, 2004

Mr. Tom Minard, Director of Facilities and Support Services
Sutter Medical Center of Santa Rosa
3325 Chanate Road
Santa Rosa, CA 95404

Subject: Sutter Medical Center of Santa Rosa/Luther Burbank Center For the Arts
Sonoma County, California

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT

Dear Mr. Minard:

ENGEO Incorporated is pleased to present our Phase One Environmental Site Assessment of the Sutter Medical Center of Santa Rosa/Luther Burbank Center for the Arts Property located in Sonoma County, California. The attached report includes a description of the site assessment activities along with ENGEO's findings regarding the property.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please contact us.

Very truly yours,

ENGEO INCORPORATED

James R. Ollerton

Theodore P. Bayham, GE, CEG, REA

Reviewed by:

FOR Dennis Nakamoto, CEG

REGISTERED ENVIRONMENTAL ASSESSOR
THEODORE P. BAYHAM
No. 04988
STATE OF CALIFORNIA

jro/dn/tpb/mb:esa

cc: 4 - Ms. Nadin Sponamore, Sponamore Associates

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APPENDIX D – ESA Questionnaire

1.0 INTRODUCTION

Sutter Medical Center of Santa Rosa retained ENGEO Incorporated to perform a Phase One Environmental Site Assessment on the Luther Burbank Center for the Arts and Sutter Foundation properties (Property). The Property is comprised of four parcels that bear the following street addresses: 18 Mark West Springs Road, 50 Mark West Springs Road and 100 Mark West Springs Road, in Santa Rosa, California (Figures 1 and 2). The Property encompasses a total of approximately 54 acres, which are identified as Assessor's Parcel Numbers (APN) 058-040-023, 058-040-026, 058-040-027, and 058-040-045. Although APN 058-040-050 has common ownership with the Property identified for this study, the 24.4 acres of vineyards within that parcel were not included in this assessment.

A review of aerial photographs and historical database research found that the Property and surrounding properties have historically been used for rural residences and agricultural production, and more recently, a performing arts center, and residential subdivisions.

ENGEO Incorporated has performed this Phase One Environmental Site Assessment for the Property in general conformance with the scope and limitations of ASTM 1527-00 and our proposal dated September 13, 2004. Based on the findings of the assessment, we have identified one Recognized Environmental Condition (REC) and four items of concern within the Property. A discussion of these findings can be found in Section 7.0 of this report.

2.0 PURPOSE AND SCOPE

2.1 Purpose of Phase One Environmental Site Assessment

The purpose of this Phase One Environmental Site Assessment is to identify recognized environmental conditions associated with the property. As defined in the American Society for Testing and Materials (ASTM) Standard Practice E 1527-00, a Recognized Environmental Condition (REC) is "the presence or likely presence of any hazardous substances or petroleum products on a Property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the Property or into the ground, groundwater, or surface water of the property".

2.2 Detailed Scope of Services

The scope of services performed included the following:

- A review of publicly available and practically reviewable standard local, state and federal environmental record sources.
- A review of publicly available and practically reviewable standard historical sources, aerial photographs, fire insurance maps and physical setting sources.
- A reconnaissance of the Property to review site use and current conditions. The reconnaissance was conducted to check for the storage, use, production or disposal of hazardous or potentially hazardous materials.
- Interviews with public and private individuals with specific knowledge of the Property.
- Preparation of this report with our findings and conclusions.

2.3 Significant Assumptions

The following significant assumptions were made during preparation of this report as well as the opinions and conclusions contained herein:

1. This study assumes that shallow and regional groundwater flow follows the topographic gradient in the vicinity of the Property, which is generally to toward the southwest.

2. This study did not include a detailed evaluation of hydrogeologic conditions beneath the Property.

3. The waste water treatment system currently in operation within the Property will be decommissioned and removed with oversight by the North Coast Regional Water Quality Control Board as a part of the proposed site development under the Master Plan.

4. The existing structures present within APN 058-040-023 and 058-040-026 will be removed prior to site development.

2.4 Limitations and Exceptions of Assessment

The professional staff at ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. The recommendations and conclusions presented in this report were based on the findings of our study, which were developed solely from the contracted services. The findings of the report are based in part on contracted database research, out-of-house reports and personal communications. ENGEO Incorporated assumes no liability for the validity of the materials relied upon in the preparation of this report.

This document must not be subject to unauthorized reuse; that is, reuse without written authorization of ENGEO Incorporated. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. The findings from a phase one environmental site assessment are typically valid for 180 days after completion of the report, particularly with regard to the regulatory database files. In some instances the shelf life of the report can be less.

This Phase One Environmental Site Assessment is not intended to represent a complete soil or groundwater characterization. This assessment does not define the depth or extent of soil or groundwater contamination. It is intended to provide an evaluation of potential environmental concerns associated with the use of the property. A more extensive assessment that would include a subsurface exploration with laboratory testing of soil and groundwater samples could provide more definitive information concerning site-specific conditions. If additional assessment activities are considered for the Property and if other entities are retained to provide such services, ENGEO cannot be held responsible for any and all claims arising from or resulting from the performance of such services by other persons or entities, and from any and all claims arising or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

2.5 Special Terms and Conditions

ENGEO Incorporated has prepared this report for the exclusive use of our client, Sutter Medical Center of Santa Rosa. It is recognized and agreed that ENGEO has assumed responsibility only for undertaking the study for the client. The responsibility for disclosures or reports to a third party and for remedial or mitigative action shall be solely that of the Client. Laboratory testing of soil or groundwater samples was not within the scope of the contracted services. The assessment did not include an asbestos survey, an evaluation of lead-based paint, an inspection of light ballasts for PCBs, or a mold survey.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's work. Visual observations referenced in this report are intended only to represent site conditions at the time of the site visit. ENGEO would not be aware of site contamination, such as dumping and/or accidental spillage that occurred subsequent to the site reconnaissance conducted by ENGEO personnel.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The subject Property (Property) consists of five parcels located on the south side of Mark West Springs Road, between Old Redwood Highway and Highway 101, in Sonoma County, California (Figure 2). The Property consists of a total of approximately 54 acres, and is identified as Assessor's Parcel Numbers (APN) 058-040-023, 058-040-026, 058-040-027, and 058-040-045. APN 058-040-050 is not a part of this study.

3.2 Site and Vicinity Characteristics

The site is relatively flat at an elevation of approximately 155 feet above mean sea level (msl). Review of the Regional Geologic Map of the Santa Rosa Quadrangle, State of California, Department of Conservation, Division of Mines and Geology 1982, compiled by D.L. Wagner, E.J. Bortugno, found that the underlying geologic formation at the Property is un-named quaternary alluvium.

We reviewed the State of California, Department of Water Resources web site for groundwater level data in the vicinity of the Property. Well Number 07N08W03L001M shows that groundwater in the vicinity of the Property is approximately 10 feet below the ground surface. This well is mapped approximately ¼-mile southeast of the Property.

3.3 Current Use of Property/Description of Site Improvements

The current uses of the Property includes the existing 85,000-square-foot Luther Burbank Center for the Arts (APN 058-040-045), a rural residence with barn, out buildings and undeveloped pasture land (APN 058-040-026 and 058-040-027), and a single-family home that is currently used as law offices (APN 058-040-023). The Luther Burbank Center For The Arts (LBC) occupies the center of the Property and is utilized as a cultural and performing arts event center. A part of the LBC Property is leased to the Sonoma Academy, an independent college-preparatory high school. This portion of the Property includes approximately 38.8 acres that are occupied by asphalt-covered parking areas, an athletic field, and a waste water treatment facility ponds. The vineyard occupies the south and southeast portions of the Property that include approximately 24.4 acres. The rural residential homestead property occupies the western portion of the Property that includes approximately 13.6 acres. This parcel is utilized in part by the Luther Burbank Center as a maintenance and storage area. The single-family home that is currently used as law offices occupies the northeast corner of the Property that includes approximately 1.3 acres. This parcel also contains an asphalt parking area which can accommodate approximately 10 vehicles, an undeveloped dirt parking area that occupies the southwest ¼ of the parcel, and two small out buildings.

3.4 Current and Past Use of Adjoining Properties

Adjoining properties to the east consist of a residential subdivision and a Sonoma County Park site. Adjoining properties to the north consist of residential subdivisions and commercial properties. Adjoining properties to the south and west consist of rural residential and agricultural properties. Highway 101 and State of California Right-of-Way are located along the west boundary of the Property.

4.0 RECORDS REVIEW

4.1 Historical Record Sources

The purpose of the historical record review is to develop a history of the previous uses or occupancies of the Property and surrounding area in order to identify those uses or occupancies that are likely to have led to recognized environmental conditions on the property.

4.1.1 Historical Topographic Maps

Historical USGS 7.5' and 15' Topographic Maps were reviewed to determine if discernible changes in topography or improvements pertaining to the Property had been recorded. We reviewed the USGS 7.5' Santa Rosa Quadrangle Maps dated 1954, 1968, 1973, and 1980; USGS 7.5' Sebastopol Quadrangle Maps dated 1954, 1968, and 1980; and USGS 15' Santa Rosa Quadrangle Maps dated 1944 and 1954.

1944 15' Map – The Property is mapped as relatively flat, undeveloped land. There are no structures mapped on the Property. Redwood Highway is mapped <¼ mile east of the site. Three small structures are mapped along the west side of the Redwood Highway, near the east boundary of the Property.

1954 15' Map – The Property is mapped as being covered with an orchard. No structures are mapped within the Property. A small structure is mapped at the southwest corner of Mark West Springs Road and Redwood Highway.

1954 7.5' Maps – Conditions within the Property are similar to those shown of the 1954 15' map. East Fulton Road is mapped along the northern boundary of the Property. A single power line is mapped running east-west, ¼ mile north of the Property. A second power line is mapped running east from the intersection of East Fulton Road and Redwood Highway. The Northwestern Pacific Railroad is shown approximately 1 mile west of the Property.

<u>1968 7.5' Maps</u> – Conditions within the Property are similar to those in the 1954 7.5' maps. Highway 101 is mapped along the west boundary of the Property. Several new, small to large structures are mapped on adjoining properties on the north side of East Fulton Road. A new residential subdivision mapped east of the intersection of East Fulton Road and Redwood Highway. Ursuline High School is mapped on the east side of the intersection of Mark West Road and Redwood Highway.

<u>1973 7.5' Map</u> – Conditions within the Property are similar to those in the 1968 7.5' maps. A residential subdivision is mapped on the east side of Redwood Highway between Mark West Road and East Fulton Road.

<u>1980 7.5' Maps</u> – The Luther Burbank Center and surrounding roadways are mapped within the Property. The western portion of the Property is still mapped as being developed as an orchard.

<u>4.1.2 Chain of Title/Ownership</u>

The Title Report lists recorded land title detail, ownership fees, leases, land contracts, easements, liens, deficiencies, and other encumbrances attached to or recorded against a subject property. However, laws and regulations pertaining to land trusts vary from state to state and the detail of information presented in a Title Report can vary greatly by jurisdiction. As a result, ENGEO utilizes a Title Report, when provided to us, as a supplement to other historical record sources. We did not receive Title Reports for any of the subject Properties.

4.1.3 Fire Insurance Maps

Environmental Data Resources, Inc. (EDR) prepared a Sanborn Fire insurance map search for the subject site and surrounding properties. No maps were located by EDR pertaining to the subject Property or adjacent properties (Appendix A).

4.1.4 Aerial Photographs

The following aerial photographs were reviewed for information regarding past conditions and land use at the subject site and in the immediate vicinity.

PHOTO NUMBER	SCALE	SOURCE	DATE
NONE	1" = 833'	Cartwright	1952
NONE	1" = 333'	Cartwright	1965
NONE	1" = 690'	WSA	1982
NONE	1" = 666'	USGS	1993

1952 Photograph – The Property is developed as an orchard. Three structures are visible within the Property. Two of the structures are within the ranch Property on the south side of East Fulton Road at the present location of the main entrance to the Luther Burbank Center. The third structure is located approximately 1,000 feet south of the ranch property. Several north-south and east-west running agriculture roads are visible within the Property. Several small to medium sized structures are visible on adjoining properties. The Redwood Highway is visible to the east of the Property.

1965 Photograph – Orchards are still present within the majority of the Property. Five structures are visible within the Property, four within the ranch Property along the north boundary of the Property, and one approximately 1,000 feet south of the ranch property. Highway 101 is visible along the west boundary of the Property. East Fulton Road (Mark

West Springs Road) has been realigned near the northeast corner of the Property to its present configuration. A small residential subdivision is visible on the west side of Redwood Highway approximately 300 feet north of Mark West springs Road. Several large buildings are visible to the north of the subdivision. Adjoining properties to the east and west beyond Highway 101 remain as agricultural land.

1982 Photograph – The Luther Burbank Center with associated parking lots and waste water treatment ponds are visible within the Property. Several residential subdivisions are visible to the north and east of the Property. Agricultural land is still present at the northeast corner of Redwood Highway and Mark West Springs Road.

1993 Photograph – Conditions within the Property appear similar to those in the 1982 photograph. A residential subdivision is now present at the northeast corner of Redwood Highway and Mark West Springs Road.

4.1.5 Building/Planning Department Records

The following agencies were contacted pertaining to possible past development and other historical data regarding the Property:

- Sonoma County Planning/Building Department

We conducted a file search of existing documents held by the Sonoma County Building Department for APN 058-040-026 (homestead Property at 100 Mark West Springs Road), and APN 058-040-045 (Luther Burbank Center at 50 Mark West Springs Road). Our file search revealed the following:

- No well or septic permits are on file for APN 058-040-045.
- No as-built plans are on file for the LBC facilities.

- No building permits are on file for the original construction of the LBC facilities.

- The Land Use Permit currently issued to the LBC parcel (APN 058-040-045) was originally issued to the Christian Life Center for 'Religious Institutional Use'.

- The LBC parcel was acquired by the Luther Burbank Memorial Foundation in October 1981.

- According to Resolution #10032 from the Sonoma County Board of Zoning Adjustments dated April 11, 1985, the Land Use Permit for the LBC parcel was changed to allow 'Cultural & Performing Arts Institutional Use'.

- The LBC complex is part of the Larkfield-Wikiup Specific Plan.

- The waste water treatment system on the LBC parcel is operated under permit by the North Coast Regional Water Quality Control Board.

4.2 Environmental Record Sources

Environmental Data Resources Inc. (EDR) performed a search of local, state and federal agency databases regarding the Property and known contaminated sites in the immediate vicinity. The EDR listed the Property in two of the databases searched. The EDR also reported eleven locations within a 1-mile radius of the Property were hazardous materials are stored, used, or have been released to the environment. Each of these locations is described below:

1. Luther Burbank Memorial Foundation (Property), 50 Mark West Springs Rd, (HAZNET). This site is listed as the location of 1.29 tons of polychlorinated biphenyls and material containing PCBs. The disposal method is not reported.

2. Luther Burbank Center for The Arts (Property), 50 Mark West Springs Rd, (CA WDS). This site is listed as the location of a domestic facility that treats sewage or a mixture of predominantly sewage and or privately owned systems (excluding individual subsurface

leaching systems disposing of less than 1,000 gallons per day). The site status is listed as active, with a moderate threat to water quality.

3. Unocal #5142, 4605 Old Redwood Highway, (LUST, Cortese). This site is located less than $^1/_8$ mile from the Property and is listed as the location of a leaking underground storage tank. No additional site status information is provided.

4. Texaco, 4601 Old Redwood Highway, (LUST, Cortese). This site is located less than $^1/_8$ mile from the Property and is listed as the location of a leaking underground storage tank. No additional site status information is provided.

5. Larkfield Auto Center, 601 Larkfield CTR, (RCRIS-SQG, FINDS, HAZNET). This site is located from $^1/_8$ to $^1/_4$ mile from the Property and is listed as a location of a small quantity generator. No violations have been found in relation to the generator. This site is also listed as the location of an aqueous solution with less than 10 percent total organic residues. The disposal method is listed to be a transfer station and a recycler.

6. Larkfield Chevron, 668 Larkfield Center, (CA FID UST). This site is located from $^1/_8$ to $^1/_4$ mile from the Property and is listed as a location of an active underground storage tank location. No additional site status information is provided.

7. 98270, 668 Larkfield Center, (HIST UST). This site is located from $^1/_8$ to $^1/_4$ mile from the Property and is listed as a location of a hazardous substance storage container. The container is noted to contain waste from a gas station. No additional site status information is provided.

8. Texaco, 4601 Old Redwood Highway, (CA FID UST, LUST). This site is located from $^1/_4$ to $^1/_2$ mile from the Property and is listed as a location of a leaking underground storage tank. It is noted that the aquifer has been affected. The status of the site is listed as undergoing

remediation. It is noted that MTBE was tested for and detected in the groundwater. The maximum concentration of MTBE found was 6.81 parts per billion. No additional site status information is provided.

9. Union 76 #5142, 4605 Old Redwood Highway, (LUST). This site is located from $^1/_4$ to $^1/_2$ mile from the Property and is listed as a location of a leaking underground storage tank which contains gasoline. It is noted that the aquifer has been affected. The status of the site is listed as case closed. It is noted that MTBE was tested for and detected in the groundwater. The maximum concentration of MTBE found was 10 parts per billion. No additional site status information is provided.

10. BP, Larkfield/Redwood Oil, 4856 Old Redwood Highway, (LUST, Cortese). This site is located from ¼ to ½ mile from the Property and is listed as the location of a leaking underground storage tank. No additional site status information is provided.

11. Davis, May L., 105 Eton, (Cortese). This site is located from $^1/_4$ to $^1/_2$ mile from the Property and is listed as the location of hazardous waste or substances. No additional site status information is provided.

12. Larkfield Chevron #98270, 4840 Old Redwood Highway, (LUST). This site is located from $^1/_4$ to ½ mile from the Property and is listed as the location of a leaking underground storage tank. It is noted that the aquifer has been affected. The status of the site is listed as "leak being confirmed". It is noted that MTBE was tested for and detected in the groundwater. The maximum concentration of MTBE found was 820 parts per billion. No additional site status information is provided.

13. Larkfield BP, 4856 Old Redwood Highway, (Notify 65, LUST). This site is located from ¼ to ½ mile from the Property and is listed as the location of a leaking underground gasoline

storage tank. It is noted that the aquifer has been affected. The status of the site is listed as "remedial action (cleanup) underway". It is noted that MTBE was tested for and detected in the groundwater. The maximum concentration of MTBE found was 49 parts per billion. No additional site status information is provided. This site is listed in the Notify 65 database, which contains facility notifications regarding facilities with known releases that could impact drinking water and thereby expose the public to a potential health risk.

The databases searched are presented and described below.

4.2.1 Federal Record Sources

The following is a summary of federal databases reviewed by EDR:

- NPL – National Priority List – The National Priority List (Superfund) identifies over 1,200 sites for priority cleanup under the Superfund program.

- Proposed NPL Sites – Provides a list of sites that are under consideration for inclusion on the NPL.

- CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System – CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies, and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to be or are on the National Priority List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

- CERCLIS-NFRAP – CERCLIS No Further Remedial Action Planned – As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration.

- CORRACTS – Corrective Action Report – CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

- RCRIS – Resource Conservation and Recovery Information System – RCRIS includes selective information on sites that generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

- ERNS – Emergency Response Notification System – ERNS records and stores information on reported releases of oil and hazardous substances.

- BRS – Biennial Reporting System – A national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

- CONSENT – Superfund (CERCLA) Consent Decrees – Major legal settlements that establish responsibility and standards for cleanup at NPL sites.

- ROD – Records of Decision – ROD documents mandate a permanent remedy at an NPL site containing technical and health information to aid in the cleanup.

- DELISTED NPL – National Priority List Deletions – Sites deleted by EPA in accordance with 40 CFR 300.425.(e) where no further response is appropriate.

- FINDS – Facility Index System/Facility Identification Initiative Program Summary Report – FINDS contains both facility information and "pointers" to other sources that contain more detailed information.

- HMIRS – Hazardous Materials Information Reporting System – HMIRS contains hazardous material spill incidents reported to the Department of Transportation (DOT).

- MLTS – Material Licensing Tracking System – MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites that possess or use radioactive materials and are subject to NRC licensing requirements.

- MINES – Mines Master Index File – Provides a list of sites that have been subjected to mining activity.

- NPL Liens – Under authority granted by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, USEPA has the authority to file liens against real Property in order to recover remedial action expenditures or when the Property owner receives notification of potential liability.

- PADS – PCB Activity Database System – PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCBs who are required to notify the EPA of such activities.

- RAATS – RCRA Administrative Action Tracking System – RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. Please note data entry of administrative actions was discontinued after September 30, 1995.

- TRIS – Toxic Chemical Release Inventory System – TRIS identifies facilities that release chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

- TSCA – Toxic Substances Control Act – TSCA identifies manufacturers and importers of chemical substances included on the SCA Chemical Substance Inventory List.

- FTTS – FIFRA/TSCA Tracking System, and FTTS INSP – FTTS tracks administrative cases and pesticide enforcement actions and compliance related to FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act), TSCA, and EPCRA (Emergency Planning and Community Right-to Know Act).

4.2.1.1 Subject Property

The Property is not listed on the above databases.

4.2.1.2 Other Properties

The EDR report identified one facility included on the above databases within the designated ASTM search radii. The database(s) with listed facilities are indicated below with the number of facilities listed in parenthesis.

- FINDS – Resource Conservation and Recovery Act Information System (1)

4.2.2 State Record Sources

The following is a summary of state databases reviewed by EDR:

- AWP – Annual Workplan Sites – Identifies known hazardous substance sites targeted for cleanup.
- CAL-SITES – Contains potential or confirmed hazardous substance release properties.
- CHMIRS – California Hazardous Materials Information Reporting System – Contains information on reported hazardous materials incidents.
- CORTESE – "Cortese" Hazardous Waste and Substances Sites List – Listed sites are designated by the State Water Resources Control Board (LUST), the Integrated Waste Board (SWF/LF), and the Department of Toxic Substances Control (Cal-Sites).
- NOTIFY 65 – Proposition 65 Records – Contains facility notifications regarding known releases that could impact drinking water and thereby expose the public to a potential health risk.
- TOXIC PITS – Toxic Pits Cleanup Act Sites – Identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.
- SWF/LF (SWIS) – Solid Waste Information System – Active, closed and inactive landfills.
- WMUDS/SWAT – Waste Management Unit Database – Used by State Water Resources Control Board staff and Regional Water Quality Control Boards for program tracking and inventory of waste management units.
- LUST – Leaking Underground Storage Tank Information System – Contains an inventory of reported leaking underground storage tank incidents.
- CA BOND EXP. PLAN – Bond Expenditure Plan – A site-specific expenditure plan used as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. This has been superceded by the Annual Work Plan (AWP).
- CA UST – Active UST Facilities – A list of active UST facilities gathered from local regulatory agencies.
- *C*A FID UST – Facility Inventory Database – An historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board.

- HIST UST – Hazardous Substance Storage Container Database – A historical listing of UST sites.

- AST – Above-ground Petroleum Storage Tank Facilities – Registered above-ground storage tanks.

- CLEANERS – Dry Cleaner Facilities – A list of dry cleaner facilities that have EPA ID numbers. Specific criteria for the subject facilities warrant inclusion on this database.
- CA WDS – Waste Discharge System – Sites that have been issued waste discharge requirements.

- HAZNET – Hazardous Waste Information System – Facility and manifest data regarding hazardous waste shipments.

4.2.2.1 Subject Property

The Property is listed on two of the above databases. The databases on which the Property is listed are indicated below.

- CA WDS

- HAZNET

4.2.2.2 Other Properties

The EDR report identified 13 facilities included on the above databases within the designated ASTM search radii. The database(s) with listed facilities are indicated below with the number of facilities listed in parenthesis.

- CORTESE (4)
- Notify 65 (1)
- LUST (7)
- CA FID UST (2)
- HIST UST (1)

4.2.3 Local Record Sources

The following is a summary of the local database reviewed by EDR.

- Sonoma County - Leaking Underground Storage Tank Sites

4.2.3.1 Subject Property

The Property is not listed on the above local database.

4.2.3.2 Other Properties

No properties were reported on the above database.

5.0 SITE RECONNAISSANCE

5.1 Methodology

ENGEO conducted a site reconnaissance of the Property on October 5, 2004. The Property was viewed for hazardous materials storage, surficial staining or discoloration, debris, stressed vegetation, or other conditions that may be indicative of potential sources of soil or groundwater contamination. The site was also reviewed for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks. The portion of the Property occupied by APN 058-040-023 was viewed only from the boundaries of this parcel. Photographs taken during the site reconnaissance are presented in Appendix B.

5.2 General Site Setting

The Property consists of a total of approximately 54 acres located at the southeast corner of Mark West Springs Road and Highway 101 in Sonoma County, California. This Phase I ESA focuses on approximately 54 acres identified by APN 058-040-023, 058-040-026, 058-040-027, and 058-040-045. The Property is bounded by Mark West Springs Road on the north, Highway 101 on the west, rural residential properties on the south, and Old Redwood Highway, a residential subdivision, and a park on the east. An approximately 24.4 acre vineyard parcel (APN 058-040-050) occupies the south and southeast portions of the Property, and is not included as a part of this study.

5.3 Exterior Observations

Hazardous Substances and Petroleum Products in Connection with Identified Uses. We observed hazardous substances and petroleum products in connection with the identified uses in three locations within the Property. These are discussed below in the section 'Hazardous Substance and Petroleum Product Containers'

Storage Tanks. No storage tanks were observed on the Property during our reconnaissance.

Odors. No odors were detected at the time of our reconnaissance.

Pools of Potentially Hazardous Liquid. No pools of potentially hazardous liquids were observed within the Property at the time of our reconnaissance.

Drums. We observed seven drums (30 to 55-gallon) adjacent to the LBC physical plant building. These drums consisted of four metal 55-gallon drums, one plastic 55-gallon drum, and two plastic 30-gallon drums. Labeling on all of these drums was either illegible or not visible.

Hazardous Substance and Petroleum Product Containers. We observed chemical storage containers in one location within the Property. These containers consisted of eight compressed chlorine gas bottles located within a small wooded shed on the west side of the northern waste water treatment pond. These chlorine gas bottles are used as part of the waste water treatment system.

We observed petroleum product containers in two locations within the Property. These containers were observed in a storage area within the barn, and outside of the Physical Plant building of the LBC. These containers consisted of five, two-gallon metal gasoline containers within the storage area of the barn; several small plastic containers with motor oil, brake fluid and other automotive fluids stored on a shelf within the barn storage area; two, 5-gallon motor oil containers stored on the concrete slab outside of the LBC physical plant building.

Polychlorinated Biphenyls (PCBs). One pad-mounted electrical transformer was observed within the Property, and one pole mounted transformer was observed near the northeast corner of the Property. We observed no signage on either transformer indicating whether or not they contained PCBs.

Pits, Ponds and Lagoons. We observed two waste water treatment ponds within the Property. These ponds are part of the on-site waste water treatment system operated by the Luther Burbank Center for the Arts, and were observed to be enclosed by chain link fences and locked gates. The northern pond functions as an influent aeration pond. The southern pond functions as a percolation pond for treated waste water effluent.

Stained Soil/Pavement. We observed minor staining on the concrete slab outside of the Physical Plant building. This staining appeared to be the result of spillage from a 5-gallon motor oil container and was restricted to an area of less than 1 square foot.

Stressed Vegetation. We observed no areas of stressed vegetation within the Property at the time of our reconnaissance.

Solid Waste. We observed several piles of solid waste in the vicinity of the barn structure within the homestead area of the Property. This solid waste consisted of several empty chlorine liquid bottles, five discarded lead-acid batteries, broken concrete, miscellaneous wood debris, and a pile of green waste.

Wastewater. The waste water treatment system operated by the LBC consists of a closed-sump located within a separate building, and two open ponds that act as aeration and percolation ponds. We understand that the water treatment facility was constructed circa 1980.

The occupied residence within the homestead parcel is equipped with two septic disposal systems, as discussed below. Additionally, it is believed that waste water disposal for the law office parcel (APN 058-040-023) at the northeast corner of the property, is via an individual septic disposal system.

Wells. One well is reported to be located on the LBC parcel (APN 058-040-045). Our research indicates that this well is used solely for landscape irrigation purposes. Data provided by Brelje & Race Consulting Engineers indicates that this well is constructed to a depth of 400 feet, and is currently equipped with a submersible pump capable of delivering approximately 200 gallons per minute (gpm). The domestic water supplies to the LBC and homestead parcels (APN 058-040-045 and 058-040-026 respectively) are provided by the Cal American Water Company. No wells were observed or reported within the homestead parcel. The water supply for the law office parcel was not observed during our reconnaissance and is unknown, however based on information reported by others it is possible that a well exists at this site and this may provide water for this parcel.

Septic Systems. We were informed that there are two active septic systems located within the homestead parcel of the property; reportedly these systems are located on the west and east sides of the residence within the homestead parcel of the property. Additional as noted above, another septic system is believed be located on the law office parcel (APN 058-040-023); however, our site reconnaissance did not observe a septic system at this parcel.

5.4 Asbestos-Containing Materials (ACM) and Lead-Based Paint

An asbestos and lead-based paint survey was not conducted as part of this assessment. Given the age of the existing structures within the homestead parcel and the parcel occupied by the law offices, it is likely that asbestos-containing materials (ACM) and lead-based paint were used for the construction of these structures.

5.5 Indoor Air Quality

An evaluation of indoor air quality, mold, or radon was not included as part of the contracted scope of services. The USEPA and CAL - EPA have conducted studies of radon risks throughout the state. Results of the studies indicate that average statistical radon concentrations in Sonoma County are less than the current EPA action level.

6.0 INTERVIEWS

We interviewed Mr. Mark Silva, Director of Operations with the Luther Burbank Center, and Mr. Jim Bailey, Maintenance Supervisor with the Luther Burbank Center regarding the history of the facility, operation of the on-site waste water treatment facility, and general information on site use within the LBC and subject parcels within the Property.

Mr. Silva and Mr. Bailey stated that the facilities occupied by LBC were originally constructed in approximately 1975 as a church complex. Prior to this time, most of the Property was used historically as prune and walnut orchards. Mr. Bailey stated that residence, garage, barn, and other buildings within the homestead Property were most likely built prior to 1940. The exact dates of construction are unknown. Mr. Bailey stated that the garage and barn are used by the LBC as storage and workshop space. Mr. Bailey also stated that all of the landscaping within the LBC grounds is maintained by an outside landscaping contractor.

Mr. Silva stated that the waste water treatment system operates by aeration and percolation with no effluent discharge outside of the Property. Mr. Silva stated that the sump pit for the waste water treatment system is pumped out periodically by a septic service, but has not been pumped for more than 3 years. Mr. Silva also stated that he is uncertain of the lining material used at the base of the north pond. Mr. Silva also stated that to his knowledge, no closure plan has been developed for the waste water treatment system.

Mr. Silva stated that the domestic water supply to the Luther Burbank Center is provided through the ‘City’ water system. Our research indicates that this system is operated by the California-American Water Company. Mr. Silva also stated that there is also an irrigation well located near the mechanical building of the LBC that is used solely for landscape watering.

We interviewed Mr. John Short of the North Coast Regional Water Quality Control Board regarding the construction and operation of the waste water treatment facility at the Luther Burbank Center. Mr. Short stated that to his knowledge, there are no construction drawings or documents available for the waste water treatment ponds. Mr. Short stated that many older waste water ponds of this nature rely on the natural clay content of the native soil to prevent leakage of untreated influent water into the surrounding groundwater. Mr. Short stated that the Luther Burbank Center has been cited in the past for minor violations related to the operation of the waste water treatment system, but was not aware of any outstanding or current violations. Mr. Short also stated that there has never been a groundwater monitoring program or monitoring wells installed to measure the impact to groundwater by the waste water treatment system.

On several occasions we contacted the Law Offices of Monte Hanson, which occupies the single-family home structure on APN 058-040-023, to inquire about the existence of water wells and septic tanks on this parcel. We did not receive a response from Mr. Hanson, however, on one occasion, we were able to speak with Ms. Pat Schiettekat, paralegal for Mr. Hanson. Ms. Schiettekat stated that to her knowledge, the water supply to the parcel and the office was from an on-site well. Ms. Schiettekat also stated however, that she was unsure about the existence of a septic system on the parcel.

We interviewed Mr. Andrew Jenson with the North Coast Regional Water Quality Control Board (RWQCB) regarding the violations that the LBC has been cited for in the past. Mr. Jenson stated that the LBC has been cited for elevated fecal coliform levels in the percolation pond water on a number of occasions following large events. Mr. Jenson also provided us with a copy of the *Waste Discharge Requirements for Luther Burbank Center for the Arts*. This document is included in Appendix C of this report.

Mr. Jenson also stated that no closure plan has been submitted to or approved by the North Coast RWQCB for the waste water treatment system at the Luther Burbank Center for the Arts.

We interviewed Mr. Tom Hail with the state Office of State Health Planning and Development - Facilities Development Division (OSHPD-FDD), regarding specific requirements in the preparation of a Phase I Environmental Site Assessments for proposed hospital facility sites. Mr. Hail stated that he was unaware of any guidelines for the preparation of such documents. Mr. Hale also stated that to his knowledge, separate studies such as a Safety Risk Analysis or other hazard studies are generally performed after the submittal of architectural design plans for the proposed development.

We interviewed Ms. Deborah Fudge, Senior Environmental Specialist with PG&E in Santa Rosa, California regarding the presence of PCB containing electrical transformers within the Property. Ms. Fudge stated that to her knowledge, all pole-mounted transformers in the vicinity of the Property would have been upgraded to non-PCB models in the 1980s. Ms. Fudge also stated that PG&E records indicate that the pad-mounted transformer located within the Luther Burbank Center is known to have been manufactured in 1973, and installed on the Property in 1974. Ms. Fudge stated that this transformer is “most likely non-PCB; however, PG&E records can not confirm this”.

7.0 CONCLUSIONS

The site reconnaissance and records research did not find documentation or physical evidence of soil or groundwater impairments associated with the use of the Property. A review of regulatory databases maintained by county, state and federal agencies found no documentation of hazardous materials violations or discharge on the Property, however hazardous materials are documented as being present on the Property. No documented soil or groundwater contamination associated with abutting properties was found from the records reviewed, however soil and groundwater contamination is documented in association with current or past uses of nearby properties.

ENGEO Incorporated has performed a phase one environmental site assessment in general conformance with the scope and limitations of ASTM 1527-00. Based on the findings of the site assessment, we identified one Recognized Environmental Condition as listed below:

- The historic Property use as an orchard may indicate that pesticides were applied according the regulations governing the application of agricultural chemical. We found no evidence indicating pesticides may have been improperly applied, spilled or disposed within the Property. However, there is a potential that residues of the agricultural chemicals may remain in shallow soil. The potential threat posed to human health and the environment by such residues is dependent on the future Property use, and exposure pathway and receptor. It is recommended that soil sampling should be considered if human exposure to shallow soil that was historically occupied by orchard will occur as a result of the future land use.

Based on the observations made during the site assessment, we have identified four items of concern within the Property as listed below:

1. The operation of the on-site waste water treatment facility has included the use of chlorine gas to treat effluent water. This may have resulted in the production of trihalomethane (THM)

compounds such as chloroform in the soil beneath the waste water treatment ponds. Currently, there is no Closure Plan in place for the decommissioning and removal of this facility. As such, it is recommended that a "Closure Plan" be developed, approved and implemented for this facility in accordance with requirements of North Coast Regional Water Quality Control Board and the Sonoma County Permit and Resource Management Department (PRMD). As required by the regulatory agencies, further environmental characterization and site assessment may be necessary to comply with decommissioning and closure requirements. We understand that closure of this facility will follow re-direction of wastewater sewer servicing this Property to another off-site facility, at which time closure and decommissioning can be performed.

2. The structures located within the homestead parcel of the Property were constructed at a time when asbestos containing building materials (ACBM) and lead based paints may have been used during their construction. It is recommended that a Cal-OSHA Certified ACBM, and lead based paint contractor, be retained to assess the structures prior to any renovation or demolition activities. Removal and disposal of ACBM, if encountered, should be performed by the asbestos abatement contractor in accordance with regulatory requirements.

3. Discarded batteries observed within the homestead Property represent a potential source of soil contamination. We recommend this debris be properly disposed of and the surrounding soil be assessed for evidence of contamination. Local removal and disposal of soils impacted with hazardous materials from the batteries should be performed in accordance with regulatory requirements.

4. Any septic systems and related leach fields located within the homestead and the law office parcels at the site should be removed and disposed of in accordance with permitting requirements of Sonoma County, once these are no longer in use, and backfill requirements conform to recommendations of the Geotechnical Engineer.

SELECTED REFERENCES

Geologic Map of the Santa Rosa Quadrangle, State of California, Department of Conservation, Division of Mines and Geology, 1991, compiled by D.L. Wagner, E.J. Bortugno, and R.D. McJunkin

USGS, Santa Rosa Quadrangle, California-Sonoma County (1944, 1954, 1968, 1973, and 1980).

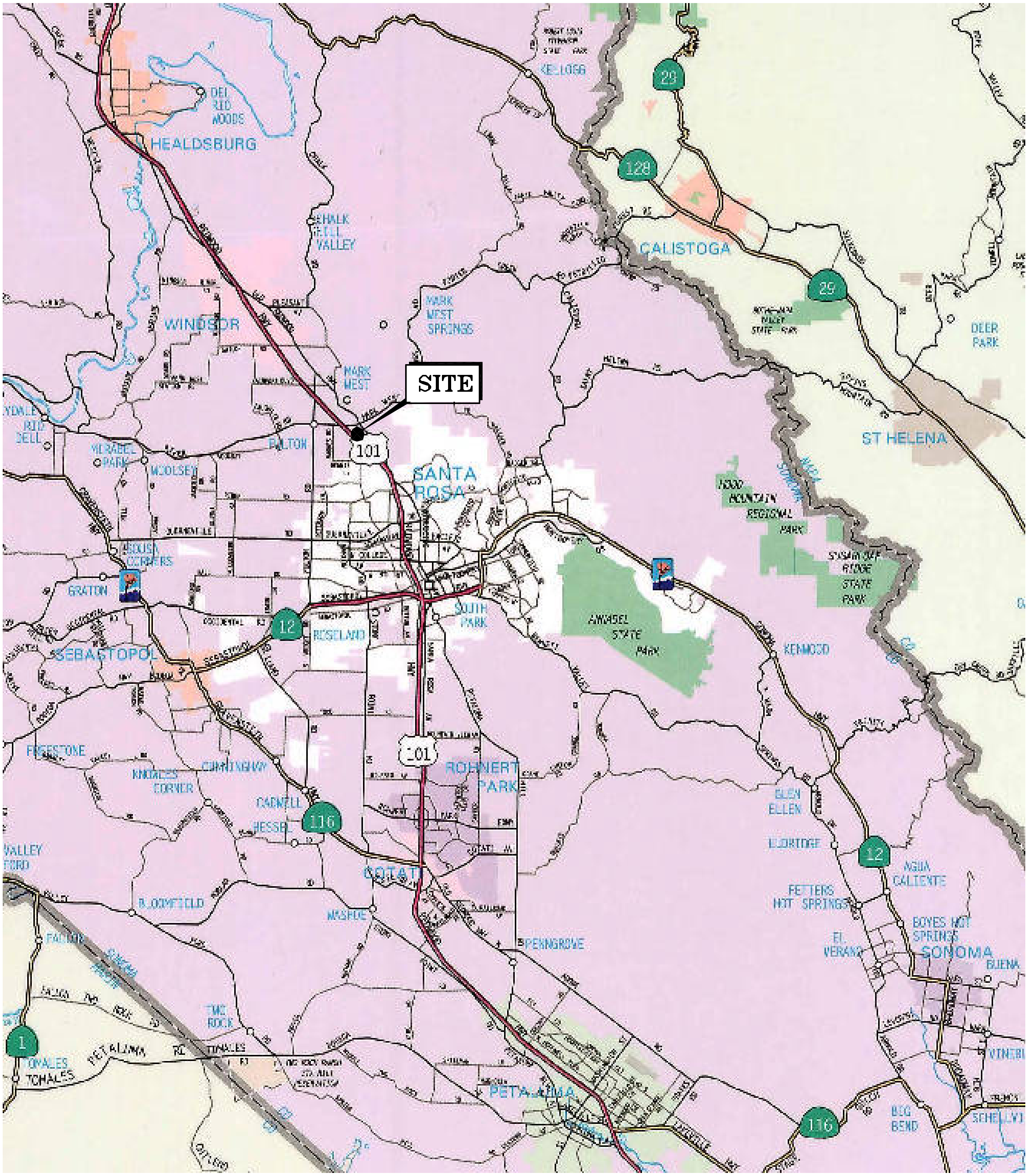
USGS, Sebastopol Quadrangle, California-Sonoma County (1954, 1968, and 1980)

http://wdl.water.ca.gov

http://www.terraserver.microsoft.com

LIST OF FIGURES

Figure 1	Site Vicinity Map
Figure 2	Topographic Map
Figure 3	Assessor's Parcel Map
Figure 4	Site Map



BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	**SITE VICINITY MAP** SUTTER MEDICAL CENTER OF SANTA ROSA SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.2.001.01	FIGURE NO. 1
		DATE: OCTOBER 2004	
		DRAWN BY: PC CHECKED BY:	

ORIGINAL FIGURE PRINTED IN COLOR

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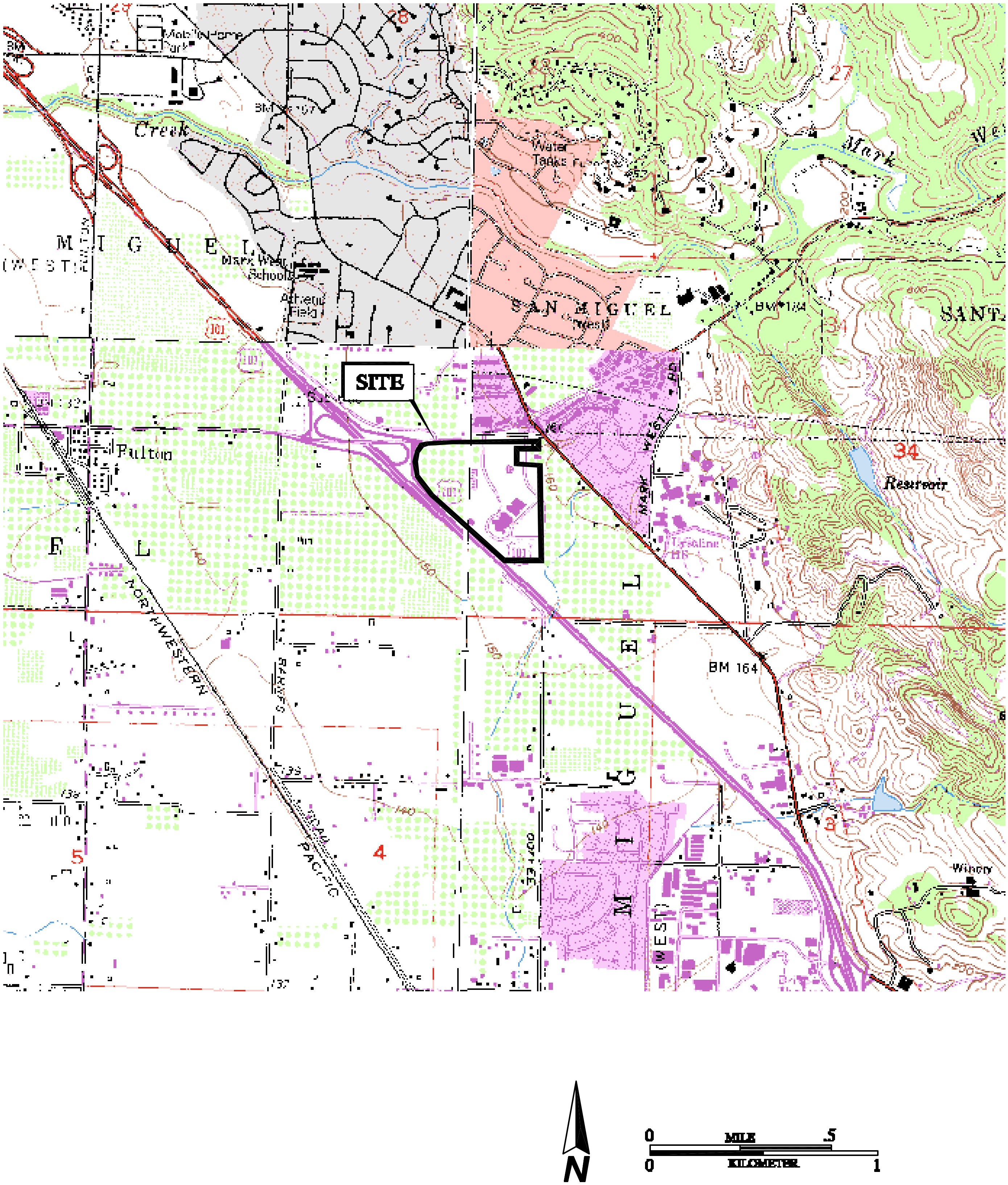

BASE MAP SOURCE: U.S.G.S.

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	**TOPOGRAPHIC MAP** SUTTER MEDICAL CENTER OF SANTA ROSA LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.001.01 DATE: OCTOBER 2004 DRAWN BY: SRP CHECKED BY:	FIGURE NO. 2

ORIGINAL FIGURE PRINTED IN COLOR

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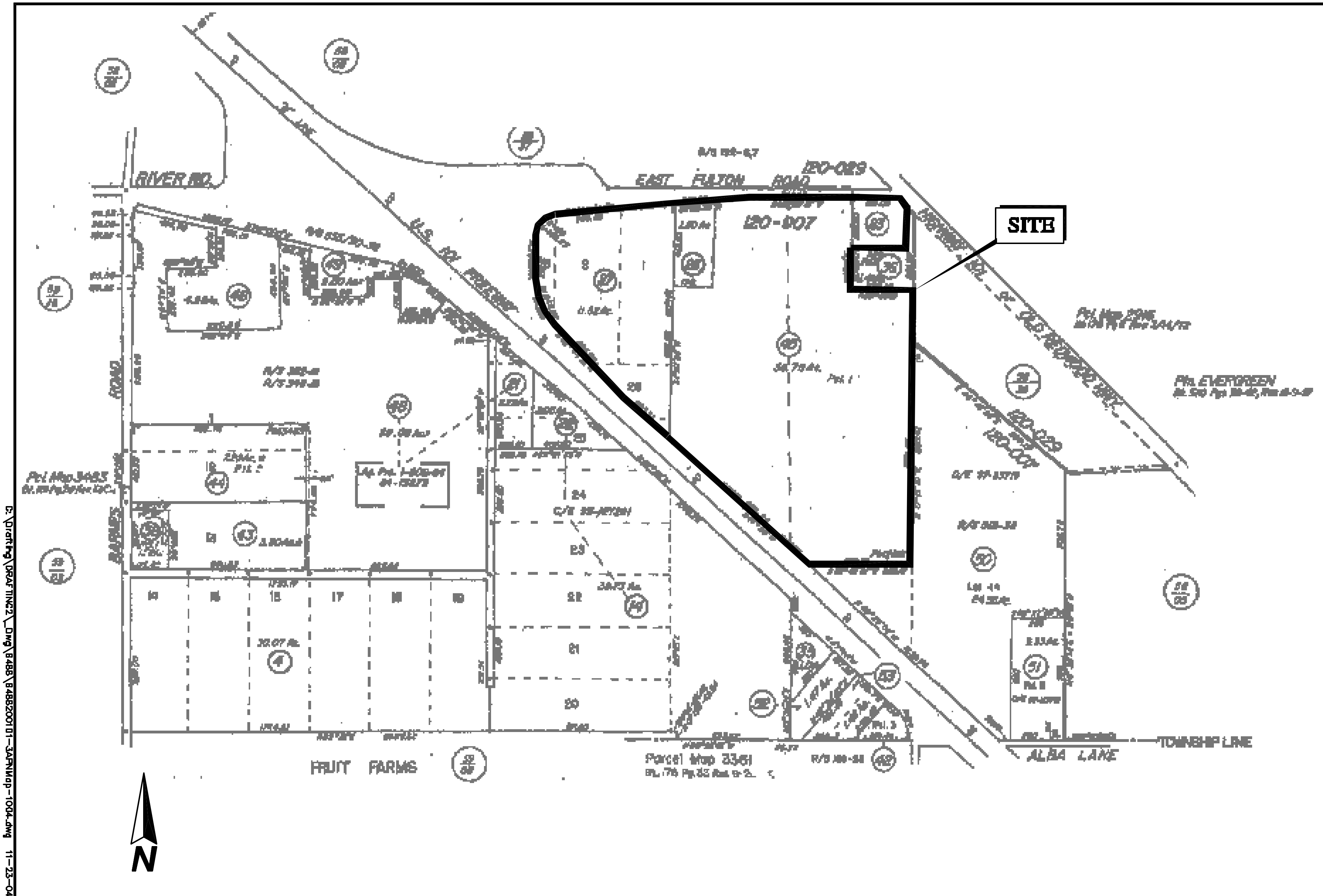

BASE MAP SOURCE: SONOMA COUNTY ASSESSOR'S OFFICE

NO SCALE

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	ASSESSOR'S PARCEL MAP SUTTER MEDICAL CENTER OF SANTA ROSA SONOMA, CALIFORNIA	PROJECT NO.: 6486.2.001.01 DATE: OCTOBER 2004 DRAWN BY: PC CHECKED BY:	FIGURE NO. 3

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BASE MAP SOURCE: BRELJE & RACE

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE PLAN
SUTTER MEDICAL CENTER OF SANTA ROSA
LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.001.01		FIGURE NO. 4
DATE: OCTOBER 2004		
DRAWN BY: SRP	CHECKED BY:	

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APPENDIX A

ENVIRONMENTAL DATA RESOURCES, INC.

Sanborn Map Report
Radius Map Report
City Directory Abstract

6486.2.001.01
December 28, 2004

EDR™ Environmental Data Resources Inc

"Linking Technology with Tradition"®

Sanborn® Map Report

Ship To: James Ollerton
Engeo
631 Commerce Drive
Roseville, CA 95678

Order Date: 9/28/2004 **Completion Date:** 9/28/2004
Inquiry #: 1278135.3
P.O. #: NA
Site Name: Sutter Medical Center of Santa Rosa
Address: 50 Mark West Springs Road
City/State: Santa Rosa, CA 95403
Cross Streets:

Customer Project: 0001.0.050.51
1013989SHA 916-786-8883

This document reports that the largest and most complete collection of Sanborn fire insurance maps has been reviewed based on client supplied information, and fire insurance maps depicting the target property at the specified address were not identified.

NO COVERAGE

The EDR Radius Map
with GeoCheck®

Sutter Medical Center of Santa Rosa
50 Mark West Springs Road
Santa Rosa, CA 95403

Inquiry Number: 1278135.2s

September 28, 2004

EDR™ Environmental Data Resources Inc

The Standard in Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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Physical Setting Source Summary A-2
Physical Setting Source Map A-9
Physical Setting Source Map Findings A-10
Physical Setting Source Records Searched A-34

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR). The report meets the government records search requirements of ASTM Standard Practice for Environmental Site Assessments, E 1527-00. Search distances are per ASTM standard or custom distances requested by the user.

TARGET PROPERTY INFORMATION

ADDRESS

50 MARK WEST SPRINGS ROAD
SANTA ROSA, CA 95403

COORDINATES

Latitude (North):	38.495100 - 38˚ 29' 42.4''
Longitude (West):	122.752300 - 122˚ 45' 8.3''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521600.9
UTM Y (Meters):	4260572.0
Elevation:	157 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property:	38122-D7 SEBASTOPOL, CA
Source:	USGS 7.5 min quad index

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following government records. For more information on this property see page 6 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
LUTHER BURBANK MEMORIAL FOUNDATION 50 MARK WEST SPRINGS RD SANTA ROSA, CA 95403	HAZNET	N/A
LUTHER BURBANK CENTER 50 MARK WEST SPRINGS RD SANTA ROSA, CA 95401	CA WDS	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the ASTM E 1527-00 search radius around the target property for the following databases:

FEDERAL ASTM STANDARD

NPL.......................... National Priority List

EXECUTIVE SUMMARY

Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRIS-TSD	Resource Conservation and Recovery Information System
RCRIS-LQG	Resource Conservation and Recovery Information System
ERNS	Emergency Response Notification System

STATE ASTM STANDARD

AWP	Annual Workplan Sites
Cal-Sites	Calsites Database
CHMIRS	California Hazardous Material Incident Report System
Toxic Pits	Toxic Pits Cleanup Act Sites
SWF/LF	Solid Waste Information System
WMUDS/SWAT	Waste Management Unit Database
CA BOND EXP. PLAN	Bond Expenditure Plan
UST	List of Underground Storage Tank Facilities
VCP	Voluntary Cleanup Program Properties
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
FINDS	Facility Index System/Facility Identification Initiative Program Summary Report
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL Liens	Federal Superfund Liens
PADS	PCB Activity Database System
ODI	Open Dump Inventory
UMTRA	Uranium Mill Tailings Sites
DOD	Department of Defense Sites
US BROWNFIELDS	A Listing of Brownfields Sites
FUDS	Formerly Used Defense Sites
INDIAN RESERV	Indian Reservations
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
SSTS	Section 7 Tracking Systems
FTTS INSP	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST	Aboveground Petroleum Storage Tank Facilities
CLEANERS	Cleaner Facilities
DEED	List of Deed Restrictions
REF	Unconfirmed Properties Referred to Another Agency
EMI	Emissions Inventory Data

EXECUTIVE SUMMARY

NFA - - - - - - - - - - No Further Action Determination
NFE - - - - - - - - - - Properties Needing Further Evaluation
SCH - - - - - - - - - - School Property Evaluation Program
CA SLIC - - - - - - - - Statewide SLIC Cases

EDR PROPRIETARY HISTORICAL DATABASES

Coal Gas - - - - - - - - Former Manufactured Gas (Coal Gas) Sites

BROWNFIELDS DATABASES

US BROWNFIELDS - - - - A Listing of Brownfields Sites
VCP - - - - - - - - - - Voluntary Cleanup Program Properties

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL ASTM STANDARD

RCRIS: Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRIS-SQG list, as provided by EDR, and dated 06/15/2004 has revealed that there is 1 RCRIS-SQG site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
LARKFIELD AUTO CENTER	***601 LARKFIELD CTR***	***1/8 - 1/4N***	***C5***	***7***

EXECUTIVE SUMMARY

STATE ASTM STANDARD

CORTESE: This database identifies public drinking water wells with detectable levels of contamination, hazardous substance sites selected for remedial action, sites with known toxic material identified through the abandoned site assessment program, sites with USTs having a reportable release and all solid waste disposal facilities from which there is known migration. The source is the California Environmental Protection Agency/Office of Emergency Information.

A review of the Cortese list, as provided by EDR, has revealed that there are 4 Cortese sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***0 - 1/8 N***	***B3***	***7***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***0 - 1/8 N***	***B4***	***7***
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***1/4 - 1/2 N***	***10***	***14***

Lower Elevation	Address	Dist / Dir	Map ID	Page
DAVIS, MAY L.	105 ETON	1/4 - 1/2 NNW	11	14

NOTIFY 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, has revealed that there is 1 Notify 65 site within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
LARKFIELD BP	***4856 OLD REDWOOD HIGHWA***	***1/4 - 1/2 NNW***	***13***	***15***

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 07/12/2004 has revealed that there are 7 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***0 - 1/8 N***	***B3***	***7***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***0 - 1/8 N***	***B4***	***7***
TEXACO	***4601 OLD REDWOOD HWY***	***1/4 - 1/2 NE***	***D8***	***11***
UNION 76 #5142	4605 OLD REDWOOD HWY	1/4 - 1/2 NE	D9	12
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***1/4 - 1/2 N***	***10***	***14***
LARKFIELD CHEVRON #98270	4840 OLD REDWOOD HWY	1/4 - 1/2 N	12	14
LARKFIELD BP	***4856 OLD REDWOOD HIGHWA***	***1/4 - 1/2 NNW***	***13***	***15***

CA FID: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, has revealed that there is 1 CA FID UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
LARKFIELD CHEVRON	668 LARKFIELD CENTER	1/8 - 1/4 NNW	C6	9

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

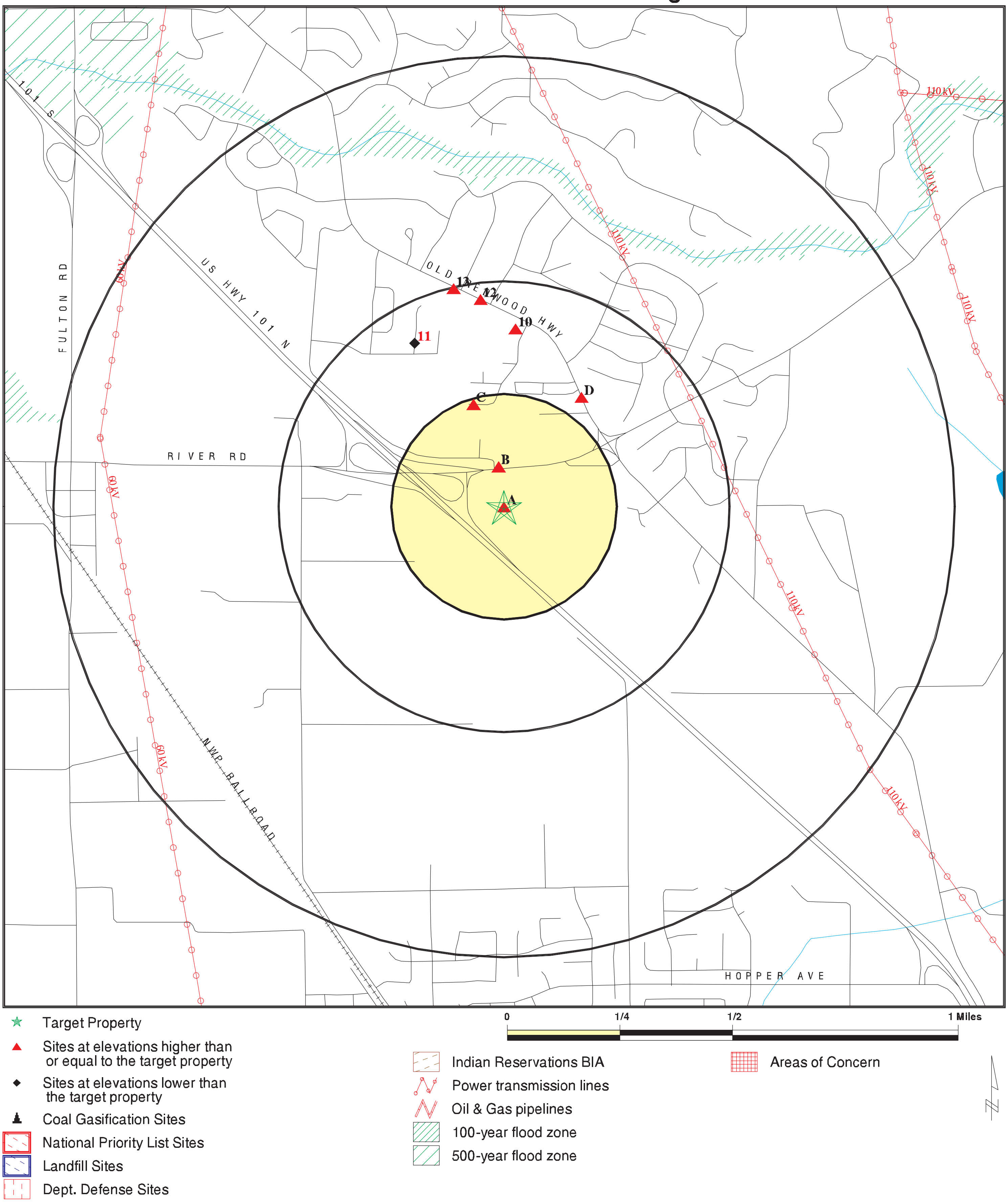
Equal/Higher Elevation	Address	Dist / Dir	Map ID	Page
98270	668 LARKFIELD CTR	1/8 - 1/4 NNW	C7	10

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

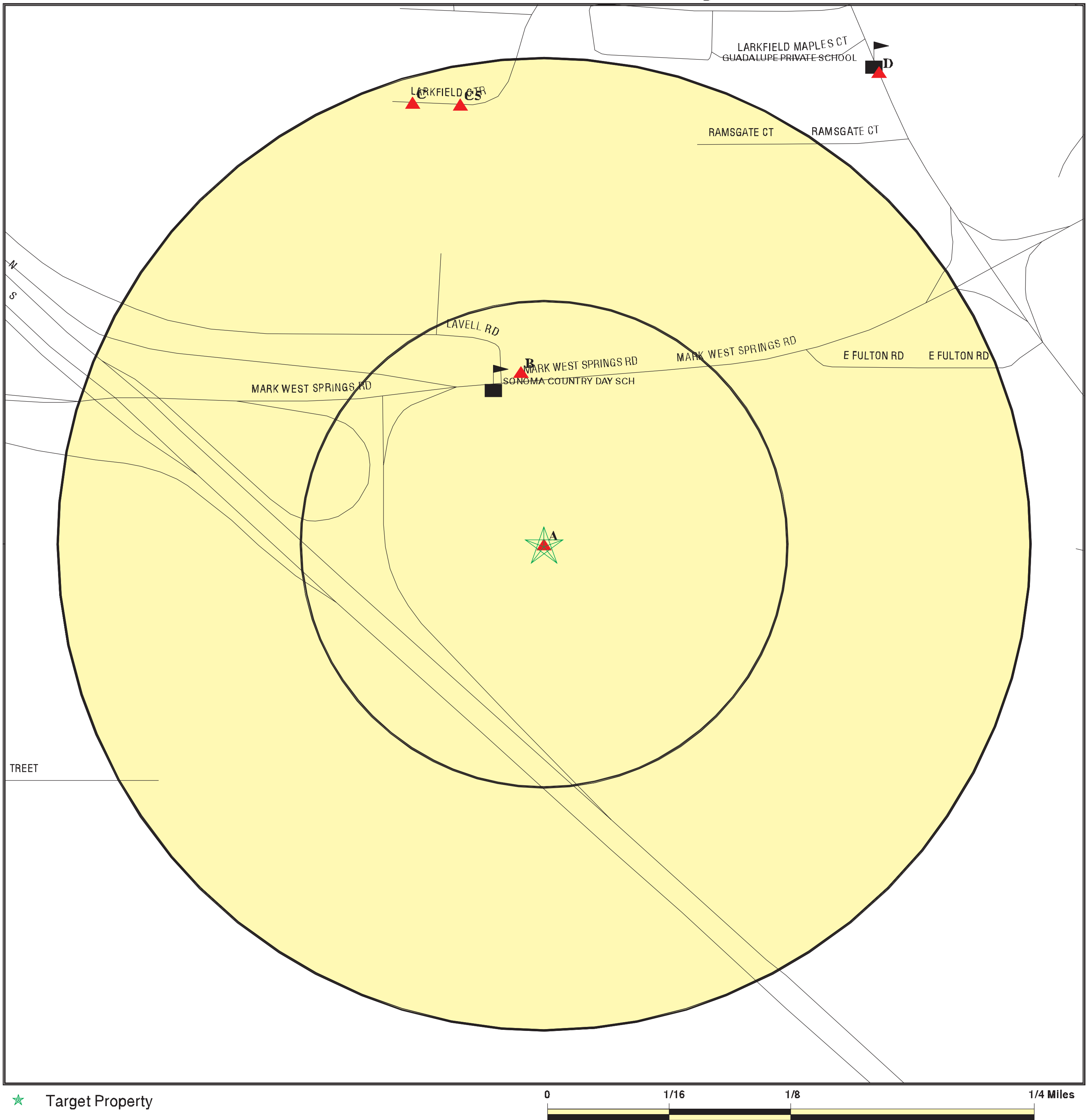
Site Name	Database(s)
CYCLEWORKS	CLEANERS
SHELL SERVICE STATION	Notify 65, LUST, Cortese, CA SLIC
EMPIRE BUILDING	LUST, Cortese, CA SLIC
SANTA ROSA BRASS FOUNDRY	LUST, Cortese
YOLO, DANIEL	LUST, Cortese
SANTA ROSA ROAD YARD	LUST
SANTA ROSA COMMUNITY DEVELOPMENT SW AREA	CA SLIC, LUST
MISSION ARBORS	LUST
AUTO EXCHANGE	LUST
SCDPW LARKFIELD SEWER	CA SLIC, LUST
UNITY CHURCH	CA SLIC, LUST
REED, LILLIE	CA SLIC, LUST
STEVENSON EQUIPMENT	LUST
SANTA ROSA DPW SARACEN AVENUE	CA SLIC, LUST
VILLA ROSA HOME OWNER ASSOC	HAZNET
(RP)GAS STN @ SANTA ROSA AVE	ERNS
CITY OF SANTA ROSA NEAR THE EASTERN PART OF COUNTY CLOSE TO	ERNS
SPRING CREEK IN SANTA ROSA BEHIND #760 CHURCH ST. JUST W OF	ERNS
LOS GUILICOS	CA SLIC
SANTA ROSA CITY OAKMONT PLANT	CA WDS

OVERVIEW MAP - 1278135.2s - Engeo



TARGET PROPERTY:	Sutter Medical Center of Santa Rosa	CUSTOMER:	Engeo
ADDRESS:	50 Mark West Springs Road	CONTACT:	James Ollerton
CITY/STATE/ZIP:	Santa Rosa CA 95403	INQUIRY #:	1278135.2s
LAT/LONG:	38.4951 / 122.7523	DATE:	September 28, 2004 7:34 pm

DETAIL MAP - 1278135.2s - Engeo



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Coal Gasification Sites
- Sensitive Receptors
- National Priority List Sites
- Landfill Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

TARGET PROPERTY:	Sutter Medical Center of Santa Rosa	CUSTOMER:	Engeo
ADDRESS:	50 Mark West Springs Road	CONTACT:	James Ollerton
CITY/STATE/ZIP:	Santa Rosa CA 95403	INQUIRY #:	1278135.2s
LAT/LONG:	38.4951 / 122.7523	DATE:	September 28, 2004 7:34 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FEDERAL ASTM STANDARD								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
CERCLIS		0.500	0	0	0	NR	NR	0
CERC-NFRAP		0.250	0	0	NR	NR	NR	0
CORRACTS		1.000	0	0	0	0	NR	0
RCRIS-TSD		0.500	0	0	0	NR	NR	0
RCRIS Lg. Quan. Gen.		0.250	0	0	NR	NR	NR	0
RCRIS Sm. Quan. Gen.		0.250	0	1	NR	NR	NR	1
ERNS		TP	NR	NR	NR	NR	NR	0
STATE ASTM STANDARD								
AWP		1.000	0	0	0	0	NR	0
Cal-Sites		1.000	0	0	0	0	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	2	0	2	NR	NR	4
Notify 65		1.000	0	0	1	0	NR	1
Toxic Pits		1.000	0	0	0	0	NR	0
State Landfill		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
LUST		0.500	2	0	5	NR	NR	7
CA Bond Exp. Plan		1.000	0	0	0	0	NR	0
UST		0.250	0	0	NR	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
CA FID UST		0.250	0	1	NR	NR	NR	1
HIST UST		0.250	0	1	NR	NR	NR	1
FEDERAL ASTM SUPPLEMENTAL								
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
Delisted NPL		1.000	0	0	0	0	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
HMIRS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
NPL Liens		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
FUDS		1.000	0	0	0	0	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
STATE OR LOCAL ASTM SUPPLEMENTAL								
AST		TP	NR	NR	NR	NR	NR	0
CLEANERS		0.250	0	0	NR	NR	NR	0
CA WDS	X	TP	NR	NR	NR	NR	NR	0
DEED		TP	NR	NR	NR	NR	NR	0
REF		0.250	0	0	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
NFA		0.250	0	0	NR	NR	NR	0
NFE		0.250	0	0	NR	NR	NR	0
SCH		0.250	0	0	NR	NR	NR	0
SLIC		0.500	0	0	0	NR	NR	0
HAZNET	X	TP	NR	NR	NR	NR	NR	0
EDR PROPRIETARY HISTORICAL DATABASES								
Coal Gas		1.000	0	0	0	0	NR	0
BROWNFIELDS DATABASES								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
VCP		0.500	0	0	0	NR	NR	0

NOTES:

AQUIFLOW - see EDR Physical Setting Source Addendum

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Coal Gas Site Search: No site was found in a search of Real Property Scan's ENVIROHAZ database.

A1 **LUTHER BURBANK MEMORIAL FOUNDATION** **HAZNET** **S103975646**
Target **50 MARK WEST SPRINGS RD** **N/A**
Property **SANTA ROSA, CA 95403**

Site 1 of 2 in cluster A

Actual:
157 ft.

HAZNET:

Gepaid:	CAC002100480
TSD EPA ID:	NYD986980233
Gen County:	Sonoma
Tsd County:	99
Tons:	1.2915
Waste Category:	Polychlorinated biphenyls and material containing PCB's
Disposal Method:	Not reported
Contact:	LUTHER BURBANK MEMORIAL FOUND
Telephone:	(707) 527-7006
Mailing Address:	50 MARK WEST SPRINGS RD SANTA ROSA, CA 95403
County	Sonoma

A2 **LUTHER BURBANK CENTER** **CA WDS** **S102007528**
Target **50 MARK WEST SPRINGS RD** **N/A**
Property **SANTA ROSA, CA 95401**

Site 2 of 2 in cluster A

Actual:
157 ft.

WDS:

Facility ID:	North Coastal 82012OSON		
Facility Contact	MARK MORRISETTE	Facility Telephone	Not reported
SIC Code:	8641	SIC Code 2:	Not reported
Agency Name:	LUTHER BURBANK CENTER		
Agency Address:	50 MARK WEST SPRINGS RD SANTA ROSA 95403		
Agency Contact:	DAN BARR	Agency Phone:	Not reported
Design Flow:	0 Million Gal/Day	Baseline Flow:	0 Million Gal/Day

Facility Type: Municipal/Domestic - Facility that treats sewage or a mixture of predominantly sewage and other waste from districts, municipalities, communities, hospitals, schools, and publicly or privately owned systems (excluding individual subsurface leaching systems disposing of less than 1,000 gallons per day).

Facility Status: Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.

Agency Type: Private

Waste Type: Domestic Sewage - Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.

Threat to Water: Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.

Complexity: Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities.

Reclamation: Producer-User: Reclamation requirements that have been issued to a producer of reclaimed water who also uses the product.

POTW: The facility is not a POTW.

LUTHER BURBANK CENTER (Continued) **S102007528**

NPDES Number: Not reported
Subregion: 1

B3
North
< 1/8
472 ft.

UNOCAL #5142
REDWOOD HIGHWAY, OLD 4605
SANTA ROSA, CA

LUST
Cortese

S101304961
N/A

Relative: Higher

Actual: 159 ft.

Site 1 of 2 in cluster B

LUST Region 1:
Facility ID: 1TSO165
Region: 1
Staff Initials: Closed

CORTESE:
Region: CORTESE
Fac Address 2: 4605 REDWOOD HIGHWAY, OLD

B4
North
< 1/8
472 ft.

TEXACO (REDWOOD HIGHWAY, 4601)
REDWOOD HIGHWAY, OLD 4601
SANTA ROSA, CA

LUST
Cortese

S101304960
N/A

Relative: Higher

Actual: 159 ft.

Site 2 of 2 in cluster B

LUST Region 1:
Facility ID: 1TSO072
Region: 1
Staff Initials: HAZ

CORTESE:
Region: CORTESE
Fac Address 2: Not reported

C5
North
1/8-1/4
1216 ft.

LARKFIELD AUTO CENTER
601 LARKFIELD CTR
SANTA ROSA, CA 95403

RCRIS-SQG
FINDS
HAZNET

1000270156
CAD982351314

Relative: Higher

Actual: 159 ft.

Site 1 of 3 in cluster C

RCRIS:
Owner: NORMAN BLACKMORE
(415) 555-1212
EPA ID: CAD982351314

Contact: ENVIRONMENTAL MANAGER
(707) 546-6881

Classification: Small Quantity Generator
TSDF Activities: Not reported

Violation Status: No violations found

LARKFIELD AUTO CENTER (Continued) **1000270156**

FINDS:
Other Pertinent Environmental Activity Identified at Site:
Resource Conservation and Recovery Act Information system

HAZNET:

Gepaid: CAD982351314
TSD EPA ID: CAD980887418
Gen County: Sonoma
Tsd County: 1
Tons: 1.5429
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Contact: LARKFIELD AUTO CENTER
Telephone: (707) 546-6881
Mailing Address: 4809 OLD REDWOOD HWY
SANTA ROSA, CA 95403 - 1415
County Sonoma

Gepaid: CAD982351314
TSD EPA ID: CAD982446874
Gen County: Sonoma
Tsd County: Yolo
Tons: .3753
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Contact: LARKFIELD AUTO CENTER
Telephone: (707) 546-6881
Mailing Address: 4809 OLD REDWOOD HWY
SANTA ROSA, CA 95403 - 1415
County Sonoma

Gepaid: CAD982351314
TSD EPA ID: CAD982446866
Gen County: Sonoma
Tsd County: Solano
Tons: .3753
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Not reported
Contact: LARKFIELD AUTO CENTER
Telephone: (707) 546-6881
Mailing Address: 4809 OLD REDWOOD HWY
SANTA ROSA, CA 95403 - 1415
County Sonoma

Gepaid: CAD982351314
TSD EPA ID: CAD980887418
Gen County: Sonoma
Tsd County: 1
Tons: .3127
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Not reported
Contact: LARKFIELD AUTO CENTER
Telephone: (707) 546-6881
Mailing Address: 4809 OLD REDWOOD HWY
SANTA ROSA, CA 95403 - 1415
County Sonoma

LARKFIELD AUTO CENTER (Continued) **1000270156**

Gepaid:	CAD982351314
TSD EPA ID:	CAD982446866
Gen County:	Sonoma
Tsd County:	Solano
Tons:	.3753
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Recycler
Contact:	LARKFIELD AUTO CENTER
Telephone:	(707) 546-6881
Mailing Address:	4809 OLD REDWOOD HWY SANTA ROSA, CA 95403 - 1415
County	Sonoma

Click this hyperlink while viewing on your computer to access
11 additional CA HAZNET record(s) in the EDR Site Report.

C6
NNW
1/8-1/4
1251 ft.

Relative:
Higher

Actual:
158 ft.

LARKFIELD CHEVRON
668 LARKFIELD CENTER
SANTA ROSA, CA 95401

CA FID UST **S101595415**
N/A

Site 2 of 3 in cluster C

FID:

Facility ID:	49002401	Regulate ID:	Not reported
Reg By:	Active Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Active	Facility Tel:	(707) 542-7101
Mail To:	Not reported 2 ANNABEL LN SANTA ROSA, CA 95401		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

Facility ID:	49002401	Regulate ID:	00063091
Reg By:	Active Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Active	Facility Tel:	(707) 542-7101
Mail To:	Not reported 668 LARKFIELD CENTER SANTA ROSA, CA 95401		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

C7 **98270** **HIST UST** **U001609148**
NNW **668 LARKFIELD CTR** **N/A**
1/8-1/4 **SANTA ROSA, CA 95401**
1251 ft.

Site 3 of 3 in cluster C

Relative:
Higher

Actual:
158 ft.

UST HIST:

Facility ID:	63091	Owner Name:	CHEVRON U.S.A. INC.
Total Tanks:	4	Region:	STATE
Owner Address:	575 MARKET SAN FRANCISCO, CA 94105		
Tank Used for:	WASTE		
Tank Num:	1	Container Num:	1
Tank Capacity:	00001000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor		
Contact Name:	MERTLE, THOMAS O.	Telephone:	(707) 542-7101
Facility Type:	Gas Station	Other Type:	Not reported

Facility ID:	63091	Owner Name:	CHEVRON U.S.A. INC.
Total Tanks:	4	Region:	STATE
Owner Address:	575 MARKET SAN FRANCISCO, CA 94105		
Tank Used for:	PRODUCT		
Tank Num:	2	Container Num:	2
Tank Capacity:	00010000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor		
Contact Name:	MERTLE, THOMAS O.	Telephone:	(707) 542-7101
Facility Type:	Gas Station	Other Type:	Not reported

Facility ID:	63091	Owner Name:	CHEVRON U.S.A. INC.
Total Tanks:	4	Region:	STATE
Owner Address:	575 MARKET SAN FRANCISCO, CA 94105		
Tank Used for:	PRODUCT		
Tank Num:	3	Container Num:	3
Tank Capacity:	00010000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor		
Contact Name:	MERTLE, THOMAS O.	Telephone:	(707) 542-7101
Facility Type:	Gas Station	Other Type:	Not reported

Facility ID:	63091	Owner Name:	CHEVRON U.S.A. INC.
Total Tanks:	4	Region:	STATE
Owner Address:	575 MARKET SAN FRANCISCO, CA 94105		
Tank Used for:	PRODUCT		
Tank Num:	4	Container Num:	4
Tank Capacity:	00010000	Year Installed:	Not reported
Type of Fuel:	Not reported	Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor		
Contact Name:	MERTLE, THOMAS O.	Telephone:	(707) 542-7101
Facility Type:	Gas Station	Other Type:	Not reported

D8
NE
1/4-1/2
1565 ft.

Relative:
Higher

Actual:
165 ft.

TEXACO
4601 OLD REDWOOD HWY
SANTA ROSA, CA 95403

CA FID UST **S101595370**
LUST **N/A**

Site 1 of 2 in cluster D

State LUST:

Cross Street:	Not reported		
Qty Leaked:	Not reported		
Case Number	1TSO072		
Reg Board:	1		
Chemical:	0		
Lead Agency:	Local Agency		
Local Agency :	49000L		
Case Type:	Aquifer affected		
Status:	Remediation Plan		
Review Date:	Not reported	Confirm Leak:	Not reported
Workplan:	1986-10-01 00:00:00	Prelim Assess:	1986-10-01 00:00:00
Pollution Char:	2003-07-09 00:00:00	Remed Plan:	2003-07-09 00:00:00
Remed Action:	2001-08-09 00:00:00		
Monitoring:	Not reported		
Close Date:	Not reported		
Release Date:	Not reported		
Cleanup Fund Id :	Not reported		
Discover Date :	Not reported		
Enforcement Dt :	Not reported		
Enf Type:	Not reported		
Enter Date :	Not reported		
Funding:	Not reported		
Staff Initials:	DB		
How Discovered:	Not reported		
How Stopped:	Not reported		
Interim :	Not reported		
Leak Cause:	Not reported		
Leak Source:	Not reported		
MTBE Date :	2000-03-28 00:0		
Max MTBE GW :	6.81 Parts per Billion		
MTBE Tested:	MTBE Detected. Site tested for MTBE & MTBE detected		
Priority:	Not reported		
Local Case # :	1435		
Beneficial:	MUN		
Staff :	HAZ		
GW Qualifier :	=		
Max MTBE Soil :	Not reported		
Soil Qualifier :	Not reported		
Hydr Basin #:	SANTA ROSA VALLEY (1		
Operator :	Not reported		
Oversight Prgm:	LUST		
Review Date :	Not reported		
Stop Date :	Not reported		
Work Suspended :	Not reported		
Responsible Party	TAYYEBEH M. MEHRJARDI		
RP Address:	520 MENDOCINO AVE		
Global Id:	T0609700047		
Org Name:	Not reported		
Contact Person:	Not reported		
MTBE Conc:	6		
Mtbe Fuel:	0		
Water System Name:	Not reported		

TEXACO (Continued) **S101595370**

Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported

LUST Sonoma County:
Region: SONOMA
LOP Number: 00001435
Global ID: T0609700047
Date: Not reported
Staff: DB
Regional Board: 1TSO072
Closed or Referred: Not reported
Funding Fed / State: F

FID:

Facility ID:	49001037	Regulate ID:	Not reported
Reg By:	Inactive Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Inactive	Facility Tel:	(707) 578-9866
Mail To:	Not reported P O BOX SANTA ROSA, CA 95403		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

Facility ID:	49001037	Regulate ID:	00016174
Reg By:	Active Underground Storage Tank Location		
Cortese Code:	Not reported	SIC Code:	Not reported
Status:	Active	Facility Tel:	(707) 578-9866
Mail To:	Not reported 4601 OLD REDWOOD HWY SANTA ROSA, CA 95401		
Contact:	Not reported	Contact Tel:	Not reported
DUNs No:	Not reported	NPDES No:	Not reported
Creation:	10/22/93	Modified:	00/00/00
EPA ID:	Not reported		
Comments:	Not reported		

D9
NE
1/4-1/2
1572 ft.

Relative: Higher

Actual: 165 ft.

UNION 76 #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

LUST **S105124635** **N/A**

Site 2 of 2 in cluster D

State LUST:

Cross Street:	Not reported		
Qty Leaked:	Not reported		
Case Number	1TSO165		
Reg Board:	1		
Chemical:	Gasoline		
Lead Agency:	Local Agency		
Local Agency :	49000L		
Case Type:	Aquifer affected		
Status:	Case Closed		
Review Date:	2001-10-08 00:00:00	Confirm Leak:	2001-10-08 00:00:00
Workplan:	1988-05-15 00:00:00	Prelim Assess:	1988-05-15 00:00:00

UNION 76 #5142 (Continued) **S105124635**

Pollution Char: Not reported Remed Plan: Not reported
Remed Action: 1993-03-29 00:00:00
Monitoring: Not reported
Close Date: 2003-05-06 00:00:00
Release Date: Not reported
Cleanup Fund Id : Not reported
Discover Date : Not reported
Enforcement Dt : Not reported
Enf Type: CLOS
Enter Date : Not reported
Funding: Not reported
Staff Initials: LCW
How Discovered: Not reported
How Stopped: Not reported
Interim : Not reported
Leak Cause: Not reported
Leak Source: Not reported
MTBE Date : 2002-03-28 00:0
Max MTBE GW : 10 Parts per Billion
MTBE Tested: MTBE Detected. Site tested for MTBE & MTBE detected
Priority: Not reported
Local Case # : 1461
Beneficial: MUN
Staff : ZZZ
GW Qualifier : =
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SANTA ROSA VALLEY (1
Operator : Not reported
Oversight Prgm: LUST
Review Date : Not reported
Stop Date : Not reported
Work Suspended :Not reported
Responsible PartyDAVID B. DEWITT
RP Address: P.O. BOX 11427
Global Id: T0609700129
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 1
Mtbe Fuel: 1
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 1
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported

LUST Sonoma County:
Region: SONOMA
LOP Number: 00001461
Global ID: T0609700129
Date: 5/6/03
Staff: Not reported
Regional Board: 1TSO165
Closed or Referred: Y
Funding Fed / State: F

10 **BP, LARKFIELD / REDWOOD OIL** **LUST** **S101304962**
North **REDWOOD HIGHWAY, OLD 4856** **Cortese** **N/A**
1/4-1/2 **SANTA ROSA, CA**
2089 ft.

Relative: Higher

Actual: 162 ft.

LUST Region 1:

Facility ID:	1TSO344
Region:	1
Staff Initials:	HAZ

CORTESE:

Region:	CORTESE
Fac Address 2:	Not reported

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11 **DAVIS, MAY L.** **Cortese** **S105026497**
NNW **105 ETON** **N/A**
1/4-1/2 **SANTA ROSA, CA 95403**
2184 ft.

Relative: Lower

Actual: 156 ft.

CORTESE:

Region:	CORTESE
Fac Address 2:	Not reported

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12 **LARKFIELD CHEVRON #98270** **LUST** **S103817497**
North **4840 OLD REDWOOD HWY** **N/A**
1/4-1/2 **SANTA ROSA, CA 95403**
2444 ft.

Relative: Higher

Actual: 162 ft.

State LUST:

Cross Street:	Not reported		
Qty Leaked:	Not reported		
Case Number	1TSO101		
Reg Board:	1		
Chemical:	0		
Lead Agency:	Local Agency		
Local Agency :	49000L		
Case Type:	Aquifer affected		
Status:	Leak being confirmed		
Review Date:	1993-11-01 00:00:00	Confirm Leak:	1993-11-01 00:00:00
Workplan:	Not reported	Prelim Assess:	Not reported
Pollution Char:	Not reported	Remed Plan:	Not reported
Remed Action:	Not reported		
Monitoring:	Not reported		
Close Date:	Not reported		
Release Date:	Not reported		
Cleanup Fund Id :	Not reported		
Discover Date :	Not reported		
Enforcement Dt :	Not reported		
Enf Type:	04/21		
Enter Date :	Not reported		
Funding:	Not reported		
Staff Initials:	DR		
How Discovered:	Not reported		
How Stopped:	Not reported		
Interim :	Not reported		
Leak Cause:	Not reported		
Leak Source:	Not reported		
MTBE Date :	2003-01-20 00:0		

LARKFIELD CHEVRON #98270 (Continued) **S103817497**

Max MTBE GW : 820 Parts per Billion
MTBE Tested: MTBE Detected. Site tested for MTBE & MTBE detected
Priority: Not reported
Local Case # : 1964
Beneficial: Not reported
Staff : HAZ
GW Qualifier : =
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SANTA ROSA VALLEY (1
Operator : Not reported
Oversight Prgm: LUST
Review Date : Not reported
Stop Date : Not reported
Work Suspended :Not reported
Responsible PartyKAREN STREICH
RP Address: P.O. BOX 6012
Global Id: T0609700074
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 11
Mtbe Fuel: 0
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported

LUST Sonoma County:
Region: SONOMA
LOP Number: 00001964
Global ID: T0609700074
Date: Not reported
Staff: DR
Regional Board: 1TSO101
Closed or Referred: Not reported
Funding Fed / State: F

13
NNW
1/4-1/2
2623 ft.

LARKFIELD BP
4856 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 93582

Notify 65 **S100179481**
LUST **N/A**

Relative:
Higher

Actual:
160 ft.

State LUST:
Cross Street: Not reported
Qty Leaked: Not reported
Case Number 1TSO344
Reg Board: 1
Chemical: Gasoline
Lead Agency: Local Agency
Local Agency : 49000L
Case Type: Aquifer affected
Status: Remedial action (cleanup) Underway
Review Date: Not reported — Confirm Leak: Not reported
Workplan: 1991-01-29 00:00:00 — Prelim Assess: 1991-01-29 00:00:00
Pollution Char: Not reported — Remed Plan: Not reported
Remed Action: 1992-09-30 00:00:00
Monitoring: Not reported
Close Date: Not reported

LARKFIELD BP (Continued) **S100179481**

Release Date: Not reported
Cleanup Fund Id : Not reported
Discover Date : Not reported
Enforcement Dt : Not reported
Enf Type: 07/21
Enter Date : Not reported
Funding: Not reported
Staff Initials: DR
How Discovered: Not reported
How Stopped: Not reported
Interim : Not reported
Leak Cause: Not reported
Leak Source: Not reported
MTBE Date : 2003-07-08 00:0
Max MTBE GW : 49 Parts per Billion
MTBE Tested: MTBE Detected. Site tested for MTBE & MTBE detected
Priority: Not reported
Local Case # : 2395
Beneficial: MUN
Staff : HAZ
GW Qualifier : =
Max MTBE Soil : Not reported
Soil Qualifier : Not reported
Hydr Basin #: SANTA ROSA VALLEY (1
Operator : Not reported
Oversight Prgm: LUST
Review Date : Not reported
Stop Date : Not reported
Work Suspended : Not reported
Responsible Party PETER VAN ALYEA
RP Address: P.O. BOX 428
Global Id: T0609700252
Org Name: Not reported
Contact Person: Not reported
MTBE Conc: 6
Mtbe Fuel: 1
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 1
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported

LUST Sonoma County:
Region: SONOMA
LOP Number: 00002395
Global ID: T0609700252
Date: Not reported
Staff: DR
Regional Board: 1TSO344
Closed or Referred: Not reported
Funding Fed / State: F

NOTIFY 65:
Date Reported: Not reported Staff Initials: Not reported
Board File Number: Not reported
Facility Type: Not reported
Discharge Date: Not reported
Incident Description: 93582

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
SANTA ROSA	8713634	(RP)GAS STN @ SANTA ROSA AVE	(RP)GAS STN @ SANTA ROSA AVE		ERNS
SANTA ROSA	S106235093	LOS GUILICOS	HWY 12 / PYTHIAN RD		CA SLIC
SANTA ROSA	S106247465	SANTA ROSA ROAD YARD	2175 AIRPORT BLVD	95403	LUST
SANTA ROSA	875916	CITY OF SANTA ROSA NEAR THE EASTERN PART OF COUNTY CLOSE TO	CITY OF SANTA ROSA NEAR THE EASTERN PART OF COUNTY CLOSE TO		ERNS
SANTA ROSA	S105088012	VILLA ROSA HOME OWNER ASSOC	2650, 2652,2654 COFFEY	95403	HAZNET
SANTA ROSA	S101309809	EMPIRE BUILDING	COURTHOUSE SQU., OLD 37		LUST, Cortese, CA SLIC
SANTA ROSA	S101304919	SHELL SERVICE STATION	255 DUTTON AVENUE		Notify 65, LUST, Cortese, CA SLIC
SANTA ROSA	S105051171	SANTA ROSA COMMUNITY DEVELOPMENT SW AREA	LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101		CA SLIC, LUST
SANTA ROSA	S100467765	SANTA ROSA BRASS FOUNDRY	MISSION		LUST, Cortese
SANTA ROSA	S104857240	MISSION ARBORS	MISSION BLVD AT HIGHWAY 12 100		LUST
SANTA ROSA	S106167484	CYCLEWORKS	5368 B OLD REDWOOD HWY	95403	CLEANERS
SANTA ROSA	S104857236	AUTO EXCHANGE	OLD REDWOOD HIGHWAY 5352		LUST
SANTA ROSA	S103393013	SCDPW LARKFIELD SEWER	REDWOOD HIGHWAY, OLD	95403	CA SLIC, LUST
SANTA ROSA	S105051009	UNITY CHURCH	4351 REDWOOD HIGHWAY, OLD	95403	CA SLIC, LUST
SANTA ROSA	S105051166	REED, LILLIE	5716 REDWOOD HIGHWAY, OLD	95403	CA SLIC, LUST
SANTA ROSA	S104163196	YOLO, DANIEL	REDWOOD HIGHWAY, OLD 5807		LUST, Cortese
SANTA ROSA	S104163195	STEVENSON EQUIPMENT	REDWOOD HIGHWAY, OLD 3975		LUST
SANTA ROSA	S101316145	SANTA ROSA DPW SARACEN AVENUE	SARACEN AVENUE		CA SLIC, LUST
SANTA ROSA	91240413	SPRING CREEK IN SANTA ROSA BEHIND #760 CHURCH ST. JUST W OF	SPRING CREEK IN SANTA ROSA BEHIND #760 CHURCH ST. JUST W OF		ERNS
SANTA ROSA	S103342441	SANTA ROSA CITY OAKMONT PLANT	6200 STONEBRIDGE RD	95403	CA WDS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/30/04
Date Made Active at EDR: 09/09/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 08/03/04
Elapsed ASTM days: 37
Date of Last EDR Contact: 08/03/04

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 07/22/04
Date Made Active at EDR: 09/09/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 08/03/04
Elapsed ASTM days: 37
Date of Last EDR Contact: 08/03/04

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 05/17/04
Date Made Active at EDR: 08/10/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/23/04
Elapsed ASTM days: 48
Date of Last EDR Contact: 06/23/04

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 05/17/04
Date Made Active at EDR: 08/10/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/23/04
Elapsed ASTM days: 48
Date of Last EDR Contact: 06/23/04

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/15/04
Date Made Active at EDR: 08/10/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 06/25/04
Elapsed ASTM days: 46
Date of Last EDR Contact: 06/07/04

RCRIS: Resource Conservation and Recovery Information System
Source: EPA
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs): generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month. Small quantity generators (SQGs): generate between 100 kg and 1,000 kg of hazardous waste per month. Large quantity generators (LQGs): generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month. Transporters are individuals or entities that move hazardous waste from the generator off-site to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/15/04
Date Made Active at EDR: 07/20/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/23/04
Elapsed ASTM days: 27
Date of Last EDR Contact: 08/24/04

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/03
Date Made Active at EDR: 03/12/04
Database Release Frequency: Annually
Date of Data Arrival at EDR: 01/26/04
Elapsed ASTM days: 46
Date of Last EDR Contact: 07/26/04

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/01/01
Database Release Frequency: Biennially
Date of Last EDR Contact: 06/22/04
Date of Next Scheduled EDR Contact: 09/13/04

CONSENT: Superfund (CERCLA) Consent Decrees
Source: Department of Justice, Consent Decree Library
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/05/04
Database Release Frequency: Varies
Date of Last EDR Contact: 07/30/04
Date of Next Scheduled EDR Contact: 10/25/04

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ROD: Records Of Decision
Source: EPA
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 06/07/04
Database Release Frequency: Annually
Date of Last EDR Contact: 07/07/04
Date of Next Scheduled EDR Contact: 10/04/04

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/30/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 08/03/04
Date of Next Scheduled EDR Contact: 11/01/04

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 04/08/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 02/17/04
Database Release Frequency: Annually
Date of Last EDR Contact: 04/20/04
Date of Next Scheduled EDR Contact: 07/19/04

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/15/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 06/04/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/30/04
Date of Next Scheduled EDR Contact: 09/27/04

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 202-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91 | Date of Last EDR Contact: 08/23/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 11/22/04

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-564-3887
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/29/04 | Date of Last EDR Contact: 08/10/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 11/08/04

DOD: Department of Defense Sites
Source: USGS
Telephone: 703-692-8801
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 10/01/03 | Date of Last EDR Contact: 08/12/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/08/04

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202-564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: 02/04/04 | Date of Last EDR Contact: 07/06/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 10/04/04

INDIAN RESERV: Indian Reservations
Source: USGS
Telephone: 202-208-3710
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 10/01/03 | Date of Last EDR Contact: 08/12/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/08/04

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 07/06/04 | Date of Last EDR Contact: 06/14/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 09/13/04

RMP: Risk Management Plans
Source: Environmental Protection Agency
Telephone: 202-564-8600
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/27/04 | Date of Last EDR Contact: 08/23/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 11/22/04

FUDS: Formerly Used Defense Sites
Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/03 | Date of Last EDR Contact: 07/06/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 10/04/04

ODI: Open Dump Inventory
Source: Environmental Protection Agency
Telephone: 800-424-9346
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/85 | Date of Last EDR Contact: 05/23/95
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: N/A

UMTRA: Uranium Mill Tailings Sites
Source: Department of Energy
Telephone: 505-845-0011
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized. In 1978, 24 inactive uranium mill tailings sites in Oregon, Idaho, Wyoming, Utah, Colorado, New Mexico, Texas, North Dakota, South Dakota, Pennsylvania, and on Navajo and Hopi tribal lands, were targeted for cleanup by the Department of Energy.

Date of Government Version: 04/22/04 | Date of Last EDR Contact: 06/21/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 09/20/04

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95 | Date of Last EDR Contact: 06/07/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 09/06/04

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-566-0250
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/02 | Date of Last EDR Contact: 06/22/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 09/20/04

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/02
Database Release Frequency: Every 4 Years
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-564-2501

Date of Government Version: 04/13/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/21/04
Date of Next Scheduled EDR Contact: 09/20/04

SSTS: Section 7 Tracking Systems
Source: EPA
Telephone: 202-564-5008
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/01
Database Release Frequency: Annually
Date of Last EDR Contact: 07/20/04
Date of Next Scheduled EDR Contact: 10/18/04

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-2501
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/13/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/21/04
Date of Next Scheduled EDR Contact: 09/20/04

STATE OF CALIFORNIA ASTM STANDARD RECORDS

AWP: Annual Workplan Sites
Source: California Environmental Protection Agency
Telephone: 916-323-3400
Known Hazardous Waste Sites. California DTSC’s Annual Workplan (AWP), formerly BEP, identifies known hazardous substance sites targeted for cleanup.

Date of Government Version: 06/01/04
Date Made Active at EDR: 06/25/04
Database Release Frequency: Annually
Date of Data Arrival at EDR: 06/04/04
Elapsed ASTM days: 21
Date of Last EDR Contact: 06/04/04

CAL-SITES: Calsites Database
Source: Department of Toxic Substance Control
Telephone: 916-323-3400
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database.

Date of Government Version: 06/01/04
Date Made Active at EDR: 06/25/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/04/04
Elapsed ASTM days: 21
Date of Last EDR Contact: 06/04/04

CHMIRS: California Hazardous Material Incident Report System
Source: Office of Emergency Services
Telephone: 916-845-8400
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/03
Date Made Active at EDR: 06/25/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 05/18/04
Elapsed ASTM days: 38
Date of Last EDR Contact: 08/23/04

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-9100
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/01
Date Made Active at EDR: 07/26/01
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 05/29/01
Elapsed ASTM days: 58
Date of Last EDR Contact: 07/29/04

NOTIFY 65: Proposition 65 Records
Source: State Water Resources Control Board
Telephone: 916-445-3846
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/93
Date Made Active at EDR: 11/19/93
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 11/01/93
Elapsed ASTM days: 18
Date of Last EDR Contact: 07/20/04

TOXIC PITS: Toxic Pits Cleanup Act Sites
Source: State Water Resources Control Board
Telephone: 916-227-4364
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/95
Date Made Active at EDR: 09/26/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 08/30/95
Elapsed ASTM days: 27
Date of Last EDR Contact: 08/02/04

SWF/LF (SWIS): Solid Waste Information System
Source: Integrated Waste Management Board
Telephone: 916-341-6320
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 06/14/04
Date Made Active at EDR: 07/26/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/16/04
Elapsed ASTM days: 40
Date of Last EDR Contact: 06/16/04

WMUDS/SWAT: Waste Management Unit Database
Source: State Water Resources Control Board
Telephone: 916-227-4448
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/00
Date Made Active at EDR: 05/10/00
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 04/10/00
Elapsed ASTM days: 30
Date of Last EDR Contact: 06/07/04

LUST: Leaking Underground Storage Tank Information System
Source: State Water Resources Control Board
Telephone: 916-341-5752
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 07/12/04
Date Made Active at EDR: 07/30/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 07/12/04
Elapsed ASTM days: 18
Date of Last EDR Contact: 07/12/04

CA BOND EXP. PLAN: Bond Expenditure Plan
Source: Department of Health Services
Telephone: 916-255-2118
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/89
Date Made Active at EDR: 08/02/94
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 07/27/94
Elapsed ASTM days: 6
Date of Last EDR Contact: 05/31/94

CA UST:

UST: Active UST Facilities
Source: SWRCB
Telephone: 916-341-5752
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 07/12/04
Date Made Active at EDR: 08/06/04
Database Release Frequency: Semi-Annually
Date of Data Arrival at EDR: 07/12/04
Elapsed ASTM days: 25
Date of Last EDR Contact: 07/12/04

VCP: Voluntary Cleanup Program Properties
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 06/01/04
Date Made Active at EDR: 06/25/04
Database Release Frequency: Quarterly
Date of Data Arrival at EDR: 06/04/04
Elapsed ASTM days: 21
Date of Last EDR Contact: 06/04/04

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land
Source: Environmental Protection Agency
Telephone: 415-972-3372
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 06/18/04
Date Made Active at EDR: 07/26/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/21/04
Elapsed ASTM days: 35
Date of Last EDR Contact: 08/23/04

INDIAN LUST: Leaking Underground Storage Tanks on Indian Land
Source: EPA Region 10
Telephone: 206-553-2857
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 06/23/04
Date Made Active at EDR: 07/26/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/23/04
Elapsed ASTM days: 33
Date of Last EDR Contact: 08/23/04

INDIAN UST: Underground Storage Tanks on Indian Land
Source: EPA Region 9
Telephone: 415-972-3368

Date of Government Version: 06/18/04
Date Made Active at EDR: 07/26/04
Database Release Frequency: Varies
Date of Data Arrival at EDR: 06/21/04
Elapsed ASTM days: 35
Date of Last EDR Contact: 08/23/04

CA FID UST: Facility Inventory Database
Source: California Environmental Protection Agency
Telephone: 916-445-6532
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/94
Date Made Active at EDR: 09/29/95
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 09/05/95
Elapsed ASTM days: 24
Date of Last EDR Contact: 12/28/98

HIST UST: Hazardous Substance Storage Container Database
Source: State Water Resources Control Board
Telephone: 916-341-5700
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/90
Date Made Active at EDR: 02/12/91
Database Release Frequency: No Update Planned
Date of Data Arrival at EDR: 01/25/91
Elapsed ASTM days: 18
Date of Last EDR Contact: 07/26/01

STATE OF CALIFORNIA ASTM SUPPLEMENTAL RECORDS

AST: Aboveground Petroleum Storage Tank Facilities
Source: State Water Resources Control Board
Telephone: 916-341-5712
Registered Aboveground Storage Tanks.

Date of Government Version: 12/01/03
Database Release Frequency: Quarterly
Date of Last EDR Contact: 08/02/04
Date of Next Scheduled EDR Contact: 11/01/04

CLEANERS: Cleaner Facilities
Source: Department of Toxic Substance Control
Telephone: 916-225-0873
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 04/21/04
Database Release Frequency: Annually
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

CA WDS: Waste Discharge System
Source: State Water Resources Control Board
Telephone: 916-341-5227
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/18/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/23/04
Date of Next Scheduled EDR Contact: 09/20/04

DEED: List of Deed Restrictions
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
The use of recorded land use restrictions is one of the methods the DTSC uses to protect the public from unsafe exposures to hazardous substances and wastes.

Date of Government Version: 07/06/04 | Date of Last EDR Contact: 07/07/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 10/04/04

NFA: No Further Action Determination
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties at which DTSC has made a clear determination that the property does not pose a problem to the environment or to public health.

Date of Government Version: 06/01/04 | Date of Last EDR Contact: 06/04/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 08/30/04

EMI: Emissions Inventory Data
Source: California Air Resources Board
Telephone: 916-322-2990
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/02 | Date of Last EDR Contact: 07/22/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 10/18/04

REF: Unconfirmed Properties Referred to Another Agency
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties where contamination has not been confirmed and which were determined as not requiring direct DTSC Site Mitigation Program action or oversight. Accordingly, these sites have been referred to another state or local regulatory agency.

Date of Government Version: 06/01/04 | Date of Last EDR Contact: 06/04/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 08/30/04

SCH: School Property Evaluation Program
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 06/01/04 | Date of Last EDR Contact: 06/04/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 08/30/04

NFE: Properties Needing Further Evaluation
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
This category contains properties that are suspected of being contaminated. These are unconfirmed contaminated properties that need to be assessed using the PEA process. PEA in Progress indicates properties where DTSC is currently conducting a PEA. PEA Required indicates properties where DTSC has determined a PEA is required, but not currently underway.

Date of Government Version: 06/01/04 | Date of Last EDR Contact: 06/04/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 08/30/04

SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
Telephone: 916-341-5752
The Spills, Leaks, Investigations, and Cleanups (SLIC) listings includes unauthorized discharges from spills and leaks, other than from underground storage tanks or other regulated sites.

Date of Government Version: 08/03/04 | Date of Last EDR Contact: 08/03/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 10/11/04

HAZNET: Facility and Manifest Data
Source: California Environmental Protection Agency
Telephone: 916-255-1136
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/02 | Date of Last EDR Contact: 08/09/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 11/08/04

LOCAL RECORDS

ALAMEDA COUNTY:

Local Oversight Program Listing of UGT Cleanup Sites
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

Date of Government Version: 06/11/04 | Date of Last EDR Contact: 07/26/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 10/25/04

Underground Tanks
Source: Alameda County Environmental Health Services
Telephone: 510-567-6700

Date of Government Version: 08/17/04 | Date of Last EDR Contact: 07/26/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 10/25/04

CONTRA COSTA COUNTY:

Site List
Source: Contra Costa Health Services Department
Telephone: 925-646-2286
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 06/14/04 | Date of Last EDR Contact: 08/30/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/29/04

FRESNO COUNTY:

CUPA Resources List
Source: Dept. of Community Health
Telephone: 559-445-3271
Certified Unified Program Agency. CUPA’s are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 07/21/04 | Date of Last EDR Contact: 08/09/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/08/04

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Kern County Sites and Tanks Listing.

Date of Government Version: 01/27/04 | Date of Last EDR Contact: 06/24/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 09/06/04

LOS ANGELES COUNTY:

List of Solid Waste Facilities
Source: La County Department of Public Works
Telephone: 818-458-5185

Date of Government Version: 06/03/03 | Date of Last EDR Contact: 08/19/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 11/15/04

City of El Segundo Underground Storage Tank
Source: City of El Segundo Fire Department
Telephone: 310-524-2236

Date of Government Version: 06/02/04 | Date of Last EDR Contact: 08/30/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/15/04

City of Long Beach Underground Storage Tank
Source: City of Long Beach Fire Department
Telephone: 562-570-2543

Date of Government Version: 03/28/03 | Date of Last EDR Contact: 08/27/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 11/22/04

City of Torrance Underground Storage Tank
Source: City of Torrance Fire Department
Telephone: 310-618-2973

Date of Government Version: 08/16/04 | Date of Last EDR Contact: 06/16/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/15/04

City of Los Angeles Landfills
Source: Engineering & Construction Division
Telephone: 213-473-7869

Date of Government Version: 03/01/04 | Date of Last EDR Contact: 06/14/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 09/13/04

HMS: Street Number List
Source: Department of Public Works
Telephone: 626-458-3517
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 04/29/04 | Date of Last EDR Contact: 08/16/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 11/15/04

Site Mitigation List
Source: Community Health Services
Telephone: 323-890-7806
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/26/04 | Date of Last EDR Contact: 08/16/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 11/15/04

San Gabriel Valley Areas of Concern
Source: EPA Region 9
Telephone: 415-972-3178
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/98
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 07/06/99
Date of Next Scheduled EDR Contact: N/A

MARIN COUNTY:

Underground Storage Tank Sites
Source: Public Works Department Waste Management
Telephone: 415-499-6647
Currently permitted USTs in Marin County.

Date of Government Version: 06/22/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/02/04
Date of Next Scheduled EDR Contact: 11/01/04

NAPA COUNTY:

Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 06/28/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/28/04
Date of Next Scheduled EDR Contact: 09/27/04

Closed and Operating Underground Storage Tank Sites
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269

Date of Government Version: 06/28/04
Database Release Frequency: Annually
Date of Last EDR Contact: 06/28/04
Date of Next Scheduled EDR Contact: 09/27/04

ORANGE COUNTY:

List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 06/01/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/08/04
Date of Next Scheduled EDR Contact: 09/06/04

List of Underground Storage Tank Facilities
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 06/01/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/08/04
Date of Next Scheduled EDR Contact: 09/06/04

List of Industrial Site Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Petroleum and non-petroleum spills.

Date of Government Version: 06/01/04
Database Release Frequency: Annually
Date of Last EDR Contact: 06/08/04
Date of Next Scheduled EDR Contact: 09/06/04

PLACER COUNTY:

Master List of Facilities
Source: Placer County Health and Human Services
Telephone: 530-889-7312
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 07/07/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/21/04
Date of Next Scheduled EDR Contact: 09/20/04

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 909-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 06/21/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/19/04
Date of Next Scheduled EDR Contact: 10/18/04

Underground Storage Tank Tank List
Source: Health Services Agency
Telephone: 909-358-5055

Date of Government Version: 06/21/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/19/04
Date of Next Scheduled EDR Contact: 10/18/04

SACRAMENTO COUNTY:

CS - Contaminated Sites
Source: Sacramento County Environmental Management
Telephone: 916-875-8406

Date of Government Version: 04/16/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 08/02/04
Date of Next Scheduled EDR Contact: 11/02/04

ML - Regulatory Compliance Master List
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 04/16/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 08/02/04
Date of Next Scheduled EDR Contact: 11/01/04

SAN BERNARDINO COUNTY:

Hazardous Material Permits
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 06/28/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

SAN DIEGO COUNTY:

Solid Waste Facilities
Source: Department of Health Services
Telephone: 619-338-2209
San Diego County Solid Waste Facilities.

Date of Government Version: 08/01/00
Database Release Frequency: Varies
Date of Last EDR Contact: 08/23/04
Date of Next Scheduled EDR Contact: 11/22/04

Hazardous Materials Management Division Database
Source: Hazardous Materials Management Division
Telephone: 619-338-2268
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 06/29/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/07/04
Date of Next Scheduled EDR Contact: 10/04/04

SAN FRANCISCO COUNTY:

Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920

Date of Government Version: 06/07/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

Underground Storage Tank Information
Source: Department of Public Health
Telephone: 415-252-3920

Date of Government Version: 06/07/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

SAN MATEO COUNTY:

Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921

Date of Government Version: 08/03/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 07/09/04
Date of Next Scheduled EDR Contact: 10/11/04

Business Inventory
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 04/07/04
Database Release Frequency: Annually
Date of Last EDR Contact: 07/12/04
Date of Next Scheduled EDR Contact: 10/11/04

SANTA CLARA COUNTY:

Fuel Leak Site Activity Report
Source: Santa Clara Valley Water District
Telephone: 408-265-2600

Date of Government Version: 06/30/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 06/28/04
Date of Next Scheduled EDR Contact: 09/27/04

Hazardous Material Facilities
Source: City of San Jose Fire Department
Telephone: 408-277-4659

Date of Government Version: 10/01/03
Database Release Frequency: Annually
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

SOLANO COUNTY:

Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-421-6770

Date of Government Version: 07/08/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/28/04
Date of Next Scheduled EDR Contact: 09/13/04

Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-421-6770

Date of Government Version: 07/08/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/28/04
Date of Next Scheduled EDR Contact: 09/13/04

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565

Date of Government Version: 07/26/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/26/04
Date of Next Scheduled EDR Contact: 10/25/04

SUTTER COUNTY:

Underground Storage Tanks
Source: Sutter County Department of Agriculture
Telephone: 530-822-7500

Date of Government Version: 01/29/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

VENTURA COUNTY:

Inventory of Illegal Abandoned and Inactive Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 09/01/02
Database Release Frequency: Annually
Date of Last EDR Contact: 08/25/04
Date of Next Scheduled EDR Contact: 11/22/04

Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/04/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/17/04
Date of Next Scheduled EDR Contact: 09/13/04

Underground Tank Closed Sites List
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 05/04/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/13/04
Date of Next Scheduled EDR Contact: 10/11/04

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 05/04/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/17/04
Date of Next Scheduled EDR Contact: 09/13/04

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Source: Yolo County Department of Health
Telephone: 530-666-8646

Date of Government Version: 06/02/04
Database Release Frequency: Annually
Date of Last EDR Contact: 06/01/04
Date of Next Scheduled EDR Contact: 10/18/04

California Regional Water Quality Control Board (RWQCB) LUST Records

LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-576-2220
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/01
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 08/23/04
Date of Next Scheduled EDR Contact: 11/22/04

LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457

Date of Government Version: 03/31/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/16/04
Date of Next Scheduled EDR Contact: 10/11/04

LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147

Date of Government Version: 05/19/03 | Date of Last EDR Contact: 08/17/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 11/15/04

LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/10/04 | Date of Last EDR Contact: 06/28/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 09/27/04

LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291

Date of Government Version: 07/01/04 | Date of Last EDR Contact: 07/19/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 10/04/04

LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 916-542-5424
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/03 | Date of Last EDR Contact: 06/29/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 09/06/04

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-346-7491

Date of Government Version: 05/27/04 | Date of Last EDR Contact: 07/06/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 10/04/04

LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-346-7491

Date of Government Version: 02/26/04 | Date of Last EDR Contact: 06/29/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 09/27/04

LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4498
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 07/01/04 | Date of Last EDR Contact: 08/09/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 11/08/04

LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/01 | Date of Last EDR Contact: 06/29/04
Database Release Frequency: No Update Planned | Date of Next Scheduled EDR Contact: 10/18/04

California Regional Water Quality Control Board (RWQCB) SLIC Records

SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220

Date of Government Version: 04/03/03
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/23/04
Date of Next Scheduled EDR Contact: 11/22/04

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 07/12/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/12/04
Date of Next Scheduled EDR Contact: 10/11/04

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 06/26/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 08/16/04
Date of Next Scheduled EDR Contact: 11/15/04

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Any contaminated site that impacts groundwater or has the potential to impact groundwater.

Date of Government Version: 07/08/04
Database Release Frequency: Quarterly
Date of Last EDR Contact: 07/26/04
Date of Next Scheduled EDR Contact: 10/25/04

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Unregulated sites that impact groundwater or have the potential to impact groundwater.

Date of Government Version: 04/01/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574

Date of Government Version: 06/07/04
Database Release Frequency: Varies
Date of Last EDR Contact: 06/07/04
Date of Next Scheduled EDR Contact: 09/06/04

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583

Date of Government Version: 04/01/04
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 07/06/04
Date of Next Scheduled EDR Contact: 10/04/04

SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491

Date of Government Version: 06/08/04 | Date of Last EDR Contact: 08/23/04
Database Release Frequency: Varies | Date of Next Scheduled EDR Contact: 11/22/04

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-3298

Date of Government Version: 07/01/04 | Date of Last EDR Contact: 07/09/04
Database Release Frequency: Semi-Annually | Date of Next Scheduled EDR Contact: 10/04/04

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980

Date of Government Version: 04/29/04 | Date of Last EDR Contact: 08/30/04
Database Release Frequency: Annually | Date of Next Scheduled EDR Contact: 11/29/04

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

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BROWNFIELDS DATABASES

VCP: Voluntary Cleanup Program Properties
Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 06/01/04 | Date of Last EDR Contact: 06/04/04
Database Release Frequency: Quarterly | Date of Next Scheduled EDR Contact: 08/30/04

US BROWNFIELDS: A Listing of Brownfields Sites
Source: Environmental Protection Agency
Telephone: 202-566-2777
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become BCRLF cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: N/A
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SUTTER MEDICAL CENTER OF SANTA ROSA
50 MARK WEST SPRINGS ROAD
SANTA ROSA, CA 95403

TARGET PROPERTY COORDINATES

Latitude (North):	38.495098 - 38˚ 29' 42.4''
Longitude (West):	122.752296 - 122˚ 45' 8.3''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521600.9
UTM Y (Meters):	4260572.0
Elevation:	157 ft. above sea level

EDR's GeoCheck Physical Setting Source Addendum has been developed to assist the environmental professional with the collection of physical setting source information in accordance with ASTM 1527-00, Section 7.2.3. Section 7.2.3 requires that a current USGS 7.5 Minute Topographic Map (or equivalent, such as the USGS Digital Elevation Model) be reviewed. It also requires that one or more additional physical setting sources be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to or from the property, and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial or customary practice, to assess the impact of migration of recognized environmental conditions in connection with the property. Such additional physical setting sources generally include information about the topographic, hydrologic, hydrogeologic, and geologic characteristics of a site, and wells in the area.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata. EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

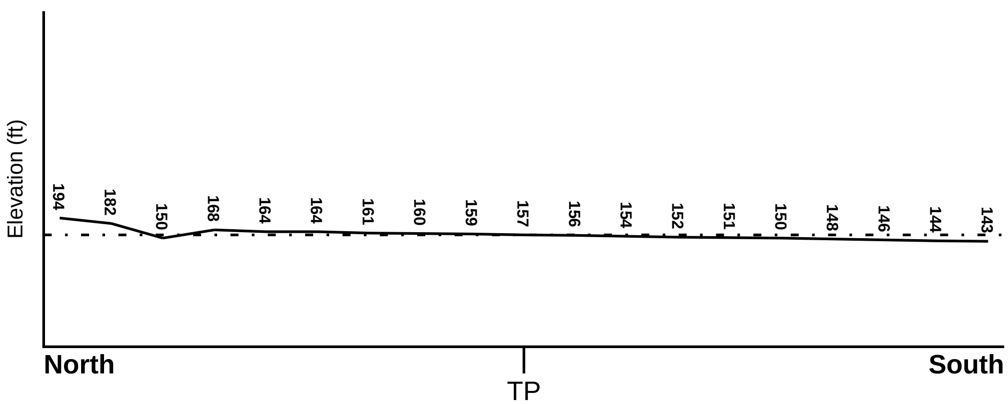
TOPOGRAPHIC INFORMATION

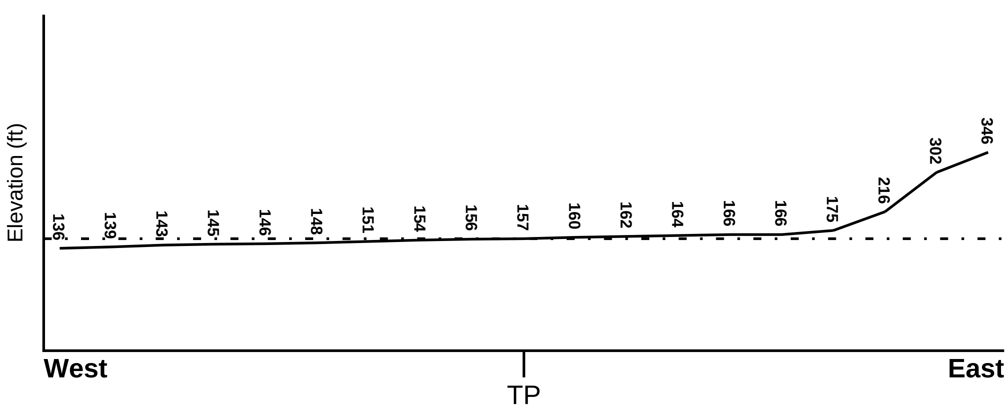
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

USGS Topographic Map: 38122-D7 SEBASTOPOL, CA
General Topographic Gradient: General SW
Source: USGS 7.5 min quad index

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 157 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
SONOMA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 0603750685B

Additional Panels in search area: 0603750545B
0603750565B
0603750725B
0603810005B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
SEBASTOPOL	Not Available

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
B3	1/8 - 1/4 Mile NE	Not Reported
B4	1/8 - 1/4 Mile NE	NNE
B5	1/8 - 1/4 Mile NE	Varies
B6	1/4 - 1/2 Mile ENE	NNE
7	1/4 - 1/2 Mile North	SW
8	1/4 - 1/2 Mile North	Varies

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
22	1/2 - 1 Mile West	Varies

For additional site information, refer to Physical Setting Source Map Findings.

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

Era:	Cenozoic
System:	Tertiary
Series:	Pliocene volcanic rocks
Code:	Tpv *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Volcanic Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture’s (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	ZAMORA
Soil Surface Texture:	silty clay loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel:	HIGH
Depth to Bedrock Min:	> 60 inches
Depth to Bedrock Max:	> 60 inches

Soil Layer Information							
	Boundary			Classification			
Layer	**Upper**	**Lower**	**Soil Texture Class**	**AASHTO Group**	**Unified Soil**	**Permeability Rate (in/hr)**	**Soil Reaction (pH)**
1	0 inches	10 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 7.30 Min: 6.10
2	10 inches	40 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 0.60 Min: 0.20	Max: 7.80 Min: 6.60
3	40 inches	51 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay. FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), silt.	Max: 2.00 Min: 0.60	Max: 8.40 Min: 6.60
4	51 inches	60 inches	gravelly - loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	COARSE-GRAINED SOILS, Sands, Sands with fines, Clayey sand. COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 2.00 Min: 0.60	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: loam
clay
silt loam
clay loam
sandy loam
very gravelly - sand

Surficial Soil Types: loam
clay
silt loam
clay loam
sandy loam

	very gravelly - sand
Shallow Soil Types:	fine sandy loam loam
Deeper Soil Types:	cemented sandy clay loam clay silt loam fine sandy loam loam stratified very gravelly - clay loam

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

According to ASTM E 1527-00, Section 7.2.2, "one or more additional state or local sources of environmental records may be checked, in the discretion of the environmental professional, to enhance and supplement federal and state sources... Factors to consider in determining which local or additional state records, if any, should be checked include (1) whether they are reasonably ascertainable, (2) whether they are sufficiently useful, accurate, and complete in light of the objective of the records review (see 7.1.1), and (3) whether they are obtained, pursuant to local, good commercial or customary practice." One of the record sources listed in Section 7.2.2 is water well information. Water well information can be used to assist the environmental professional in assessing sources that may impact groundwater flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	USGS0178385	1/8 - 1/4 Mile ESE
C9	USGS0178445	1/4 - 1/2 Mile NW
C10	USGS0178446	1/2 - 1 Mile NW
17	USGS0178447	1/2 - 1 Mile North
E18	USGS0178448	1/2 - 1 Mile NNW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
23	CA4901093	1/2 - 1 Mile West

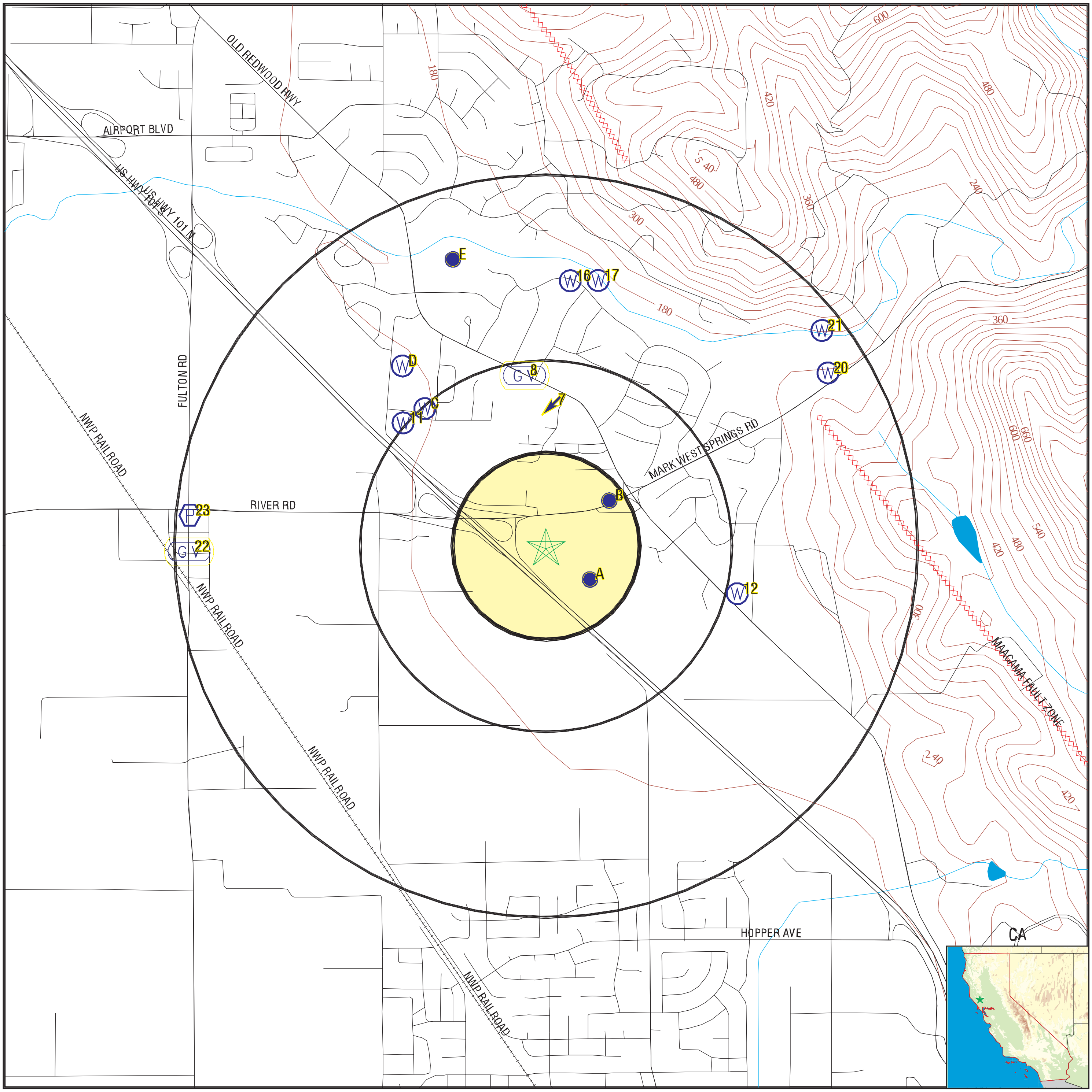
Note: PWS System location is not always the same as well location.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	8409	0 - 1/8 Mile SE
11	20765	1/2 - 1 Mile NW
12	8408	1/2 - 1 Mile ESE
D13	8407	1/2 - 1 Mile NW
D14	8406	1/2 - 1 Mile NW
D15	8401	1/2 - 1 Mile NW
16	8400	1/2 - 1 Mile North
E19	8399	1/2 - 1 Mile NNW
20	8410	1/2 - 1 Mile ENE
21	20766	1/2 - 1 Mile NE

PHYSICAL SETTING SOURCE MAP - 1278135.2s



County Boundary
Major Roads
Contour Lines
Earthquake Fault Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location
Closest Hydrogeological Data
Oil, gas or related wells

TARGET PROPERTY:	Sutter Medical Center of Santa Rosa	CUSTOMER:	Engeo
ADDRESS:	50 Mark West Springs Road	CONTACT:	James Ollerton
CITY/STATE/ZIP:	Santa Rosa CA 95403	INQUIRY #:	1278135.2s
LAT/LONG:	38.4951 / 122.7523	DATE:	September 28, 2004 7:34 pm

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID Direction Distance Elevation	Database	EDR ID Number
A1 **SE** **0 - 1/8 Mile** **Higher**	**CA WELLS**	**8409**

Water System Information:

Prime Station Code:	08N/08W-33K01 M	User ID:	49C
FRDS Number:	4900685001	County:	Sonoma
District Number:	79	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382938.0 1224459.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4900685		
System Name:	LUTHER BURBANK CENTER		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

	Database	EDR ID Number
A2 **ESE** **1/8 - 1/4 Mile** **Higher**	**FED USGS**	**USGS0178385**

Agency:	USGS	Site ID:	382938122445401
Site Name:	008N008W33K001M		
Dec. Latitude:	38.4938		
Dec. Longitude:	-122.74943		
Coord Sys:	NAD83		
State:	CA		
County:	Sonoma County		
Altitude:	155		
Hydrologic code:	18010110		
Topographic:	Valley flat		
Site Type:	Ground-water other than Spring		
Const Date:	19731023	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	400		
Hole depth:	400	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1973-10-01	15.00	

			Database	EDR ID Number
B3 **NE** **1/8 - 1/4 Mile** **Higher**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Not Reported 8.75 9 Not Reported 04/30/1993	**AQUIFLOW**	**70934**

Map ID / Direction / Distance / Elevation			Database	EDR ID Number
B4 NE 1/8 - 1/4 Mile Higher	Site ID:	Not Reported	**AQUIFLOW**	**54266**
	Groundwater Flow:	NNE		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	11/24/1998		
B5 NE 1/8 - 1/4 Mile Higher	Site ID:	Not Reported	**AQUIFLOW**	**54544**
	Groundwater Flow:	Varies		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	10		
	Date:	06/18/1999		
B6 ENE 1/4 - 1/2 Mile Higher	Site ID:	Not Reported	**AQUIFLOW**	**54267**
	Groundwater Flow:	NNE		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	11/24/1998		
7 North 1/4 - 1/2 Mile Higher	Site ID:	Not Reported	**AQUIFLOW**	**54548**
	Groundwater Flow:	SW		
	Shallow Water Depth:	11		
	Deep Water Depth:	14		
	Average Water Depth:	Not Reported		
	Date:	04/26/1991		
8 North 1/4 - 1/2 Mile Higher	Site ID:	Not Reported	**AQUIFLOW**	**54550**
	Groundwater Flow:	Varies		
	Shallow Water Depth:	8		
	Deep Water Depth:	11		
	Average Water Depth:	Not Reported		
	Date:	06/05/1996		
C9 NW 1/4 - 1/2 Mile Lower			**FED USGS**	**USGS0178445**

Agency:	USGS	Site ID:	383002122452501
Site Name:	008N008W33D004M		
Dec. Latitude:	38.50047		
Dec. Longitude:	-122.75804		
Coord Sys:	NAD83		
State:	CA		
County:	Sonoma County		
Altitude:	150		
Hydrologic code:	18010110		
Topographic:	Valley flat		
Site Type:	Ground-water other than Spring		
Const Date:	Not Reported	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		

Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	360		
Hole depth:	484	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

C10
NW
1/2 - 1 Mile
Lower

FED USGS USGS0178446

Agency:	USGS	Site ID:	383002122452701
Site Name:	008N008W33D003M		
Dec. Latitude:	38.50047		
Dec. Longitude:	-122.7586		
Coord Sys:	NAD83		
State:	CA		
County:	Sonoma County		
Altitude:	150		
Hydrologic code:	18010110		
Topographic:	Valley flat		
Site Type:	Ground-water other than Spring		
Const Date:	19620601	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	380		
Hole depth:	380	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

11
NW
1/2 - 1 Mile
Lower

CA WELLS 20765

Water System Information:

Prime Station Code:	4910023-005	User ID:	RXR
FRDS Number:	4910023005	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383000.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 05		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	08/10/1992	Findings:	5.000 UNITS
Chemical:	COLOR		
Sample Collected:	08/10/1992	Findings:	3.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	08/10/1992	Findings:	380.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		

Sample Collected:	08/10/1992	Findings:	6.800
Chemical:	PH (LABORATORY)		
Sample Collected:	08/10/1992	Findings:	150.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/10/1992	Findings:	180.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/10/1992	Findings:	130.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/10/1992	Findings:	18.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/10/1992	Findings:	21.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/10/1992	Findings:	14.000 MG/L
Chemical:	SODIUM		
Sample Collected:	08/10/1992	Findings:	27.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/10/1992	Findings:	.160 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/10/1992	Findings:	3100.000 UG/L
Chemical:	IRON		
Sample Collected:	08/10/1992	Findings:	720.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/10/1992	Findings:	2.380 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/10/1992	Findings:	240.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/10/1992	Findings:	40.000 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	12/28/1992	Findings:	1.880 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/29/1993	Findings:	2.340 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/24/1995	Findings:	2.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	08/24/1995	Findings:	330.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/24/1995	Findings:	7.600
Chemical:	PH (LABORATORY)		
Sample Collected:	08/24/1995	Findings:	120.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/24/1995	Findings:	150.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/24/1995	Findings:	89.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/24/1995	Findings:	14.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/24/1995	Findings:	13.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/24/1995	Findings:	16.000 MG/L
Chemical:	SODIUM		

Sample Collected:	08/24/1995	Findings:	11.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/24/1995	Findings:	.190 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/24/1995	Findings:	6.400 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/24/1995	Findings:	130.000 UG/L
Chemical:	IRON		
Sample Collected:	08/24/1995	Findings:	550.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/24/1995	Findings:	69.000 UG/L
Chemical:	ALUMINUM		
Sample Collected:	08/24/1995	Findings:	220.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/24/1995	Findings:	.490 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	08/24/1995	Findings:	11.000
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	07/30/1996	Findings:	4.390 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	07/30/1996	Findings:	- 1.320 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

12
ESE
1/2 - 1 Mile
Higher

CA WELLS 8408

Water System Information:

Prime Station Code:	08N/08W-33J01 M	User ID:	RXR
FRDS Number:	4900869001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382936.0 1224430.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4900869		
System Name:	LA MANCHA APARTMENTS		
Organization That Operates System:			
	P.O. BOX 11427		
	SANTA ROSA, CA 95406		
Pop Served:	140	Connections:	1
Area Served:	Not Reported		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	08/30/1994	Findings:	401.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/30/1994	Findings:	6.600
Chemical:	PH (LABORATORY)		
Sample Collected:	08/30/1994	Findings:	151.200 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/30/1994	Findings:	184.500 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/30/1994	Findings:	120.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		

Sample Collected:	08/30/1994	Findings:	17.600 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/30/1994	Findings:	17.600 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/30/1994	Findings:	30.200 MG/L
Chemical:	SODIUM		
Sample Collected:	08/30/1994	Findings:	4.300 MG/L
Chemical:	POTASSIUM		
Sample Collected:	08/30/1994	Findings:	20.200 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/30/1994	Findings:	.400 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/30/1994	Findings:	5.100 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/30/1994	Findings:	157.500 UG/L
Chemical:	BARIUM		
Sample Collected:	08/30/1994	Findings:	138.000 UG/L
Chemical:	IRON		
Sample Collected:	08/30/1994	Findings:	203.500 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/30/1994	Findings:	6.700 UG/L
Chemical:	SELENIUM		
Sample Collected:	08/30/1994	Findings:	.200 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/30/1994	Findings:	234.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/30/1994	Findings:	.540 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	11/15/1994	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/24/1995	Findings:	1.200 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/16/1995	Findings:	1.700 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	05/16/1995	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	11/13/1995	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	11/13/1995	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

D13
NW
1/2 - 1 Mile
Lower

CA WELLS 8407

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Water System Information:

Prime Station Code:	08N/08W-33D04 M	User ID:	RXR
FRDS Number:	4910023003	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383006.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 03		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	07/09/1986	Findings:	.900 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/05/1987	Findings:	5.000 UNITS
Chemical:	COLOR		
Sample Collected:	08/05/1987	Findings:	250.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/05/1987	Findings:	7.300
Chemical:	PH (LABORATORY)		
Sample Collected:	08/05/1987	Findings:	120.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/05/1987	Findings:	150.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/05/1987	Findings:	94.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/05/1987	Findings:	16.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/05/1987	Findings:	13.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/05/1987	Findings:	17.000 MG/L
Chemical:	SODIUM		
Sample Collected:	08/05/1987	Findings:	7.200 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/05/1987	Findings:	.180 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/05/1987	Findings:	120.000 UG/L
Chemical:	IRON		
Sample Collected:	08/05/1987	Findings:	820.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/05/1987	Findings:	220.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/05/1987	Findings:	52.000 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	04/05/1993	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	04/05/1993	Findings:	410.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		

Sample Collected:	04/05/1993	Findings:	7.700
Chemical:	PH (LABORATORY)		
Sample Collected:	04/05/1993	Findings:	130.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	04/05/1993	Findings:	160.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	04/05/1993	Findings:	110.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	04/05/1993	Findings:	17.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	04/05/1993	Findings:	16.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	04/05/1993	Findings:	14.000 MG/L
Chemical:	SODIUM		
Sample Collected:	04/05/1993	Findings:	13.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	04/05/1993	Findings:	.140 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	04/05/1993	Findings:	510.000 UG/L
Chemical:	IRON		
Sample Collected:	04/05/1993	Findings:	1400.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/05/1993	Findings:	270.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	04/05/1993	Findings:	4.700 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	01/06/1994	Findings:	6.200 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	01/06/1994	Findings:	2.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	04/18/1994	Findings:	2.500 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	04/18/1994	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/05/1994	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/05/1994	Findings:	.800 PCI/L
Chemical:	RADIUM 226		
Sample Collected:	07/05/1994	Findings:	.500 PCI/L
Chemical:	RADIUM 226 COUNTING ERROR		
Sample Collected:	07/05/1994	Findings:	2.000 PCI/L
Chemical:	URANIUM COUNTING ERROR		
Sample Collected:	10/18/1994	Findings:	3.800 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	10/18/1994	Findings:	1.600 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/12/1996	Findings:	310.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/12/1996	Findings:	7.500
Chemical:	PH (LABORATORY)		

Sample Collected:	03/12/1996	Findings:	130.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	160.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/12/1996	Findings:	110.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	19.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/12/1996	Findings:	14.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/12/1996	Findings:	14.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/12/1996	Findings:	9.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/12/1996	Findings:	.160 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/12/1996	Findings:	11.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/12/1996	Findings:	150.000 UG/L
Chemical:	IRON		
Sample Collected:	03/12/1996	Findings:	710.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/12/1996	Findings:	240.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/12/1996	Findings:	.610 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	03/12/1996	Findings:	11.000
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

D14
NW
1/2 - 1 Mile
Lower

CA WELLS 8406

Water System Information:

Prime Station Code:	08N/08W-33D01 M	User ID:	RXR
FRDS Number:	4901048001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Untreated
Source Lat/Long:	383009.0 1224529.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4901048		
System Name:	MARK WEST SCHOOL		
Organization That Operates System:			
	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

Map ID Direction Distance Elevation	Database	EDR ID Number
D15 **NW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**8401**

Water System Information:

Prime Station Code:	08N/08W-28Q02 M	User ID:	RXR
FRDS Number:	4910023002	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383009.9 1224531.1	Precision:	100 Feet (one Second)
Source Name:	WELL 02		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	06/26/1992	Findings:	1.640 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

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16 **North** **1/2 - 1 Mile** **Higher**	**CA WELLS**	**8400**

Water System Information:

Prime Station Code:	08N/08W-28Q01 M	User ID:	RXR
FRDS Number:	4910023001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383020.5 1224500.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	11/24/1984	Findings:	2.000 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	07/09/1986	Findings:	.930 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	11/24/1986	Findings:	2.000 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	11/24/1986	Findings:	2.000 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	03/04/1987	Findings:	170.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/04/1987	Findings:	160.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		

Sample Collected:	03/04/1987	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/04/1987	Findings:	24.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/04/1987	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/04/1987	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	03/04/1987	Findings:	370.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/04/1987	Findings:	7.200
Chemical:	PH (LABORATORY)		
Sample Collected:	03/04/1987	Findings:	170.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/04/1987	Findings:	210.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/04/1987	Findings:	170.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/04/1987	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/04/1987	Findings:	24.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/04/1987	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/04/1987	Findings:	18.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/04/1987	Findings:	.170 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/04/1987	Findings:	900.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/04/1987	Findings:	320.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/04/1987	Findings:	.100
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	03/04/1987	Findings:	.500 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	08/13/1991	Findings:	1.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/13/1991	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	08/13/1991	Findings:	6.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	08/13/1991	Findings:	420.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/13/1991	Findings:	6.800
Chemical:	PH (LABORATORY)		
Sample Collected:	08/13/1991	Findings:	190.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/13/1991	Findings:	230.000 MG/L
Chemical:	BICARBONATE ALKALINITY		

Sample Collected:	08/13/1991	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/13/1991	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/13/1991	Findings:	21.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/13/1991	Findings:	34.000 MG/L
Chemical:	SODIUM		
Sample Collected:	08/13/1991	Findings:	14.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/13/1991	Findings:	.170 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/13/1991	Findings:	12.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/1991	Findings:	490.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/1991	Findings:	1.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/13/1991	Findings:	.650 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	08/13/1991	Findings:	320.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/13/1991	Findings:	.820 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	08/13/1991	Findings:	.650 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	02/25/1992	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	02/25/1992	Findings:	440.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/1992	Findings:	7.500
Chemical:	PH (LABORATORY)		
Sample Collected:	02/25/1992	Findings:	170.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	02/25/1992	Findings:	210.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/1992	Findings:	180.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	02/25/1992	Findings:	24.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/1992	Findings:	19.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/1992	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/1992	Findings:	13.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/1992	Findings:	15.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/1992	Findings:	560.000 UG/L
Chemical:	IRON		

Sample Collected:	02/25/1992	Findings:	600.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/1992	Findings:	120.000 UG/L
Chemical:	ALUMINUM		
Sample Collected:	02/25/1992	Findings:	290.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/1992	Findings:	3.000 NTU
Chemical:	TURBIDITY (LAB)		

17
North
1/2 - 1 Mile
Higher

FED USGS **USGS0178447**

Agency:	USGS	Site ID:	383020122445501
Site Name:	008N008W28Q001M		
Dec. Latitude:	38.50547		
Dec. Longitude:	-122.74971		
Coord Sys:	NAD83		
State:	CA		
County:	Sonoma County		
Altitude:	160		
Hydrologic code:	18010110		
Topographic:	Stream channel		
Site Type:	Ground-water other than Spring		
Const Date:	19590319	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	332		
Hole depth:	332	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

E18
NNW
1/2 - 1 Mile
Lower

FED USGS **USGS0178448**

Agency:	USGS	Site ID:	383023122452001
Site Name:	008N008W28N001M		
Dec. Latitude:	38.5063		
Dec. Longitude:	-122.75665		
Coord Sys:	NAD83		
State:	CA		
County:	Sonoma County		
Altitude:	150		
Hydrologic code:	18010110		
Topographic:	Stream channel		
Site Type:	Ground-water other than Spring		
Const Date:	19741120	Inven Date:	Not Reported
Well Type:	Single well, other than collector or Ranney type		
Primary Aquifer:	Not Reported		
Aquifer type:	Not Reported		
Well depth:	410		
Hole depth:	462	Source:	Not Reported
Project no:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
E19 NNW 1/2 - 1 Mile Lower	**CA WELLS**	**8399**

Water System Information:

Prime Station Code:	08N/08W-28N01 M	User ID:	RXR
FRDS Number:	4910023004	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383023.0 1224522.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 04A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	07/09/1986	Findings:	.840 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/04/1987	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	03/04/1987	Findings:	290.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/04/1987	Findings:	6.700
Chemical:	PH (LABORATORY)		
Sample Collected:	03/04/1987	Findings:	150.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/04/1987	Findings:	180.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/04/1987	Findings:	110.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/04/1987	Findings:	19.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/04/1987	Findings:	15.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/04/1987	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/04/1987	Findings:	8.500 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/04/1987	Findings:	.180 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/04/1987	Findings:	920.000 UG/L
Chemical:	IRON		
Sample Collected:	03/04/1987	Findings:	650.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/04/1987	Findings:	270.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		

Sample Collected:	03/04/1987	Findings:	- .690
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	03/04/1987	Findings:	2.200 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	06/28/1988	Findings:	310.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/28/1988	Findings:	7.400
Chemical:	PH (LABORATORY)		
Sample Collected:	06/28/1988	Findings:	160.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	06/28/1988	Findings:	160.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	06/28/1988	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	06/28/1988	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	06/28/1988	Findings:	18.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	06/28/1988	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	06/28/1988	Findings:	11.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	06/28/1988	Findings:	.200 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	06/28/1988	Findings:	6.000 UG/L
Chemical:	CADMIUM		
Sample Collected:	06/28/1988	Findings:	820.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	06/28/1988	Findings:	260.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	06/28/1988	Findings:	310.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/28/1988	Findings:	7.400
Chemical:	PH (LABORATORY)		
Sample Collected:	06/28/1988	Findings:	160.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	06/28/1988	Findings:	160.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	06/28/1988	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	06/28/1988	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	06/28/1988	Findings:	18.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	06/28/1988	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	06/28/1988	Findings:	11.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	06/28/1988	Findings:	.200 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		

Sample Collected:	06/28/1988	Findings:	6.000 UG/L
Chemical:	CADMIUM		
Sample Collected:	06/28/1988	Findings:	820.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	06/28/1988	Findings:	.810 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	06/28/1988	Findings:	11.740 PCI/L
Chemical:	GROSS BETA COUNTING ERROR		
Sample Collected:	06/28/1988	Findings:	260.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/24/1989	Findings:	.600 UG/L
Chemical:	XYLENES (TOTAL)		
Sample Collected:	08/01/1990	Findings:	.600 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/29/1993	Findings:	5.000 UNITS
Chemical:	COLOR		
Sample Collected:	03/29/1993	Findings:	350.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/29/1993	Findings:	6.700
Chemical:	PH (LABORATORY)		
Sample Collected:	03/29/1993	Findings:	150.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/29/1993	Findings:	180.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/29/1993	Findings:	120.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/29/1993	Findings:	16.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/29/1993	Findings:	19.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/29/1993	Findings:	22.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/29/1993	Findings:	10.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/29/1993	Findings:	.140 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/29/1993	Findings:	120.000 UG/L
Chemical:	BARIUM		
Sample Collected:	03/29/1993	Findings:	660.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/29/1993	Findings:	240.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	01/06/1994	Findings:	1.400 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	01/06/1994	Findings:	.600 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	04/18/1994	Findings:	3.200 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	04/18/1994	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

Sample Collected:	07/05/1994	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	10/18/1994	Findings:	1.600 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	10/18/1994	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/12/1996	Findings:	370.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/12/1996	Findings:	7.400
Chemical:	PH (LABORATORY)		
Sample Collected:	03/12/1996	Findings:	160.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	190.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/12/1996	Findings:	120.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	22.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/12/1996	Findings:	17.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/12/1996	Findings:	15.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/12/1996	Findings:	9.900 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/12/1996	Findings:	.140 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/12/1996	Findings:	9.100 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/12/1996	Findings:	130.000 UG/L
Chemical:	BARIUM		
Sample Collected:	03/12/1996	Findings:	260.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/12/1996	Findings:	.130 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	03/12/1996	Findings:	11.000
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

20
ENE
1/2 - 1 Mile
Higher

CA WELLS 8410

Water System Information:

Prime Station Code:	08N/08W-34D01 M	User ID:	RXR
FRDS Number:	4900890001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383007.0 1224414.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		

System Number: 4900890
System Name: REDWOOD JUNIOR ACADEMY
Organization That Operates System:
385 MARK WEST SPRINGS RD.
SANTA ROSA, CA 95404
Pop Served: 300 Connections: 1
Area Served: Not Reported

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	06/09/1993	Findings:	3.000 UNITS
Chemical:	COLOR		
Sample Collected:	06/09/1993	Findings:	480.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/09/1993	Findings:	7.100
Chemical:	PH (LABORATORY)		
Sample Collected:	06/09/1993	Findings:	210.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	06/09/1993	Findings:	250.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	06/09/1993	Findings:	230.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	06/09/1993	Findings:	27.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	06/09/1993	Findings:	40.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	06/09/1993	Findings:	20.000 MG/L
Chemical:	SODIUM		
Sample Collected:	06/09/1993	Findings:	10.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	06/09/1993	Findings:	450.000 UG/L
Chemical:	ZINC		
Sample Collected:	06/09/1993	Findings:	320.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	06/09/1993	Findings:	1.100 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	04/05/1994	Findings:	1.800 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	04/05/1994	Findings:	.900 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/12/1994	Findings:	2.000 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	07/12/1994	Findings:	.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	01/23/1995	Findings:	3.100 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	01/23/1995	Findings:	.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/10/1995	Findings:	1.100 UG/L
Chemical:	BROMODICHLORMETHANE (THM)		
Sample Collected:	07/10/1995	Findings:	1.400 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		

Sample Collected:	07/10/1995	Findings:	1.100 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	07/10/1995	Findings:	3.600 UG/L
Chemical:	TOTAL TRIHALOMETHANES		

21
NE
1/2 - 1 Mile
Higher

CA WELLS 20766

Water System Information:

Prime Station Code:	4910023-006	User ID:	RXR
FRDS Number:	4910023006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383013.0 1224415.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Information: * Only Findings Above Detection Level Are Listed

Sample Collected:	08/13/1991	Findings:	1.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/13/1991	Findings:	.650 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	08/13/1991	Findings:	.650 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	02/25/1992	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	02/25/1992	Findings:	440.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/1992	Findings:	7.500
Chemical:	PH (LABORATORY)		
Sample Collected:	02/25/1992	Findings:	170.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	02/25/1992	Findings:	210.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/1992	Findings:	180.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	02/25/1992	Findings:	24.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/1992	Findings:	19.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/1992	Findings:	21.000 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/1992	Findings:	13.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/1992	Findings:	15.000 UG/L
Chemical:	ARSENIC		

Sample Collected:	02/25/1992	Findings:	560.000 UG/L
Chemical:	IRON		
Sample Collected:	02/25/1992	Findings:	600.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/1992	Findings:	120.000 UG/L
Chemical:	ALUMINUM		
Sample Collected:	02/25/1992	Findings:	2.110 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/1992	Findings:	290.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/1992	Findings:	3.000 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	06/26/1992	Findings:	1.640 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/13/1992	Findings:	10.000 UNITS
Chemical:	COLOR		
Sample Collected:	08/13/1992	Findings:	6.000 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	08/13/1992	Findings:	420.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/13/1992	Findings:	6.800
Chemical:	PH (LABORATORY)		
Sample Collected:	08/13/1992	Findings:	190.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	08/13/1992	Findings:	230.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/13/1992	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	08/13/1992	Findings:	26.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/13/1992	Findings:	21.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/13/1992	Findings:	34.000 MG/L
Chemical:	SODIUM		
Sample Collected:	08/13/1992	Findings:	14.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/13/1992	Findings:	.170 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	08/13/1992	Findings:	12.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/1992	Findings:	490.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/1992	Findings:	1.800 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/13/1992	Findings:	320.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/13/1992	Findings:	.820 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	09/16/1992	Findings:	1.850 PCI/L
Chemical:	GROSS ALPHA		

Sample Collected:	09/16/1992	Findings:	3.140 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	12/28/1992	Findings:	2.270 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/29/1993	Findings:	5.000 UNITS
Chemical:	COLOR		
Sample Collected:	03/29/1993	Findings:	1.400 TON
Chemical:	ODOR THRESHOLD @ 60 C		
Sample Collected:	03/29/1993	Findings:	470.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/29/1993	Findings:	7.000
Chemical:	PH (LABORATORY)		
Sample Collected:	03/29/1993	Findings:	200.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/29/1993	Findings:	240.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/29/1993	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/29/1993	Findings:	24.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/29/1993	Findings:	22.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/29/1993	Findings:	32.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/29/1993	Findings:	12.000 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/29/1993	Findings:	.140 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/29/1993	Findings:	10.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/29/1993	Findings:	150.000 UG/L
Chemical:	BARIUM		
Sample Collected:	03/29/1993	Findings:	680.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/29/1993	Findings:	290.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/29/1993	Findings:	.300 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	01/06/1994	Findings:	2.500 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	01/06/1994	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	04/18/1994	Findings:	1.500 PCI/L
Chemical:	GROSS ALPHA		
Sample Collected:	04/18/1994	Findings:	1.200 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/05/1994	Findings:	1.000 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	10/18/1994	Findings:	1.300 PCI/L
Chemical:	GROSS ALPHA		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	10/18/1994	Findings:	.900 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	03/12/1996	Findings:	470.000 UMHO
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	03/12/1996	Findings:	7.700
Chemical:	PH (LABORATORY)		
Sample Collected:	03/12/1996	Findings:	210.000 MG/L
Chemical:	TOTAL ALKALINITY (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	250.000 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	03/12/1996	Findings:	150.000 MG/L
Chemical:	TOTAL HARDNESS (AS CACO3)		
Sample Collected:	03/12/1996	Findings:	30.000 MG/L
Chemical:	CALCIUM		
Sample Collected:	03/12/1996	Findings:	19.000 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	03/12/1996	Findings:	26.000 MG/L
Chemical:	SODIUM		
Sample Collected:	03/12/1996	Findings:	9.500 MG/L
Chemical:	CHLORIDE		
Sample Collected:	03/12/1996	Findings:	.150 MG/L
Chemical:	FLUORIDE (TEMPERATURE DEPENDENT)		
Sample Collected:	03/12/1996	Findings:	14.000 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/12/1996	Findings:	150.000 UG/L
Chemical:	BARIUM		
Sample Collected:	03/12/1996	Findings:	190.000 UG/L
Chemical:	IRON		
Sample Collected:	03/12/1996	Findings:	600.000 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/12/1996	Findings:	300.000 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	03/12/1996	Findings:	1.100 NTU
Chemical:	TURBIDITY (LAB)		
Sample Collected:	03/12/1996	Findings:	12.000
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

22
West
1/2 - 1 Mile
Lower

AQUIFLOW 70216

Site ID:	Not Reported
Groundwater Flow:	Varies
Shallow Water Depth:	Not Reported
Deep Water Depth:	Not Reported
Average Water Depth:	Not Reported
Date:	08/20/1993

23
West
1/2 - 1 Mile
Lower

FRDS PWS CA4901093

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

PWS ID:	CA4901093	PWS Status:	Active
Date Initiated:	Not Reported	Date Deactivated:	Not Reported
PWS Name:	MARTINELLI WINERY MARTINELLI WINERY 3362 RIVIR FORESTVILLE, CA 95436		
Addressee / Facility:	System Owner/Responsible Party MARTINELLI WINERY 8895 MARTINELLI ROAD FORESTVILLE, CA 95436		
Facility Latitude:	38 29 47	Facility Longitude:	122 46 08
City Served:	Not Reported		
Treatment Class:	Untreated	Population:	00000045

PWS currently has or had major violation(s) or enforcement: Yes

Violations information not reported.

ENFORCEMENT INFORMATION:

System Name:	MARTINELLI RANCH		
Violation Type:	Monitoring, Repeat Minor (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1995-04-01 - 1995-04-30	Analytical Value:	00000000.00
Violation ID:	9503001	Enforcement ID:	Not Reported
Enforcement Date:	Not Reported	Enf. Action:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
95403	8	0	0.00

Federal EPA Radon Zone for SONOMA County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 95403

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.575 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002. 7.5-Minute DEMs correspond to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

ADDITIONAL ENVIRONMENTAL RECORD SOURCES

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

STATE RECORDS

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

California Oil and Gas Well Locations for District 2, 3, 5 and 6
Source: Department of Conservation
Telephone: 916-323-1779

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

The EDR-City Directory
Abstract

Sutter Medical Center of Santa
50 Mark West Springs Road
Santa Rosa, CA 95403

October 01, 2004

Inquiry Number: 1278135-7

EDR™ Environmental Data Resources Inc

The Standard In Environmental Risk Management Information

440 Wheelers Farms Road
Milford, Connecticut 06460

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802

Environmental Data Resources, Inc.
City Directory Abstract

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist professionals in evaluating potential liability on a target property resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable means information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.*

To meet the prior use requirements of ASTM E 1527-00, Section 7.3.4, the following *standard historical sources* may be used: aerial photographs, fire insurance maps, property tax files, land title records (although these cannot be the sole historical source consulted), topographic maps, city directories, building department records, or zoning/land use records. ASTM E 1527-00 requires *"All obvious uses of the property shall be identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier. This task requires reviewing only as many of the standard historical sources as are necessary, and that are reasonably ascertainable and likely to be useful."* (ASTM E 1527-00, Section 7.3.2, page 12.)

EDR's City Directory Abstract includes a search and abstract of available city directory data.

City Directories
City directories have been published for cities and towns across the U.S. since the 1700s. Originally a list of residents, the city directory developed into a sophisticated tool for locating individuals and businesses in a particular urban or suburban area. Twentieth century directories are generally divided into three sections: a business index, a list of resident names and addresses, and a street index. With each address, the directory lists the name of the resident or, if a business is operated from this address, the name and type of business (if unclear from the name). While city directory coverage is comprehensive for major cities, it may be spotty for rural areas and small towns. ASTM E 1527-00 specifies that a *"review of city directories (standard historical sources) at less than approximately five year intervals is not required by this practice." (ASTM E 1527-00, Section 7.3.2.1, page 12.)*

NAICS (North American Industry Classification System) Codes
NAICS is a unique, all-new system for classifying business establishments. Adopted in 1997 to replace the prior Standard Industry Classification (SIC) system, it is the system used by the statistical agencies of the United States. It is the first economic classification system to be constructed based on a single economic concept. To learn more about the background, the development and difference between NAICS and SIC, visit the following Census website: http://www.census.gov/epcd/www/naicsdev.htm.

Please call EDR Nationwide Customer Service at
1-800-352-0050 (8am-8pm EST)
with questions or comments about your report.
Thank you for your business!

4. SUMMARY

- ***City Directories:***

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1957 through 1999. (These years are not necessarily inclusive.) A summary of the information obtained is provided in the text of this report.

Date EDR Searched Historical Sources:
City Directories Oct 01, 2004

Target Property:
50 Mark West Springs Road
Santa Rosa, CA 95403

PUR ID *Year*	*Uses*	*NAICS*	*Source*
-- 1957	Street not listed in research source.	N/A	Polk City Directory
-- 1964	Street not listed in research source.	N/A	Polk City Directory
-- 1969	Address not Listed in Research Source	N/A	Polk City Directory
-- 1974	Address not Listed in Research Source	N/A	Polk City Directory
-- 1979	Christian Life Center		Polk City Directory
	Christian Life Elementary School		
-- 1985	KCLB FM Radio		Polk City Directory
	Luther Burbank Center For Performing Arts		
	Children's World Day Care Center		
	Nation Julie College		
	Center For Positive Living		
-- 1999	Actors Theatre		Polk City Directory
	Calvary Chapel		
	Foundation Lutheran Burbank Center		
	Santa Rosa Symphony Foundation		

Adjoining Properties

SURROUNDING
Multiple Addresses
Santa Rosa, CA 95403

PUR ID *Year*	*Uses*	*NAICS*	*Source*
1957	Street not listed in research source.	N/A	Polk City Directory
1964	Street not listed in research source.	N/A	Polk City Directory
1969	**MARK WEST SPRINGS RD**		Polk City Directory
	Residence (65)		
	Larkfield Apts (69)		
	Residence (100)		
	-No other addresses within range		
1974	**MARK WEST SPRINGS RD**		Polk City Directory
	Residence (65)		

PUR ID Year	Uses	NAICS	Source
1974 (continued)			
	Larkfield Elms Apts (69)		
	Residence (100)		
	-No other addresses within range		
1979	****MARK WEST SPRINGS RD****		Polk City Directory
	Residence (65)		
	Genesis House (69)		
	Harvest House (100)		
	-No other addresses within range		
1985	****MARK WEST SPRINGS RD****		Polk City Directory
	Residence (65)		
	Mark West Villas (69)		
	Residence (100)		
	-No other addresses within range		
1999	****MARK WEST SPRINGS RD****		Polk City Directory
	Residence (65)		
	Apts (69)		
	Residence (100)		
	-No other addresses within range		

APPENDIX B

Site Photographs

SITE PHOTOGRAPHS

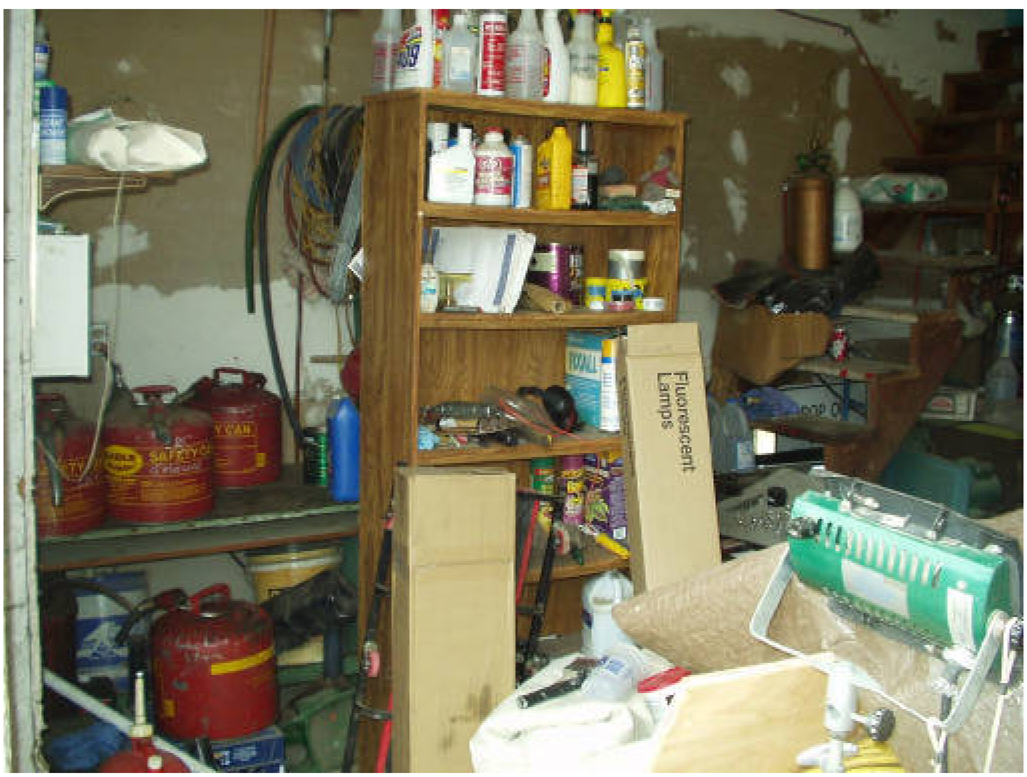
Interior view of the chlorine gas injection system shed.

View to the northeast of the waste water treatment aeration pond.

View to the south of the waste water treatment system percolation pond.

View of empty chlorine containers and discarded batteries west of the barn.

View of discarded batteries west of the barn.



View of petroleum product containers inside the barn.

View of chemical storage area outside of the LBC Physical Plant building.

View to the west of the northeast corner of the Property.

View to the north of storage area on the west side of barn building.

View to the south of the single-family home used as law offices.

View to the northeast of the athletic fields along the northern boundary of the Property.

View to the east of the garage building within the homestead property.

View of the pasture area toward the northwest corner of the Property.

View to the northwest along the west boundary of the Property.

APPENDIX C

Waste Discharge Permit

F

California Regional Water Quality Control Board
North Coast Region

ORDER NO. 96-40
ID NO. 1B820120SON

WASTE DISCHARGE REQUIREMENTS

FOR

LUTHER BURBANK CENTER FOR THE ARTS

Sonoma County

The California Regional Water Quality Control Board, North Coast Region, (hereinafter the Regional Water Board) finds that:

1. On April 12, 1996, Mark Morrisette, Director of Operations, submitted on behalf of the Luther Burbank Memorial Foundation, a report of waste discharge for revision of waste discharge requirements for the Luther Burbank Center for the Arts. The Luther Burbank Memorial Foundation shall hereinafter be referred to as the discharger.

2. The wastewater treatment and disposal facilities at the Luther Burbank Center for the Arts are owned and operated by the discharger to provide wastewater treatment and disposal for the Luther Burbank Center. The Luther Burbank Wastewater Treatment and Disposal Facilities are located approximately two miles north of Santa Rosa and one mile east of Fulton near the interchange of Highway 101 and River Road as shown on Attachment A to this Order.

Mark West Creek

3. The Luther Burbank Wastewater Treatment System is designed to provide secondary treatment for up to 25,000 gallons of wastewater per day, average dry weather flow. Treatment consists of an aeration pond followed by disinfection, prior to being discharged into an evaporation/percolation pond. A process flow schematic of the Luther Burbank Wastewater Treatment System is shown on Attachment B to this Order.

4. The Water Quality Control Plan for the North Coast Region (Basin Plan) includes water quality objectives, implementation plans for point source and nonpoint source discharges and statewide plans and policies.

11. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

THEREFORE, IT IS HEREBY ORDERED that Waste Discharge Requirements, Order No. 82-12 are rescinded and the discharger, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of any waste not specifically regulated by this Order is prohibited.

2. Creation of a pollution, contamination, or nuisance, as defined by Section 13050 of the California Water Code (CWC), is prohibited. [Health and Safety Code, Section 5411]

3. The discharge of domestic waste to surface waters is prohibited.

4. The discharge of untreated waste from anywhere within the collection, treatment, or disposal facility is prohibited.

5. The discharge of waste to the Russian River and its tributaries is prohibited.

B. EFFLUENT LIMITATIONS

1. Wastes discharged to the evaporation/percolation ponds shall not contain constituents in excess of the following limits:

Constituent	Unit	30-Day Average[1]	Daily Maximum
BOD(20°C, 5-day)	mg/l	50	80
Nonfilterable Residue	mg/l	50	80
Total Coliform Organisms	MPN/100 ml	23[2]	230
Hydrogen Ion	pH	Not less than 6.0 nor greater than 9.0	

---

[1] The arithmetic mean of the values for effluent samples collected in a period of 30 consecutive days

[2] Monthly median

2. The mean daily dry weather flow of waste to the Luther Burbank Wastewater Treatment System shall not exceed 25,000 gallons per day averaged over a period of 30 consecutive days.

C. SOLIDS DISPOSAL

1. Collected screenings, sludges, and other solids removed from liquid wastes shall be disposed of at a legal point of disposal, and in accordance with the provisions of Title 23, Division 3, Chapter 15 of the California Code of Regulations.

D. PROVISIONS

1. A copy of this Order shall be maintained at the discharge facility and be available at all times to operating personnel.

2. Severability

   Provisions of these waste discharge requirements are severable. If any provision of these requirements is found invalid, the remainder of these requirements shall not be affected.

3. Operation and Maintenance

   The discharger must maintain in good working order and operate as efficiently as possible any facility or control system installed by the discharger to achieve compliance with these waste discharge requirements.

4. Change in Discharge

   The discharger must promptly report to the Regional Water Board any material change in the character, location, or volume of the discharge.

5. Change in Ownership

   In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which must be forwarded to the Regional Water Board.

6. Vested Rights

This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, nor protect the discharger from his liability under federal, State, or local laws, nor create a vested right for the discharger to continue the waste discharge.

7. Monitoring

The discharger must comply with the Contingency Planning and Notification Requirements Order No. 74-151 and the Monitoring and Reporting Program No. 96-40 and any modifications to these documents as specified by the Executive Officer. Such documents are attached to this Order and incorporated herein. Chemical, bacteriological, and bioassay analyses must be conducted at a laboratory certified for such analyses by the State Department of Health Services. In the event a certified laboratory is not available to the discharger, analyses performed by a noncertified laboratory will be accepted provided:

a. A quality assurance/quality control program is instituted by the laboratory. A manual containing the steps followed in this program must be kept in the laboratory and available for inspection by staff of the Regional Water Board. The quality assurance/quality control program must conform to EPA guidelines or procedures approved by the Regional Water Board.

b. The laboratory will become certified within the shortest practicable time if the State Certification Program is resumed.

8. Inspections

The discharger shall permit authorized staff of the Regional Water Board:

a. entry upon premises in which an effluent source is located or in which any required records are kept;
b. access to copy any records required to be kept under terms and conditions of this Order;
c. inspection of monitoring equipment or records; and
d. sampling of any discharge.

9. Noncompliance

In the event the discharger is unable to comply with any of the conditions of this Order due to:

a. breakdown of waste treatment equipment;
b. accidents caused by human error or negligence; or
c. other causes such as acts of nature;

the discharger must notify the Executive Officer by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within two weeks of the telephone notification. The written notification shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps are being taken to prevent the problem from recurring.

10. Revision of Requirements

The Regional Water Board requires the discharger to file a report of waste discharge at least 120 days before making any material change or proposed change in the character, location, or volume of the discharge.

11. Operator Certification

Supervisors and operators of municipal wastewater treatment plants shall possess a certificate of appropriate grade in accordance with Title 23, California Code of Regulations, Section 3680. The State Water Board may accept experience in lieu of qualification training. In lieu of a properly certified wastewater treatment plant operator, the State Water Board may approve use of a water treatment plant operator of appropriate grade certified by the State Department of Health Services where reclamation is involved.

12. Adequate Capacity

Whenever a publicly owned wastewater treatment plant will reach capacity within four years, the discharger shall notify the Regional Water Board. A copy of such notification shall be sent to appropriate local elected officials, local permitting agencies, and the press. The discharger must demonstrate that adequate steps are being taken to address the capacity problem. The discharger shall submit a technical report to the Regional Water

Board showing how flow volumes will be prevented from exceeding capacity, or how capacity will be increased, within 120 days after providing notification to the Regional Water Board, or within 120 days after receipt of Regional Water Board notification, that the POTW will reach capacity within four years. The time for filing the required technical report may be extended by the Regional Water Board. An extension of 30 days may be granted by the Executive Officer, and longer extensions may be granted by the Regional Water Board itself. (CCR Title 23, Section 2232)

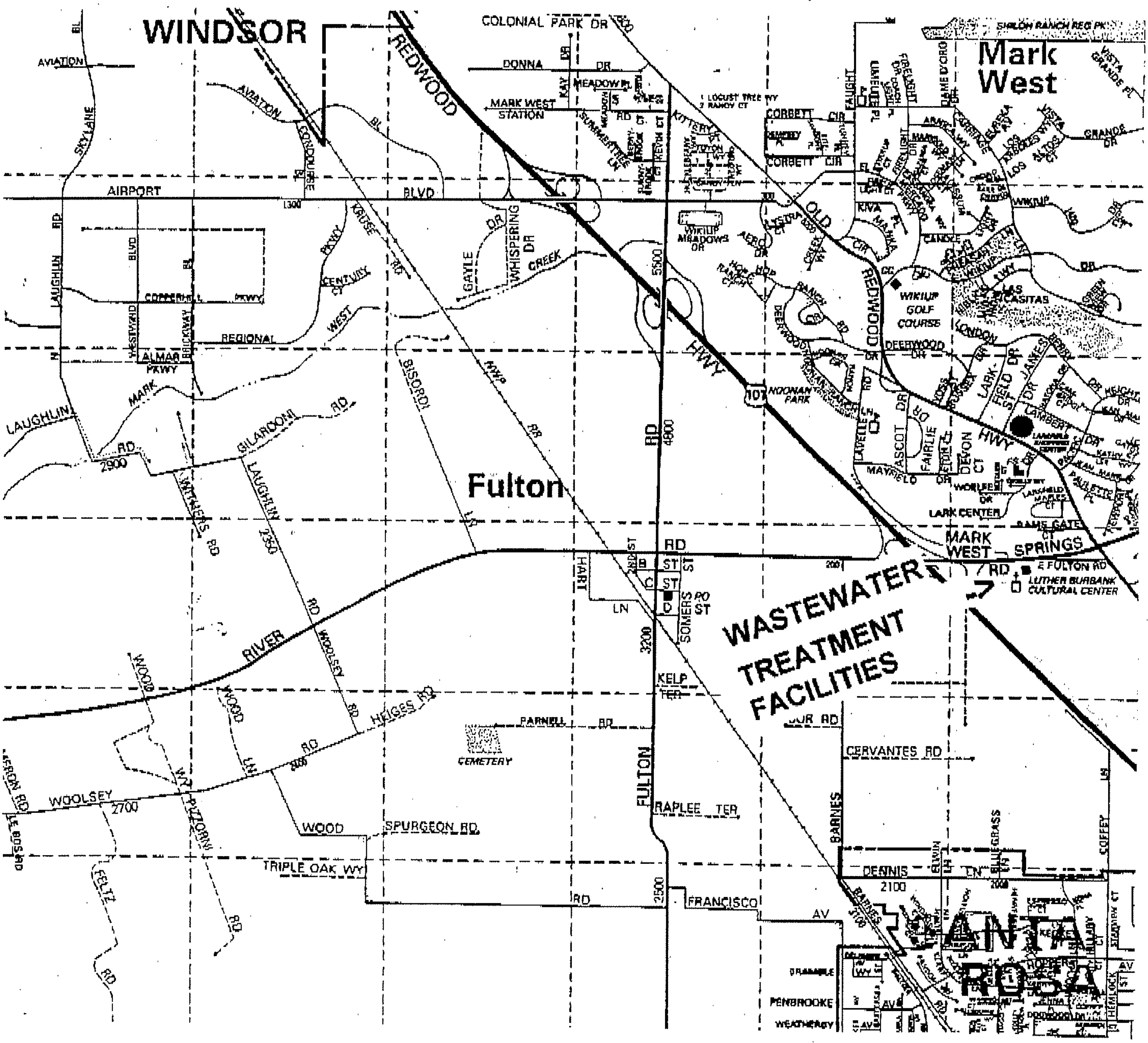
Certification

I, Benjamin D. Kor, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, North Coast Region, on June 27, 1996.

Benjamin D. Kor
Executive Officer

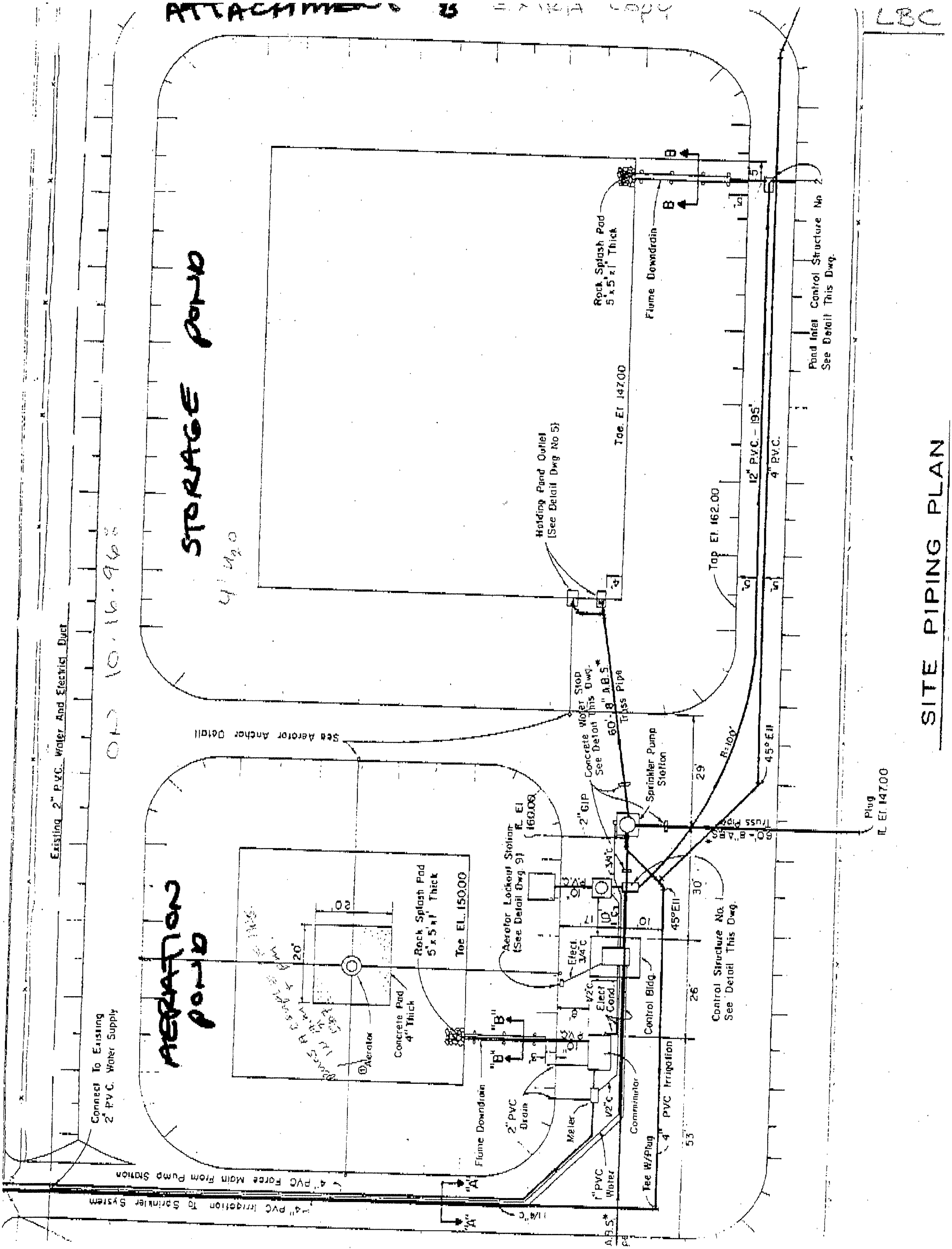
(lbcwdr)

ATTACHMENT "A"



ATTACHMENT

LBC



California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. 96-40

FOR

LUTHER BURBANK CENTER FOR THE ARTS

Sonoma County

MONITORING

Influent Monitoring

Constituent	Units	Type of Sample	Sampling Frequency
Flow (Mean and Peak)	mgd	Continuous	Daily

Monitoring the Discharge to the Evaporation/Percolation Pond

Treated wastewater shall be sampled at a point prior to its entrance into the evaporation/percolation pond. The following shall constitute the monitoring program:

Constituent	Units	Type of Sample	Sampling Frequency
BOD (20°C, 5-day)	mg/l	Grab	Weekly
Nonfilterable Residue	mg/l	Grab	Weekly
Total Coliform Organisms	MPN/100 ml	Grab	Weekly
Hydrogen Ion	pH	Grab	Weekly
Chlorine Residual	mg/l	Grab	Daily
Mean Daily Flow	mgd	Continuous	Daily

The discharger shall measure and record the depth of water and remaining freeboard in feet and inches in the evaporation/percolation pond on a weekly basis.

REPORTING

Monitoring reports shall be submitted monthly by the 15th day of the following month. In reporting the monitoring data, the discharger shall arrange the data in tabular form to clearly illustrate compliance with the waste discharge requirements.

In addition to the above, the discharger shall have all flow measuring devices tested annually and their accuracy certified. This certification shall be submitted with the annual monitoring report which is to be submitted by January 30, each year.

Ordered by ____________________
Benjamin D. Kor
Executive Officer

June 27, 1996

(1bcm&r)

APPENDIX D

Environmental Site Assessment Questionnaire

ENGEO
INCORPORATED
631 Commerce Drive
Suite 100
Roseville, CA 95678
(916) 786-8883
Fax (916) 786-7891

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE

To evaluate the potential for environmentally related concerns associated with the property in question, we require the following information prior to the site walkover. In most cases, this information is crucial to the formulation of a competent site assessment plan so your prompt cooperation is appreciated.

1. Contact person at law, lending or insurance firm and telephone number. MELISSA MOSSI, ABD INSURANCE (707) 773-1859

2. Contact person at property in question (if appropriate) and telephone number. Is there a local contractor we should contact? MARK SILVA (707) 527-7006

3. Present property owner, date of acquisition, deed number and those known to be in the chain of title. Is a chain-of-title available? If so, from whom? LUTHER BURBANK MEMORIAL FOUNDATION, 1981

4. Property acreage and lot numbers (if appropriate), including tax map identification.
APN # 058 040 045 – 38.75 AC.
APN # 058 040 026 – 1.80 AC.
APN # 058 040 027 – 11.82 AC.

5. Are site plans, as-builts, or other property maps available? If so, from whom?
SOME SITE PLANS, NO ASBUILTS. MARK SILVA

6. Present use of property and intended use.
ARTS CENTER

7. Knowledge of past use of property.
CHURCH / CHRISTIAN CENTER

8. Neighboring property uses.
AGRICULTURE, RESIDENTIAL.

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE

9. Is the *property* or any *adjoining property* used for an industrial use?	Yes	No	Unknown
10. To the best of your knowledge, has the *property* or any *adjoining property* been used for an industrial use in the past?	Yes	No	Unknown
11. Is the *property* or any *adjoining property* used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility?	Yes	No	Unknown
12. To the best of your knowledge has the *property* or any *adjoining property* been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility?	Yes	No	Unknown
13. Are there currently, or to the best of your knowledge have there been previously, any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of greater than 5 gal in volume or 50 gal in the aggregate, stored on or used at the *property* or at the facility?	Yes	No	Unknown
14. Are there currently, or to the best of your knowledge have been previously, any industrial *drums* (typically 55 gal) or sacks of chemicals located on the property or at the facility?	Yes	No	Unknown
15. Has *fill dirt* been brought onto the property that originated from a contaminated site or that is of an unknown origin?	Yes	No	Unknown
16. Are there currently, or to the best of you knowledge have there been previously, any *pits, ponds, or lagoons* located on the *property* in connection with waste treatment or waste disposal?	Yes	No	Unknown
17. Is there currently, or to the best of your knowledge has there been previously, any stained soil on the *property*?	Yes	No	Unknown
18. Are there currently, or to the best of your knowledge have there been previously, any registered or unregistered storage tanks (above or underground) located on the *property*?	Yes	No	Unknown
19. Are there currently, or to the best of your knowledge have there been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the *property* or adjacent to any structure located on the *property*?	Yes	No	Unknown
20. Are there currently, or to the best of your knowledge have there been previously, any flooring, drains, or walls located within the facility that are stained by substances other than water or are emitting foul odors?	Yes	No	Unknown
21. Are there any domestic, irrigation or monitoring wells on the property?	Yes	No	Unknown
22. If the *property* is served by a private well or non-public water system, have contaminants been identified in the well or system that exceed guidelines applicable to the water system or has the well been designated as contaminated by any government environmental/health agency?	Yes	No	Unknown

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE

23. Does the *owner* or *occupant* of the *property* have any knowledge of *environmental liens* or governmental notification relating to past or recurrent violations of environmental laws with respect to the *property* or any facility located on the *property*?	Yes	No	Unknown
24. Has the *owner* or *occupant* of the *property* been informed of the past or current existence of *hazardous substances* or *petroleum products* or environmental violations with respect to the *property* or any facility located on the *property*?	Yes	No	Unknown
25. Does the *owner* or *occupant* of the *property* have any knowledge of any *environmental site assessment* of the *property* or facility that indicated the presence of *hazardous substances* or *petroleum products* on, or contamination of, the *property* or recommended further assessment of the *property*?	Yes	No	Unknown
26. Does the *owner* or *occupant* of the *property* know of any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any *hazardous substance* or *petroleum products* involving the *property* by any owner or occupant of the *property*?	Yes	No	Unknown
27. Is there an active or abandoned on-site septic system in place?	Yes	No	Unknown
28. Does the *property* discharge waste water on or adjacent to the *property* other than storm water into a sanitary sewer system?	Yes	No	Unknown
29. To the best of your knowledge, have any *hazardous substances* or *petroleum products*, unidentified waste materials, tires, automotive or industrial batteries or any other waste materials been dumped above grade, buried and/or burned on the *property*?	Yes	No	Unknown
30. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs?	Yes	No	Unknown

Mark Silva
Preparer Name

Luther Burbank Center
Company

Director of Operations
Title

11-16-04
Date

Appendix G2

Phase Two Environmental Site Assessment, Sutter Medical Center

ENGEO
INCORPORATED

GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Project No.
6486.2.002.01

February 24, 2004

Ms. Nadin Sponamore
Sponamore Associates
1205 McDonald Avenue
Santa Rosa, CA 95404

Subject: Sutter Medical Center of Santa Rosa
Sonoma County, California

PHASE TWO ENVIRONMENTAL SITE ASSESSMENT REPORT

Dear Ms. Sponamore:

ENGEO Incorporated is pleased to present our Phase Two Environmental Site Assessment of the Sutter Medical Center of Santa Rosa/Luther Burbank Center for the Arts Property located in Sonoma County, California. A site location map is shown on Figure 1. Sampling of shallow soil was conducted to evaluate whether the orchard activities and storage of lead acid battery casings have impacted shallow soil.

The Phase II activities do not address conditions arising from the operation of the Luther Burbank Waste Water Treatment Plant (WWTP) because the WWTP remains in operation according to the conditions of its operating permit.

We propose to perform the following tasks to characterize shallow soil within the undeveloped areas of the property. Our scope of work does not include sampling within the existing pavement areas of the property. Although there are plans to expand the area of the existing parking lots, we understand that grading is not required for the expansion. We also understand that the existing parking lot lie on approximately three feet of imported engineered fill. We concluded that sampling beneath the parking areas would be proposed only if laboratory results for the undisturbed soil that previously supported orchard operations showed residues of pesticides present at high concentrations.

The following briefly describe procedures used to collect shallow soil samples:

- Sample locations were marked for utility clearance at least 48-hours prior to the start of sampling activities.
- Shallow soil samples were collected from the following two areas of the Property. Sample locations are shown on Figure 1.
  - Approximately 12 acres that historically supported orchard activities and has not be disturbed by grading activities (Area 1).

- Two samples were collected from each of the 24 locations (S-1 through S-24) from Area 1 that were composited at a ratio of 6:1 for a total of eight composite samples submitted for laboratory analysis.

- Four composite samples were comprised of samples collected from depths of 0 to 6 inches below ground surface (bgs) (S-1-6A, S-7-12A, S-13-18A, and S-19-24A).

- Four composite samples were comprised of samples collected from depths of 24 to 30 inches bgs (S-1-6B, S-7-12B, S-13-18B, and S-19-24B).

o Approximately 10 acres that historically supported orchard activities and was later covered by approximately 3 feet of imported engineered fill (Area 2).

- Two samples were collected from each of the 10 samples from Area 2 that were composited at a ratio of 10:1 for a total for two composite samples submitted for laboratory analysis.

- One composite sample was comprised of samples collected from the northern 5 acres of Area 2 (S-25A-29B) including five samples from depths of 0 to 6 bgs and five samples from depths of 24 to 30 inches bgs.

- One composite sample was comprised of samples collected from the southern 5 acres of Area 2 (S-30A-34B) including five samples from depths of 0 to 6 bgs and five samples from depths of 24 to 30 inches bgs.

o Samples were submitted to McCambell Analytical, Inc. of Pacheco, California (McCambell) for analysis of organochlorine pesticides by EPA Method 8081B, CAM 17 metals by EPA Method 6010C, and Mercury by EPA Method 6020A.

Shallow soil samples were also collected from the homestead parcel of the Property as shown on Figure 1.

o A small area near the residential structures where surface soil may be impacted due to the improper storage of lead acid battery casings (Area 3).

- Two samples were collected from the area west of the barn including one sample from a depth of 0 to 6 bgs (S-35A) and one sample from depth of 24 to 30 inches bgs (S-35B).

o Samples were submitted to McCambell for analysis of the cadmium, chromium, copper, lead, zinc, and pH.

RESULTS

The soil sampling results for organochlorine pesticides and metals are shown on Tables 1 and 2, respectively. The concentrations from composite shallow samples from Area 1 (S-1-6A, S-7-12A, S-13-18A, and S-19-24A) and the composite sample from the northern 5 acres of Area 2 exceeded the laboratory detection limit for the following pesticides: Dichlorodiphenyltrichloroethane (DDT), Dichlorodiphenyldichloroethylene (DDE), and Dichlorodiphenyldichloroethane (DDD). The low detections of pesticides can be attributed to the orchard activities. All composite samples from Areas 1 and 2 exhibited concentrations exceeding laboratory detection limits for the following metals: barium, chromium, cobalt, copper, lead, nickel, vanadium, zinc, and mercury.

The two samples from Area 3 exhibited concentrations exceeding laboratory detection limits for the following metals: chromium, copper, lead, zinc. Table 1 shows that metal concentrations were slightly greater in the S-35A sample that was collected from 0 to 6 inches bgs than in the S-35B sample that was collected from 24 to 30 inches bgs. Table 1 also shows that soil pH was slightly lower in sample S-35A (pH = 6.16) than in sample S-35B (pH = 6.44). The metals concentrations from the Area 3 samples were generally present in greater concentrations than found in soil samples collected from other locations within the Property. Even though results for samples S-35A and S-35B suggest that a limited quantity of battery acid may have been released to soil, the metal concentrations are relatively low and are below cancer and hazard thresholds that are discussed in the following section.

RISK ANALYSIS

A risk analysis was evaluated for each soil composite sample to determine the potential carcinogenic and hazard risk of exposure to the soil. The evaluation was performed using the following equation, presented in the California Department of Toxic Substances Control document entitled, "*Preliminary Endangerment Assessment Guidance Manual*" dated January 1994.

$$Risk_{soil} = (SF_o \times C_s \times (1.57 \times 10^{-6})) + (SF_o \times C \times (1.87 \times 10^{-5}) \times ABS) \quad (1)$$

$$Hazard_{soil} = (C_s/RfD_o \times (1.28 \times 10^{-5})) + (C_s/RfD_o \times (1.28 \times 10^{-4}) \times ABS) \quad (2)$$

Where:

$Risk_{soil}$	=	Cancer risk
$Hazard_{soil}$	=	Hazard quotient
SF_o	=	oral cancer slope factor, (mg/kg-day)$^{-1}$
RfD_o	=	oral risk reference dose, mg/kg-day
C_s	=	concentration in soil, mg/kg
ABS	=	absorption fraction, dimensionless

Results from these calculations are presented for each soil composite sample on Tables 1 and 2. Both risk and hazard were calculated as the sum derived for each compound present in each sample. Calculated cancer risks and hazard quotients were well below the acceptable risk levels of one in a million (10^{-6}) ranged and a quotient of one. This indicates that the current soils at the site do not pose an unacceptable risk to human health.

We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to contact us.

Very truly yours,

ENGEO Incorporated

Christopher A. Goddard, EIT
Staff Engineer

Reviewed by:

Dennis B. Nakamoto, CEG, CHG, REA II
Associate

Attachments: Table 1 - Organochlorine Pesticides in Soil Analytical Data
Table 2 - Metals in Soil Analytical Data
Figure 1 – Site Vicinity Map
Figure 2 – Soil Sampling Location Map
Laboratory Analytical Results

TABLE 1
ORGANOCHLORINE PESTICIDES IN SOIL ANALYTICAL DATA
SUTTER MC
SANTA ROSA, CALIFORNIA

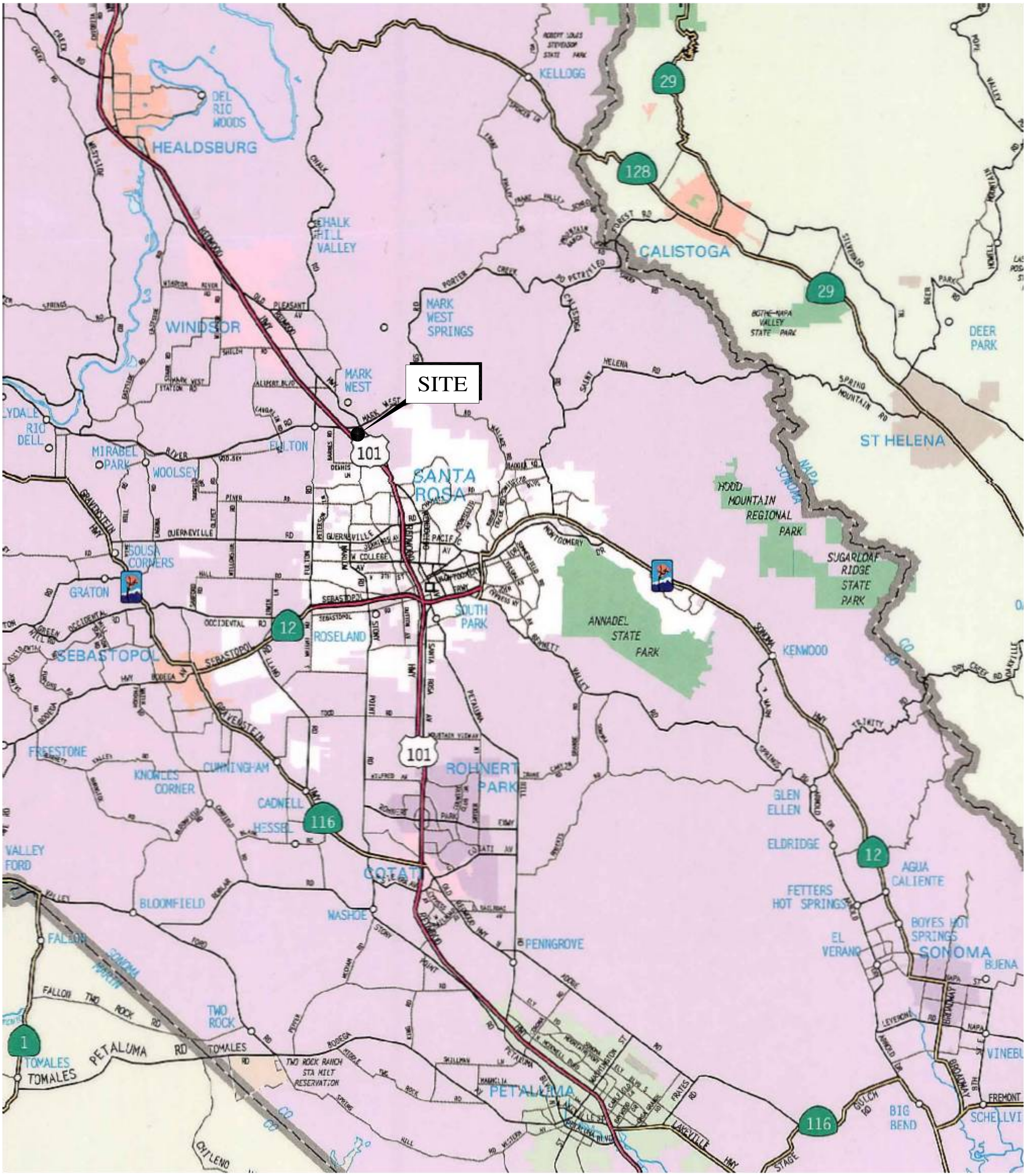
Sample ID		Sample Date	Aldrin	a-BHC	b-BHC	d-BHC	g-BHC	Chlordane	a-Chlordane	g-Chlordane	p,p-DDD	p,p-DDE	p,p-DDT	Dieldrin	Endosulfan I	Endosulfan II	Endosulfan sulfate	Endrin	Endrin aldehyde	Heptachlor epoxide	Heptachlor	Methoxychlor	Toxaphene	Cancer Risk	Hazard Quotient
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		
Area 1 (0-6 in. bgs samples)	**S-1-6A**	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	**0.0015**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	**1.2E-10**	0.0
	S-7-12A	1/18/2005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.12	<0.005	<0.005	<0.005	**0.047**	**0.022**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.25	**5.4E-09**	**0.0**
	S-13-18A	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	**0.0043**	**0.038**	**0.014**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	**4.4E-09**	**0.0**
	S-19-24A	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	**0.0038**	**0.011**	**0.0015**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	**1.3E-09**	**0.0**
Area 1 (24-30 in. bgs samples)	**S-1-6B**	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	0.0E+00	0.0
	S-7-12B	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	0.0E+00	0.0
	S-13-18B	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	0.0E+00	0.0
	S-19-24B	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	0.0E+00	0.0
Area 2 (composite)	**S-25A-29B**	1/19/2005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.05	<0.002	<0.002	<0.002	**0.0071**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.10	**5.6E-10**	0.0
	S-30A-34B	1/18/2005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.05	0.0E+00	0.0
																						Acceptable Risk Level:		**1.0E-06**	**1.0**

Notes:
mg/kg = milligram per kilogram
Samples analyzed by EPA Test Method SW8081B
Cancer Risk and Hazard Quotient calculated through methodology from California Department of Toxic Substances Control document "Preliminary Endangerment Assessment Guidance Manual", January 1994.

TABLE 2
METALS IN SOIL ANALYTICAL DATA
SUTTER MC
SANTA ROSA, CALIFORNIA

Area	Sample ID	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Molybdenum	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Mercury TTLC	pH	Cancer Risk	Hazard Quotient
			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L	pH units		
Area 1 (0-6 in. bgs samples)	S-1-6A	1/18/2005	<5	5	200	<1.5	<1.5	64	19	24	27	<1.5	73	<5	<1.5	<5	42	59	0.08	NA	4.0E-07	0.21
	S-7-12A	1/18/2005	<5	<5	190	<1.5	<1.5	58	16	21	23	<1.5	67	<5	<1.5	<5	38	50	0.08	NA	3.4E-07	0.19
	S-13-18A	1/18/2005	<5	<5	170	<1.5	<1.5	58	15	21	26	<1.5	60	<5	<1.5	<5	38	48	0.07	NA	3.9E-07	0.18
	S-19-24A	1/18/2005	<5	<5	160	<1.5	<1.5	64	16	21	25	<1.5	64	<5	<1.5	<5	42	46	0.07	NA	3.7E-07	0.19
Area 1 (24-30 in. bgs samples)	S-1-6B	1/18/2005	<5	<5	210	<1.5	<1.5	72	18	23	8.7	<1.5	87	<5	<1.5	<5	43	50	0.10	NA	1.3E-07	0.22
	S-7-12B	1/18/2005	<5	<5	220	<1.5	<1.5	100	20	26	7.3	<1.5	120	<5	<1.5	<5	44	49	0.10	NA	1.1E-07	0.25
	S-13-18B	1/18/2005	<5	<5	240	<1.5	<1.5	78	26	25	9.3	<1.5	100	<5	<1.5	<5	47	55	0.12	NA	1.4E-07	0.25
	S-19-24B	1/18/2005	<5	<5	240	<1.5	<1.5	80	25	25	7.2	<1.5	120	<5	<1.5	<5	45	52	0.11	NA	1.1E-07	0.26
Area 2 (composite)	S-25A-29B	1/19/2005	<5	<5	200	<1.5	<1.5	83	22	27	10	<1.5	100	<5	<1.5	<5	48	58	0.10	NA	1.5E-07	0.24
	S-30A-34B	1/18/2005	<5	<5	160	<1.5	<1.5	84	17	27	12	<1.5	120	<5	<1.5	<5	44	56	0.29	NA	1.8E-07	0.24
Area 3 (0-6 in. bgs)	S-35A	2/15/2005	NA	NA	NA	NA	<1.5	110	NA	44	43	NA	NA	NA	NA	NA	NA	120	NA	6.16	6.4E-07	0.02
Area 3 (24-30 in. bgs)	S-35B	2/15/2005	NA	NA	NA	NA	<1.5	99	NA	33	15	NA	NA	NA	NA	NA	NA	69	NA	6.44	2.2E-07	0.02
																				Acceptable Risk Level:	1.0E-06	1.00

Notes:
mg/kg = milligram per kilogram
mg/L = milligrams per liter
TTLC = Total Threshold Limit Concentration
Samples analyzed by EPA Test Method SW3050B for metals and 6020A for Mercury
Cancer Risk and Hazard Quotient calculated through methodology from California Department of Toxic Substances Control document "Preliminary Endangerment Assessment Guidance Manual", January 1994.



0 MILES 4

0 KILOMETERS 8

BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE VICINITY MAP
SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.2.002.01	
DATE: FEBRUARY 2005	
DRAWN BY: KN	CHECKED BY:

FIGURE NO. 1

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\6486\002\6486200201-1SiteVicMap-0205.dwg 2-25-05 02:50:12 PM

BASE MAP SOURCE: BRELJI AND RACE CONSULTING CIVIL ENGINEERS, 2004

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SITE PLAN SHOWING SAMPLE LOCATIONS SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.002.01 DATE: FEBRUARY 2005 DRAWN BY: KN CHECKED BY:	FIGURE NO. 2

G:\Drafting\DRAFTING2_Dwg\6486\002\648620020I-2SITEPLAN-0205.dwg 2-25-05 02:49:47 PM

0502232

McCAMPBELL ANALYTICAL, INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☒ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: JANET KAN
Bill To: ENGEO INC.
Company: ENGEO INC.
E-Mail: DBUS @ENGEO INC
Tele: (925) 570 7840
Fax: (   )
Project #: 6486. 2.002.01
Project Name: SUTTER MEDICAL
Project Location: SANTA ROSA
Sampler Signature:

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	BTEX only (EPA 602/8020)	TPH as Diesel (8015)	Total Petroleum Oil & Grease (5520/1664 (E/F/BF)	Total Petroleum Hydrocarbons (418.1)	EPA 601/8010/8021 (Halocarbons)	EPA 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ONLY	EPA 8140 / 8141 (Np Pesticides)	EPA 8150 / 8151 (Acidic Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525 / 625 / 8270 (SVOCs)	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020)	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Other: PH	Other: Cd Cr Cu Pb Zn	Comments: Filter Samples for Metals analysis: Yes / No
1	SR.	2/15/05	1 PM				X																								X	X	
2	SR.	2/15/05	1 PM				X																								X	X	

Relinquished By:	Date:	Time:	Received By:
	2/15/05	2 PM	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° NO
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

COMMENTS:

PRESERVATION VOAS | O&G | METALS pH<2 | OTHER

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0502232 **ClientID: ENGE**

Report to:
Janet Kan
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634

TEL: (925) 838-1600
FAX: (925) 866-0199
ProjectNo: #6486.2.002.01; Sutter Medical
PO:

Bill to:
Accounts Payable
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634

Requested TAT: 5 days
Date Received: 02/15/2005
Date Printed: 02/15/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0502232-001	#1	Soil	2/15/05 1:00:00 PM	☐	A	A													
0502232-002	#2	Soil	2/15/05	☐	A	A													

Test Legend:

1	METALS_S	2	PH_S	3		4		5	
6		7		8		9		10	
11		12		13		14		15	

Prepared by: Maria Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated	Client Project ID: #6486.2.002.01; Sutter Medical	Date Sampled: 02/15/05
2010 Crow Canyon Place, Ste 250		Date Received: 02/15/05
San Ramon, CA 94583-4634	Client Contact: Janet Kan	Date Extracted: 02/15/05
	Client P.O.:	Date Analyzed: 02/16/05

Metals*

Extraction method: SW3050B Analytical methods: 6010C Work Order: 0502232

Lab ID	Client ID	Matrix	Extraction	Cadmium	Chromium	Copper	Lead	Zinc	DF	% SS
001A	#1	S	TTLC	ND	110	44	43	120	1	101
002A	#2	S	TTLC	ND	99	33	15	69	1	102

Reporting Limit for DF =1; ND means not detected at or above the reporting limit								
	W	TTLC	NA	NA	NA	NA	NA	NA
	S	TTLC	1.5	1.5	1.5	5.0	5.0	mg/Kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digiested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.2.002.01; Sutter Medical	Date Sampled: 02/15/05
		Date Received: 02/15/05
	Client Contact: Janet Kan	Date Extracted: 02/15/05
	Client P.O.:	Date Analyzed: 02/15/05

pH*

Analytical Method: SW9045C

Work Order: 0502232

Lab ID	Client ID	Matrix	pH
0502232-001A	#1	S	6.16 @ 22.8°C
0502232-002A	#2	S	6.44 @ 22.8°C

Method Accuracy and Reporting Units	W	NA
	S	±0.1, pH units @ °C

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

INVOICE for ANALYTICAL SERVICES

Project Name: #6486.2.002.01; Sutter Medical
PO Number: N/A
Date Sampled: 2/15/05
Date Received: 2/15/05

Invoice N°: 0502232

INV DATE: ***February 18, 2005***
Print DATE: *February 18, 2005*

Report To: Janet Kan
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634

Invoice To: Accounts Payable
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
ICP Metals (TTLC)	5 days	Soil	2	1	$65.00	$130.00
pH	5 days	Soil	2	1	$11.00	$22.00
					SubTotal:	$152.00

Invoice Total: $152.00

If paid by**03/24/05** Prompt Pay Invoice Total = $136.80

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 1.5% interest per month will be charged. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6468.2.002.01; Sutter MC--Santa Rosa	Date Sampled: 01/18/05
		Date Received: 01/19/05
	Client Contact: Keith Nowell	Date Reported: 01/26/05
	Client P.O.:	Date Completed: 01/26/05

WorkOrder: 0501238

January 26, 2005

RECEIVED
FEB 07 2005
ENGEO

Dear Keith:

Enclosed are:

1). the results of **10** analyzed samples from your **#6468.2.002.01; Sutter MC--Santa Rosa project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6468.2.002.01; Sutter MC--Santa Rosa	Date Sampled: 01/18/05-01/19/05 Date Received: 01/19/05
	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/22/05-01/24/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C — Analytical Method: SW8081B — Work Order: 0501238

Lab ID	0501238-001A	0501238-002A	0501238-003A	0501238-004A	Reporting Limit for DF =1	
Client ID	S-1-6A	S-7-12A	S-13-18A	S-19-24A		
Matrix	S	S	S	S		
DF	1	5	1	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND<0.0050	ND	ND	0.001	NA
a-BHC	ND	ND<0.0050	ND	ND	0.001	NA
b-BHC	ND	ND<0.0050	ND	ND	0.001	NA
d-BHC	ND	ND<0.0050	ND	ND	0.001	NA
g-BHC	ND	ND<0.0050	ND	ND	0.001	NA
Chlordane (Technical)	ND	ND<0.12	ND	ND	0.025	NA
a-Chlordane	ND	ND<0.0050	ND	ND	0.001	NA
g-Chlordane	ND	ND<0.0050	ND	ND	0.001	NA
p,p-DDD	ND	ND<0.0050	0.0043	0.0038	0.001	NA
p,p-DDE	0.0015	0.047	0.038	0.011	0.001	NA
p,p-DDT	ND	0.022	0.014	0.0015	0.001	NA
Dieldrin	ND	ND<0.0050	ND	ND	0.001	NA
Endosulfan I	ND	ND<0.0050	ND	ND	0.001	NA
Endosulfan II	ND	ND<0.0050	ND	ND	0.001	NA
Endosulfan sulfate	ND	ND<0.0050	ND	ND	0.001	NA
Endrin	ND	ND<0.0050	ND	ND	0.001	NA
Endrin aldehyde	ND	ND<0.0050	ND	ND	0.001	NA
Heptachlor epoxide	ND	ND<0.0050	ND	ND	0.001	NA
Heptachlor	ND	ND<0.0050	ND	ND	0.001	NA
Methoxychlor	ND	ND<0.0050	ND	ND	0.001	NA
Toxaphene	ND	ND<0.25	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	114	128	117	117		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis.

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6468.2.002.01; Sutter MC--Santa Rosa	Date Sampled: 01/18/05-01/19/05 Date Received: 01/19/05
	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/22/05-01/24/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081B Work Order: 0501238

Lab ID	0501238-005A	0501238-006A	0501238-007A	0501238-008A	Reporting Limit for DF =1	
Client ID	S-25A-29B	S-1-6B	S-7-12B	S-13-18B		
Matrix	S	S	S	S		
DF	2	1	1	1	S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.0020	ND	ND	ND	0.001	NA
a-BHC	ND<0.0020	ND	ND	ND	0.001	NA
b-BHC	ND<0.0020	ND	ND	ND	0.001	NA
d-BHC	ND<0.0020	ND	ND	ND	0.001	NA
g-BHC	ND<0.0020	ND	ND	ND	0.001	NA
Chlordane (Technical)	ND<0.050	ND	ND	ND	0.025	NA
a-Chlordane	ND<0.0020	ND	ND	ND	0.001	NA
g-Chlordane	ND<0.0020	ND	ND	ND	0.001	NA
p,p-DDD	ND<0.0020	ND	ND	ND	0.001	NA
p,p-DDE	0.0071	ND	ND	ND	0.001	NA
p,p-DDT	ND<0.0020	ND	ND	ND	0.001	NA
Dieldrin	ND<0.0020	ND	ND	ND	0.001	NA
Endosulfan I	ND<0.0020	ND	ND	ND	0.001	NA
Endosulfan II	ND<0.0020	ND	ND	ND	0.001	NA
Endosulfan sulfate	ND<0.0020	ND	ND	ND	0.001	NA
Endrin	ND<0.0020	ND	ND	ND	0.001	NA
Endrin aldehyde	ND<0.0020	ND	ND	ND	0.001	NA
Heptachlor epoxide	ND<0.0020	ND	ND	ND	0.001	NA
Heptachlor	ND<0.0020	ND	ND	ND	0.001	NA
Methoxychlor	ND<0.0020	ND	ND	ND	0.001	NA
Toxaphene	ND<0.10	ND	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	117	114	114	114		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis.

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		Date Received: 01/19/05
	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/22/05-01/24/05

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C   Analytical Method: SW8081B   Work Order: 0501238

Lab ID	0501238-009A	0501238-010A			Reporting Limit for DF =1	
Client ID	S-19-24B	S-30A-34B				
Matrix	S	S				
DF	1	5			S	W
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND<0.0050			0.001	NA
a-BHC	ND	ND<0.0050			0.001	NA
b-BHC	ND	ND<0.0050			0.001	NA
d-BHC	ND	ND<0.0050			0.001	NA
g-BHC	ND	ND<0.0050			0.001	NA
Chlordane (Technical)	ND	ND<0.12			0.025	NA
a-Chlordane	ND	ND<0.0050			0.001	NA
g-Chlordane	ND	ND<0.0050			0.001	NA
p,p-DDD	ND	ND<0.0050			0.001	NA
p,p-DDE	ND	ND<0.0050			0.001	NA
p,p-DDT	ND	ND<0.0050			0.001	NA
Dieldrin	ND	ND<0.0050			0.001	NA
Endosulfan I	ND	ND<0.0050			0.001	NA
Endosulfan II	ND	ND<0.0050			0.001	NA
Endosulfan sulfate	ND	ND<0.0050			0.001	NA
Endrin	ND	ND<0.0050			0.001	NA
Endrin aldehyde	ND	ND<0.0050			0.001	NA
Heptachlor epoxide	ND	ND<0.0050			0.001	NA
Heptachlor	ND	ND<0.0050			0.001	NA
Methoxychlor	ND	ND<0.0050			0.001	NA
Toxaphene	ND	ND<0.25			0.05	NA
Surrogate Recoveries (%)						
%SS:	114	112				
Comments		j				

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak.

(a) PCB aroclor 1016; (b) PCB aroclor 1221; (c) PCB aroclor 1232; (d) PCB aroclor 1242; (e) PCB aroclor 1248; (f) PCB aroclor 1254; (g) PCB aroclor 1260; (h) a lighter than water immiscible sheen/product is present; (i) liquid sample that contains >~1 vol. % sediment; (j) sample diluted due to high organic content; (k) p,p,- is the same as 4,4,-; (l) florisil (EPA 3620) cleanup; (m) silica-gel (EPA 3630) cleanup; (n) elemental sulfur (EPA 3660) cleanup; (o) sulfuric acid permanganate (EPA 3665) cleanup; (r) results are reported on a dry weight basis.

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		Date Received: 01/19/05
	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/21/05

Metals*

Analytical Method: 6010C

ICP Metals, Concentration*

Extraction Method: SW3050B

Work Order: 0501238

Lab ID	0501238-001A	0501238-002A	0501238-003A	0501238-004A	Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	S-1-6A	S-7-12A	S-13-18A	S-19-24A		
Matrix	S	S	S	S	S	W
Extraction Type	TTLC	TTLC	TTLC	TTLC	mg/Kg	mg/L
Dilution Factor	1	1	1	1	1	1
Antimony	ND	ND	ND	ND	5.0	NA
Arsenic	5.3	ND	ND	ND	5.0	NA
Barium	200	190	170	160	5.0	NA
Beryllium	ND	ND	ND	ND	1.5	NA
Cadmium	ND	ND	ND	ND	1.5	NA
Chromium	64	58	58	64	1.5	NA
Cobalt	19	16	15	16	1.5	NA
Copper	24	21	21	21	1.5	NA
Lead	27	23	26	25	1.5	NA
Molybdenum	ND	ND	ND	ND	5.0	NA
Nickel	73	67	60	64	1.5	NA
Selenium	ND	ND	ND	ND	1.5	NA
Silver	ND	ND	ND	ND	5.0	NA
Thallium	ND	ND	ND	ND	1.5	NA
Vanadium	42	38	38	42	5.0	NA
Zinc	59	50	48	46	5.0	NA
%SS:	109	113	109	110		
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digiested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narative.

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	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/21/05

Metals*

Lab ID	0501238-005A	0501238-006A	0501238-007A	0501238-008A	Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	S-25A-29B	S-1-6B	S-7-12B	S-13-18B		
Matrix	S	S	S	S	S	W
Extraction Type	TTLC	TTLC	TTLC	TTLC	mg/Kg	mg/L

ICP Metals, Concentration*

Analytical Method: 6010C Extraction Method: SW3050B Work Order: 0501238

Dilution Factor	1	1	1	1	1	1
Antimony	ND	ND	ND	ND	5.0	NA
Arsenic	ND	ND	ND	ND	5.0	NA
Barium	200	210	220	240	1.5	NA
Beryllium	ND	ND	ND	ND	1.5	NA
Cadmium	ND	ND	ND	ND	1.5	NA
Chromium	83	72	100	78	1.5	NA
Cobalt	22	18	20	26	1.5	NA
Copper	27	23	26	25	1.5	NA
Lead	10	8.7	7.3	9.3	5.0	NA
Molybdenum	ND	ND	ND	ND	1.5	NA
Nickel	100	87	120	100	1.5	NA
Selenium	ND	ND	ND	ND	5.0	NA
Silver	ND	ND	ND	ND	1.5	NA
Thallium	ND	ND	ND	ND	5.0	NA
Vanadium	48	43	44	47	5.0	NA
Zinc	58	50	49	55	5.0	NA
%SS:	109	103	110	112		
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digiested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narative.

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	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/21/05

Metals*

ICP Metals, Concentration*

Analytical Method: 6010C — Extraction Method: SW3050B — Work Order: 0501238

Lab ID	0501238-009A	0501238-010A			Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	S-19-24B	S-30A-34B				
Matrix	S	S			S	W
Extraction Type	TTLC	TTLC			mg/Kg	mg/L
Dilution Factor	1	1			1	1
Antimony	ND	ND			5.0	NA
Arsenic	ND	ND			5.0	NA
Barium	240	160			1.5	NA
Beryllium	ND	ND			1.5	NA
Cadmium	ND	ND			1.5	NA
Chromium	80	94			1.5	NA
Cobalt	25	17			1.5	NA
Copper	25	27			1.5	NA
Lead	7.2	12			5.0	NA
Molybdenum	ND	ND			1.5	NA
Nickel	120	120			1.5	NA
Selenium	ND	ND			5.0	NA
Silver	ND	ND			1.5	NA
Thallium	ND	ND			5.0	NA
Vanadium	45	44			5.0	NA
Zinc	52	56			5.0	NA
%SS:	112	108				
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digiested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narative.

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	Client Contact: Keith Nowell	Date Extracted: 01/19/05
	Client P.O.:	Date Analyzed: 01/24/05

Mercury by ICP-MS*

Extraction method: SW3050B Analytical methods: 6020A Work Order: 0501238

Lab ID	Client ID	Matrix	Extraction	Mercury	DF	% SS
0501238-001A	S-1-6A	S	TTLC	0.080	1	108
0501238-002A	S-7-12A	S	TTLC	0.080	1	106
0501238-003A	S-13-18A	S	TTLC	0.070	1	106
0501238-004A	S-19-24A	S	TTLC	0.070	1	106
0501238-005A	S-25A-29B	S	TTLC	0.10	1	108
0501238-006A	S-1-6B	S	TTLC	0.10	1	105
0501238-007A	S-7-12B	S	TTLC	0.10	1	105
0501238-008A	S-13-18B	S	TTLC	0.12	1	110
0501238-009A	S-19-24B	S	TTLC	0.11	1	113
0501238-010A	S-30A-34B	S	TTLC	0.29	1	113

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TTLC	NA	mg/L
	S	TTLC	0.05	mg/Kg

*water/product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate recovery outside of acceptance range due to matrix interference; & means low or no surrogate due to matrix interference; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument; ** special large volume digestion

Analytical Methods: EPA 6010C/200.7 for all elements except: 200.9 (water/liquid- Sb, As, Pb, Se, Tl); 245.1 (Hg); 7010 (sludge/soil/solid/oil/product/wipe/filter - As, Se, Tl); 7471B (Hg).

i) liquid sample that contains greater than ~1 vol. % sediment; this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations; j) reporting limit raised due to insufficient sample amount; k) results are reported by dry weight; y) estimated values due to low surrogate recovery; z) reporting limit raised due to matrix interference.

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0501238

EPA Method: SW8081B Extraction: SW3550C BatchID: 14689 Spiked Sample ID: 0501198-002A

Analyte	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND	0.010	130	129	0.820	126	128	1.24	70 - 130	70 - 130
g-BHC	ND	0.010	76.8	76.3	0.620	90.4	92.4	2.19	70 - 130	70 - 130
p,p-DDT	0.002154	0.025	100	99.3	0.718	87.3	91.3	4.49	70 - 130	70 - 130
Dieldrin	ND	0.025	97.8	97.4	0.345	96.9	96.8	0.0946	70 - 130	70 - 130
Endrin	ND	0.025	101	101	0	101	100	0.449	70 - 130	70 - 130
Heptachlor	ND	0.010	106	106	0	100	100	0	70 - 130	70 - 130
%SS:	115	0.050	109	109	0	111	110	0.782	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR SW8081B

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0501238

EPA Method: SW8081B Extraction: SW3550C BatchID: 14731 Spiked Sample ID: 0501238-006A

Analyte	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Aldrin	ND	0.010	122	123	0.524	120	119	0.554	70 - 130	70 - 130
g-BHC	ND	0.010	82.4	84.1	1.97	80.7	80.3	0.470	70 - 130	70 - 130
p,p-DDT	ND	0.025	77	79.2	2.72	80.8	80.4	0.580	70 - 130	70 - 130
Dieldrin	ND	0.025	89.1	90.7	1.80	88	86.5	1.72	70 - 130	70 - 130
Endrin	ND	0.025	89.4	90.9	1.69	89.1	87.8	1.51	70 - 130	70 - 130
Heptachlor	ND	0.010	94.9	96.5	1.65	92.3	90.8	1.57	70 - 130	70 - 130
%SS:	114	0.050	111	112	0.177	114	113	0.564	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR 6010C

W.O. Sample Matrix: Soil | QC Matrix: Soil | WorkOrder: 0501238

EPA Method: 6010C | Extraction: SW3050B | BatchID: 14722 | Spiked Sample ID: 0501225-012A

Analyte	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	ND	50	102	101	0.394	100	97.4	3.03	70 - 130	80 - 120
Arsenic	7.603	50	106	103	2.60	95.8	98.8	3.03	70 - 130	80 - 120
Barium	201.8	50	NR	NR	NR	106	105	0.809	70 - 130	80 - 120
Beryllium	ND	50	110	107	3.36	108	104	3.54	70 - 130	80 - 120
Cadmium	ND	50	102	102	0	104	104	0	70 - 130	80 - 120
Chromium	61.8	50	NR	NR	NR	108	107	1.11	70 - 130	80 - 120
Cobalt	13.99	50	101	101	0	103	102	1.17	70 - 130	80 - 120
Copper	35.98	50	110	108	0.802	111	112	1.21	70 - 130	80 - 120
Lead	19.51	50	112	101	7.73	101	95.6	5.05	70 - 130	80 - 120
Molybdenum	ND	50	106	106	0	102	105	2.37	70 - 130	80 - 120
Nickel	91.5	50	NR	NR	NR	102	104	1.60	70 - 130	80 - 120
Selenium	ND	50	103	103	0	99.7	102	1.89	70 - 130	80 - 120
Silver	ND	5	89.5	89	0.504	92.1	85.7	7.20	70 - 130	80 - 120
Thallium	ND	50	105	105	0	96.8	99	2.25	70 - 130	80 - 120
Vanadium	29.98	50	107	106	0.240	99	97	2.14	70 - 130	80 - 120
Zinc	71.55	50	NR	NR	NR	107	99.8	7.01	70 - 130	80 - 120
%SS:	103	250	88	86	2.28	99	95	3.60	70 - 130	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* Acceptance Criteria for MS / MSD is between 70% and 130%. MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0501238

EPA Method: 6020A Extraction: SW3050B BatchID: 14764 Spiked Sample ID: 0501285-025A

Analyte	Sample	Spiked	MS*	MSD*	MS-MSD*	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Mercury	0.1	0.25	112	112	0	96	100	4.08	75 - 125	85 - 115
%SS:	104	250	110	112	1.55	98	99	1.30	80 - 120	80 - 120

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

* Acceptance Criteria for MS / MSD is between 70% and 130%. MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0501238 ClientID: ENGM

Report to:
Keith Nowell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

TEL: (707) 562-0030
FAX: (707) 562-0032
ProjectNo: #6468.2.002.01; Sutter MC--Santa Rosa
PO:

Bill to:
Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Requested TAT: 5 days
Date Received: 01/19/2005
Date Printed: 01/24/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0501238-001	S-1-6A	Soil	1/18/05 10:19:00	☐	A	A	A												
0501238-002	S-7-12A	Soil	1/19/05 10:28:00	☐	A	A	A												
0501238-003	S-13-18A	Soil	1/19/05 10:45:00	☐	A	A	A												
0501238-004	S-19-24A	Soil	1/19/05 12:15:00	☐	A	A	A												
0501238-005	S-25A-29B	Soil	1/19/05 9:46:00 AM	☐	A	A	A												
0501238-006	S-1-6B	Soil	1/19/05 11:24:00	☐	A	A	A												
0501238-007	S-7-12B	Soil	1/19/05 11:06:00	☐	A	A	A												
0501238-008	S-13-18B	Soil	1/19/05 10:51:00	☐	A	A	A												
0501238-009	S-19-24B	Soil	1/19/05 10:39:00	☐	A	A	A												
0501238-010	S-30A-34B	Soil	1/19/05 9:05:00 AM	☐	A	A	A												

Test Legend:

1	8081_S	2	CAM17_S	3	PRCOMPOSITING	4		5	
6		7		8		9		10	
11		12		13		14		15	

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

EN GEO INCORPORATED

690 Walnut Avenue, Suite 220
Mare Island, Vallejo, CA 94592
Phone: (707) 562-0030
Fax (707) 562-0032

050123B

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 6468.2.002.01

PROJECT NAME: Sutter MC-- Santa Rosa

SAMPLED BY: (SIGNATURE) Keith Nowell *Keith Nowell*

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESER-VATIVE	TPH-- GASOLINE (EPA 8015/5030)	TPH-- DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	SEMI VOLATILE ORGANICS (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	O-C PESTICIDES (EPA 505, 8081)	TITLE 26 METALS (17)	MtBE (EPA 602, 8020)	REMARKS/ REQUIRED DETECTION LIMITS
S-1A	1/18/2004	10:53	Soil	1	2"x 6"	None								X	X		
S-2A	1/18/2004	10:49	Soil	1	2"x 6"	None								X	X		RUN AS ONE SIX-
S-3A	1/18/2004	10:19	Soil	1	2"x 6"	None								X	X		POINT COMPOSITE
S-4A	1/18/2004	10:24	Soil	1	2"x 6"	None								X	X		
S-5A	1/18/2004	13:15	Soil	1	2"x 6"	None								X	X		
S-6A	1/18/2004	13:11	Soil	1	2"x 6"	None								X	X		

S-7A	1/18/2004	11:41	Soil	1	2"x 6"	None								X	X		
S-8A	1/18/2004	11:37	Soil	1	2"x 6"	None								X	X		RUN AS ONE SIX-
S-9A	1/18/2004	10:28	Soil	1	2"x 6"	None								X	X		POINT COMPOSITE
S-10A	1/18/2004	10:34	Soil	1	2"x 6"	None								X	X		
S-11A	1/18/2004	11:31	Soil	1	2"x 6"	None								X	X		
S-12A	1/18/2004	10:40	Soil	1	2"x 6"	None								X	X		

S-13A	1/18/2004	13:07	Soil	1	2"x 6"	None								X	X		
S-14A	1/18/2004	12:49	Soil	1	2"x 6"	None								X	X		
S-15A	1/18/2004	11:00	Soil	1	2"x 6"	None								X	X		RUN AS ONE SIX-
S-16A	1/18/2004	12:41	Soil	1	2"x 6"	None								X	X		POINT COMPOSITE
S-17A	1/18/2004	10:54	Soil	1	2"x 6"	None								X	X		
S-18A	1/18/2004	10:45	Soil	1	2"x 6"	None								X	X		

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
Keith Nowell	1/19/05 1710	*[signature]*			
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
RELINQUISHED BY:	DATE / TIME	RECEIVED FOR LABORATORY BY:	REMARKS: 5 DAY TAT		

ICE/T° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB
PRESERVATION: VOAS | O&G | METALS | OTHER

ENGEO
INCORPORATED

690 Walnut Avenue, Suite 220
Mare Island, Vallejo, CA 94592
Phone: (707) 562-0030
Fax (707) 562-0032

0501238

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 6468.2.002.01

PROJECT NAME: Sutter MC-- Santa Rosa

SAMPLED BY: (SIGNATURE) Keith Nowell (Keith Nowell)

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESER-VATIVE	TPH– GASOLINE (EPA 8015/5030)	TPH– DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	SEMI VOLATILE ORGANICS (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	O-C PESTICIDES (EPA 505, 8081)	TITLE 26 METALS (17)	MtBE (EPA 602, 8020)	REMARKS/ REQUIRED DETECTION LIMITS
S-19A	1/18/2004	12:53	Soil	1	2"x 6"	None								X	X		
S-20A	1/18/2004	13:00	Soil	1	2"x 6"	None								X	X		
S-21A	1/18/2004	12:35	Soil	1	2"x 6"	None								X	X		RUN AS ONE SIX-
S-22A	1/18/2004	12:15	Soil	1	2"x 6"	None								X	X		POINT COMPOSITE
S-23A	1/18/2004	12:29	Soil	1	2"x 6"	None								X	X		
S-24A	1/18/2004	12:21	Soil	1	2"x 6"	None								X	X		

S-25A	1/18/2004	14:50	Soil	1	2"x 6"	None								X	X		
S-26A	1/18/2004	14:40	Soil	1	2"x 6"	None								X	X		
S-27A	1/18/2004	14:34	Soil	1	2"x 6"	None								X	X		
S-28A	1/18/2004	14:21	Soil	1	2"x 6"	None								X	X		RUN AS ONE TEN-
S-29A	1/18/2004	14:17	Soil	1	2"x 6"	None								X	X		POINT COMPOSITE
S-25B	1/19/2004	10:01	Soil	1	2"x 6"	None								X	X		
S-26B	1/19/2004	10:17	Soil	1	2"x 6"	None								X	X		
S-27B	1/19/2004	10:12	Soil	1	2"x 6"	None								X	X		
S-28B	1/19/2004	9:51	Soil	1	2"x 6"	None								X	X		
S-29B	1/19/2004	9:46	Soil	1	2"x 6"	None								X	X		

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
Keith Nowell	1/19/05 1710	Mel Vall			
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
RELINQUISHED BY:	DATE / TIME	RECEIVED FOR LABORATORY BY:	REMARKS: 5 DAY TAT		

0501238

EN GEO INCORPORATED

690 Walnut Avenue, Suite 220
Mare Island, Vallejo, CA 94592
Phone: (707) 562-0030
Fax (707) 562-0032

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 6468.2.002.01

PROJECT NAME: Sutter MC-- Santa Rosa

SAMPLED BY: (SIGNATURE) Keith Nowell (Keith Nowell)

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESER-VATIVE	TPH-- GASOLINE (EPA 8015/5030)	TPH-- DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	SEMI VOLATILE ORGANICS (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	O-C PESTICIDES (EPA 505, 8081)		TITLE 26 METALS (17)	MtBE (EPA 602, 8020)						REMARKS/ REQUIRED DETECTION LIMITS
S-1B	1/19/2004	11:24	Soil	1	2"x 6"	None								X		X							
S-2B	1/19/2004	11:48	Soil	1	2"x 6"	None								X		X							RUN AS ONE SIX-
S-3B	1/19/2004	11:43	Soil	1	2"x 6"	None								X		X							POINT COMPOSITE
S-4B	1/19/2004	11:45	Soil	1	2"x 6"	None								X		X							
S-5B	1/19/2004	12:32	Soil	1	2"x 6"	None								X		X							
S-6B	1/19/2004	12:27	Soil	1	2"x 6"	None								X		X							

S-7B	1/19/2004	11:17	Soil	1	2"x 6"	None								X		X							
S-8B	1/19/2004	11:13	Soil	1	2"x 6"	None								X		X							RUN AS ONE SIX-
S-9B	1/19/2004	11:55	Soil	1	2"x 6"	None								X		X							POINT COMPOSITE
S-10B	1/19/2004	11:10	Soil	1	2"x 6"	None								X		X							
S-11B	1/19/2004	11:59	Soil	1	2"x 6"	None								X		X							
S-12B	1/19/2004	11:06	Soil	1	2"x 6"	None								X		X							

S-13B	1/19/2004	12:24	Soil	1	2"x 6"	None								X		X							
S-14B	1/19/2004	12:08	Soil	1	2"x 6"	None								X		X							RUN AS ONE SIX-
S-15B	1/19/2004	12:03	Soil	1	2"x 6"	None								X		X							POINT COMPOSITE
S-16B	1/19/2004	10:51	Soil	1	2"x 6"	None								X		X							
S-17B	1/19/2004	10:56	Soil	1	2"x 6"	None								X		X							
S-18B	1/19/2004	11:02	Soil	1	2"x 6"	None								X		X							

RELINQUISHED BY:	DATE / TIME		RECEIVED BY:	RELINQUISHED BY:	DATE / TIME		RECEIVED BY:
Keith Nowell	1/19/05	1710	[signature]				
RELINQUISHED BY:	DATE / TIME		RECEIVED BY:	RELINQUISHED BY:	DATE / TIME		RECEIVED BY:
RELINQUISHED BY:	DATE / TIME		RECEIVED FOR LABORATORY BY:	REMARKS: 5 DAY TAT			

ENGEO
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Phone: (707) 562-0030
Fax (707) 562-0032

0501238

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 6468.2.002.01

PROJECT NAME: Sutter MC-- Santa Rosa

SAMPLED BY: (SIGNATURE) Keith Nowell (Keith Nowell)

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESER-VATIVE	TPH-- GASOLINE (EPA 8015/5030)	TPH-- DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	SEMI VOLATILE ORGANICS (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	O-C PESTICIDES (EPA 505, 8081)		TITLE 26 METALS (17)	MtBE (EPA 602, 8020)	REMARKS/ REQUIRED DETECTION LIMITS
S-19B	1/19/2004	12:20	Soil	1	2"x 6"	None								X		X		
S-20B	1/19/2004	12:18	Soil	1	2"x 6"	None								X		X		RUN AS ONE SIX-
S-21B	1/19/2004	10:48	Soil	1	2"x 6"	None								X		X		POINT COMPOSITE
S-22B	1/19/2004	12:13	Soil	1	2"x 6"	None								X		X		
S-23B	1/19/2004	10:45	Soil	1	2"x 6"	None								X		X		
S-24B	1/19/2004	10:39	Soil	1	2"x 6"	None								X		X		

S-30A	1/18/2004	13:48	Soil	1	2"x 6"	None								X		X		
S-31A	1/18/2004	14:04	Soil	1	2"x 6"	None								X		X		
S-32A	1/18/2004	13:52	Soil	1	2"x 6"	None								X		X		RUN AS ONE TEN-
S-33A	1/18/2004	13:56	Soil	1	2"x 6"	None								X		X		POINT COMPOSITE
S-34A	1/18/2004	14:00	Soil	1	2"x 6"	None								X		X		
S-30B	1/19/2004	9:05	Soil	1	2"x 6"	None								X		X		
S-31B	1/19/2004	9:35	Soil	1	2"x 6"	None								X		X		
S-32B	1/19/2004	9:25	Soil	1	2"x 6"	None								X		X		
S-33B	1/19/2004	9:13	Soil	1	2"x 6"	None								X		X		
S-34B	1/19/2004	9:31	Soil	1	2"x 6"	None								X		X		

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
Keith Nowell	1/19/05 1710	[illegible]			
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
RELINQUISHED BY:	DATE / TIME	RECEIVED FOR LABORATORY BY:	REMARKS: 5 DAY TAT		

Appendix G3

Phase One Environmental Site Assessment, Sutter Medical Center

Phase One Environmental Site Assessment Report

WFC / SMCSR PROPERTIES
SANTA ROSA, CALIFORNIA

Submitted to:

Nadin Sponamore
Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, California 95405

April 29, 2009
Project No. 6486.201.102

- Expect Excellence -

ENGEO INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
6486.201.102

April 29, 2009

Ms. Nadin Sponamore
Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, CA 95405

Subject: WFC / SMCSR Properties
Sonoma County, California

PHASE ONE ENVIRONMENTAL SITE ASSESSMENT

Dear Ms. Sponamore:

ENGEO Incorporated is pleased to present our phase one environmental site assessment of the subject property, located in Sonoma County, California. The attached report includes a description of the site assessment activities, along with ENGEO's findings, opinions, and conclusions regarding the Property.

ENGEO has the specific qualifications based on education, training, and experience to assess the nature, history, and setting of the Property, and has developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312. We declare that, to the best of our professional knowledge and belief, the responsible charge for this study meets the definition of Environmental Professional as defined in Section 312.10 of 40 CFR 312 and ASTM 1527-05.

We are pleased to be of service to you on this project. If you have any questions concerning the contents of our report, please contact us.

Sincerely,

ENGEO Incorporated

Shawn Munger, CHG, REAII
sm/jf:esa

Brian Flaherty, CEG

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EXECUTIVE SUMMARY

ENGEO Incorporated (ENGEO) conducted a phase one environmental site assessment for the subject property located at the southeast intersection of Highway 101 and Mark West Springs Road in Sonoma County, California (Property) (Figure 1). The Property is approximately 53 acres in area and is identified by Assessor's Parcel Numbers (APN) 058-040-058, 058-040-059, 058-040-060, and 058-040-061 (Figure 2). Two parcels were reported by Assessor's Office personnel to have physical addresses: 50 Mark West Springs Road (APN 058-040-060) and 100 Mark West Springs Road (APN 058-040-058).

The Property consists of a commercial building, a barn, an out-structure and a shed. A private wastewater treatment plant (WWTP) services the commercial building. The commercial building, the Wells Fargo Center for the Arts (WFC), is a modular 85,000-square-foot structure operated by the Luther Burbank Memorial Foundation (LBMF). The WFC is a cultural and performing arts event center. A school, the Santa Rosa Christian School, occupies a portion of the WFC. The barn is used by the WFC for material and chemical storage and as a workshop. The Property includes metal storage container units used for special events material storage, athletic fields, graded open space used for special events, and an undeveloped field.

Review of historical records indicate that the WFC and associated WWTP facilities were developed in the late 1970s and early 1980s. Previous land use was as an orchard with a ranch site consisting of a residence and several out-buildings. The barn is the only remaining structure from the former ranch compound. Portions of the Property have been occupied by an orchard since prior to 1953 until circa 1980.

Two reports (ENGEO 2004 and ENGEO 2005) which were prepared for the Property were reviewed for this phase one assessment. ENGEO Incorporated (ENGEO) prepared a Phase One Environmental Site Assessment dated December 28, 2004, for the Sutter Medical Center of Santa Rosa/Luther Burbank Center for the Arts. Based on the findings of the 2004 site assessment, ENGEO identified one Recognized Environmental Condition and four items of concern within the Property.

In order to address the REC identified in the 2004 phase one assessment, ENGEO performed a limited phase two environmental study of the site (2005 - Reference 2). The phase two study was comprised of an agrichemical study and an impact evaluation associated with the improper storage of lead acid battery casings.

The result of the soil sample analysis for organochlorine pesticides and metals identified the presence of DDT, DDE, and DDD and metals including barium, chromium, cobalt, copper, lead, nickel, vanadium, zinc, and mercury.

A risk analysis was evaluated for each soil composite sample to determine the potential carcinogenic and hazard risk of exposure to the soil. The evaluation was performed in accordance with the procedures presented in the California Department of Toxic Substances Control (DTSC) document entitled, "*Preliminary Endangerment Assessment Guidance Manual*" dated January 1994. The 2005 ENGEO Phase Two report concluded the low levels of pesticides could be attributed to the orchard activity and that a limited quantity of battery acid may have been released to soil; however, the metal concentrations are relatively low and are below cancer and hazard thresholds.

ENGEO recently performed a supplemental agrichemical assessment concurrent with this phase one assessment (ENGEO 2009A). The study was performed in accordance with the current DTSC per the *Interim Guidance for Sampling Agricultural Properties (Third Revision); August 7, 2008*. A total of 32 soil samples were recovered from the 22-acre study area for laboratory analysis. The 32 soil samples were submitted as eight 4-point composite samples for OCPs. One selected discrete sample from each of the eight composites was analyzed for arsenic.

Sixteen of the soil samples were recovered from the open field located in the western portion of the Property (Area 1). The samples were collected from the interval of 0 to 6 inches below the ground surface. Sixteen of the soil samples were recovered from the open fields located in the eastern portion of the Property (Area 2). The sample locations were excavated with the use of a backhoe. A determination of the thickness of fill was made in the field with the samples collected from the interval of 0 to 6 inches below the base of the fill. Three OCPs, DDT, DDE, and DDD, were reported at the Property at levels above the laboratory reporting limit. The reported levels of DDT, DDE and DDD in the soil samples recovered at the Property are well below the California Human Health Screening Levels (CHHSLs) established by Cal/EPA.

Arsenic concentrations for the composite samples ranged from 4.4 mg/kg to 12 mg/kg with a mean of 6.3 mg/kg. Natural background concentrations of arsenic in California are often above the health-based, direct-exposure goals in soil of 0.07 mg/kg for residential land use. The reported arsenic levels are within the anticipated background concentrations and would not be from an anthropomorphic source.

This phase one assessment included a review of local, state, tribal, and federal environmental record sources, standard historical sources, aerial photographs, fire insurance maps and physical setting sources. A reconnaissance of the Property was conducted to review site use and current conditions to check for the storage, use, production or disposal of hazardous or potentially hazardous materials. Interviews were also conducted with persons knowledgeable about current and past site use of the Property.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the use of the Property. A review of regulatory databases maintained by county, state, tribal, and federal agencies found no documentation of hazardous materials violations or discharge on the Property and did not identify contaminated facilities within the appropriate American Society for Testing and Materials (ASTM) search distances that would reasonably be expected to impact the Property.

Based on the findings of this assessment, no Recognized Environmental Conditions (RECs) and no historical RECs were identified for the Property.

Based on the review of regulatory databases and site reconnaissance, we present information on features of potential environmental concern that were either contained in the databases or observed on the Property. These features were not considered to be RECs. We briefly discuss each feature below:

- The operation of the on-site wastewater treatment facility has included the use of chlorine gas to treat effluent water. This may have resulted in the production of trihalomethane (THM) compounds such as chloroform in the soil and groundwater beneath the WWTP ponds.

- Property structures were constructed at a time when asbestos-containing building materials (ACBM) and lead-based paints may have been used in building materials.

- Batteries and an assortment of containers were viewed in the vicinity of the barn. Improper material storage may lead to release of contents by spillage or structural failure of the container.

- A septic system was reported to be located in the vicinity of the barn.

ENGEO has performed a phase one environmental site assessment of the Property in general conformance with the scope and limitations of ASTM E 1527-05 "Standard Practice for Environmental Site Assessments" and USEPA "Standards and Practices for All Appropriate Inquires", 40 CFR Part 312. Based on the findings of this assessment, ENGEO provides the following recommendations:

- The operation of the on-site wastewater treatment facility has included the use of chlorine gas to treat effluent water. ENGEO understands a Closure Plan for the plant decommissioning and removal is under development. Environmental characterization, including the testing for trihalomethane compounds, should be conducted in accordance with Regional Water Quality Control Board requirements. We understand this work is currently in progress.

- Property structures should be evaluated for the presence of asbestos-containing building materials (ACBM) and lead-based paints prior to their renovation of demolition. The evaluation should be conducted by a Cal-OSHA Certified ACBM and lead-based paint contractor.

- We recommend materials no longer in use be properly disposed. Disposal of batteries in the barn area should be performed in accordance with regulatory requirements.

- Empty containers for paint and chlorine should be property disposed.

- Any septic systems and related leach fields located within the Property should be removed in accordance with permitting requirements of Sonoma County, once these are no longer in use, and backfill requirements conform to recommendations of the Geotechnical Engineer.

- Areas of the Property were not viewed due to the presence of structures or dense vegetation. These areas should be viewed by an environmental professional should the structures or vegetation be removed.

1.0 INTRODUCTION

ENGEO Incorporated (ENGEO) conducted a phase one environmental site assessment for the Property located at the southeast intersection of US Highway 101 and Mark West Springs Road in Sonoma County, California (Figure 1). The Property is approximately 53 acres in area and is identified by Assessor's Parcel Numbers (APN) 058-040-058, 058-040-059, 058-040-060, and 058-040-061 (Figure 2). The four parcels include the following street addresses: 50 Mark West Springs Road and 100 Mark West Springs Road.

The Property consists of a commercial building, a barn, an out-structure and shed, and a private wastewater treatment plant (WWTP). The commercial building, the Wells Fargo Center for the Arts (WFC), is an 85,000-square-foot structure operated by the Luther Burbank Memorial Foundation (LBMF). The WFC is a cultural and performing arts event center. A school, the Santa Rosa Christian School, occupies a portion of the WFC building. The barn is used by the WFC as a workshop and for material and chemical storage. The Property includes metal storage container units used for special events material storage, athletic fields, graded open space used for special events, and an undeveloped field.

1.1 PURPOSE OF PHASE ONE ENVIRONMENTAL SITE ASSESSMENT

This assessment was performed at the request of Sponamore Associates for the purpose of environmental due diligence. The objective of this phase one environmental site assessment is to identify recognized environmental conditions associated with the Property. As defined in the ASTM Standard Practice E 1527-05, a REC is "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property."

1.2 DETAILED SCOPE OF SERVICES

The scope of services performed included the following:

- A review of publicly available and practically reviewable standard local, state, tribal, and federal environmental record sources.
- A review of publicly available and practically reviewable standard historical sources, aerial photographs, fire insurance maps and physical setting sources.
- A reconnaissance of the Property to review site use and current conditions. The reconnaissance was conducted to check for the storage, use, production or disposal of hazardous or potentially hazardous materials.
- Interviews with owners/occupants and public sector officials.

- Preparation of this report with our findings, opinions, and conclusions.

1.3 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

The professional staff at ENGEO strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. The recommendations and conclusions presented in this report were based on the findings of our study, which were developed solely from the contracted services. The findings of the report are based in part on contracted database research, out-of-house reports and personal communications. The opinions formed by ENGEO are based on the assumed accuracy of the relied upon data in conjunction with our relevant professional experience related to such data interpretation. ENGEO assumes no liability for the validity of the materials relied upon in the preparation of this report.

This document must not be subject to unauthorized reuse; that is, reuse without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. The findings from a phase one environmental site assessment are valid for one year after completion of the report. Updates of portions of the assessment may be necessary after a period of 180 days after completion.

This phase one environmental site assessment is not intended to represent a complete soil or groundwater characterization, nor define the depth or extent of soil or groundwater contamination. It is intended to provide an evaluation of potential environmental concerns associated with the use of the Property. A more extensive assessment that would include a subsurface exploration with laboratory testing of soil and groundwater samples could provide more definitive information concerning site-specific conditions. If additional assessment activities are considered for the Property and if other entities are retained to provide such services, ENGEO cannot be held responsible for any and all claims arising from or resulting from the performance of such services by other persons or entities. ENGEO can also not be held responsible from any and all claims arising or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

1.4 SPECIAL TERMS AND CONDITIONS

Laboratory testing of soil or groundwater samples was not within the scope of the contracted services. The assessment did not include an asbestos survey, an evaluation of lead-based paint, an inspection of light ballasts for polychlorinated biphenyls (PCBs), a radon evaluation, or a mold survey.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's assessment. Visual observations referenced in this report are intended only to represent conditions at the time of the reconnaissance. ENGEO would not be aware of site contamination, such as dumping and/or accidental spillage that occurred subsequent to the reconnaissance conducted by ENGEO personnel.

2.0 PROPERTY INFORMATION

2.1 SITE LOCATION

The Property is located at 50 Mark West Springs Road and 100 Mark West Springs Road, in unincorporated Sonoma County, California (Figure 1). The approximately 53-acre Property is identified as APN 058-040-058, 058-040-059, 058-040-060, and 058-040-061 (Figure 2).

2.2 SITE AND VICINITY CHARACTERISTICS

According to published topographic maps, the Property is relatively level at an elevation of approximately 155 feet above mean sea level (msl) (Figure 3). Review of the Regional Geologic Map of the Santa Rosa Quadrangle, State of California, Department of Conservation, Division of Mines and Geology 1982, compiled by D.L. Wagner and E.J. Bortugno found that the Property is underlain by un-named Quaternary (Holocene) alluvium. No earthquake faults are mapped crossing the Property; however, an Alquist Priolo special studies zone for the active Rodgers Creek fault is located approximately 3,300 feet northeast of the Property.

Geocheck – Physical Setting Source Summary of the Environmental Resources Data report (Appendix A) indicated five Federal United States Geological Survey (USGS) wells are located within one mile of the Property. Well Number USGS3236471 is mapped within the Property and one groundwater level measurement is reported for this well. Groundwater in this well was measured at 15 feet below the ground surface (bgs). The well is also identified as Well 8409 in the State well database.

The Physical Setting Source Summary also provided hydrogeologic information for use as an indicator of groundwater flow direction in the immediate area. The Summary indentified four wells approximately ¼ mile north-to-northeast of the Property. Information gathered from this site indicates the groundwater flow direction ranged to the north-northeast and the depth to groundwater is approximately 9 feet.

Groundwater flow measurements at nearby existing and former service station sites found groundwater generally flows to the north and northwest in the vicinity of the Property.

The site-specific depth to groundwater and direction of groundwater flow was not determined as part of this assessment. Groundwater measurements performed in conjunction with a concurrent geotechnical investigation (ENGEO 2009B) indicated groundwater was between 10 feet and 15 feet bgs. Fluctuations in groundwater levels may occur seasonally and over a period of years due to variations in precipitation, temperature, irrigation and other factors.

2.3 CURRENT USE OF PROPERTY/DESCRIPTION OF SITE IMPROVEMENTS

Site improvements include the existing 85,000-square-foot Wells Fargo Center (WFC), a barn, an out-building, and a storage shed. The WFC occupies the center of the Property and is utilized as a cultural and performing arts event center. The WFC is a modular structure having several pods or wing-buildings that are linked by interior corridors. A part of the WFC Property is leased to the Santa Rosa Christian School. The WFC operates a central cooling system. The machinery for the cooling system is located in a separate pod, referred herein as the physical plant building. The room containing the natural-gas-fired boiler is located in a separate room of the physical plant. An exterior pressurized water tank is located adjacent to the physical plant. The WFC includes asphalt-paved parking areas, an athletic field, and a wastewater treatment facility.

The WWTP is operated by the WFC for the treatment of domestic effluent. The WWTP consists of a closed-sump located within a separate building, and two open ponds - one for aeration and one for percolation. A shed located along the western edge of the northern pond is used for chemical storage. A barn is located in the north-central area of the Property, near Mark West Springs Road. The barn and vicinity is utilized in part by the WFC as a workshop and storage area. A small out-building is located east of the WFC along the eastern property boundary. Graded dirt lots south and east of the WFC building are used for special events and additional parking. The WFC is serviced by municipal water (Cal-American). Power to the site is provided by PG&E. Except for the overhead electric lines servicing the barn, natural gas and electricity is conveyed through underground utilities.

2.4 CURRENT USE OF ADJOINING PROPERTIES

Adjoining properties to the east consist of a residential subdivision and a Sonoma County Park site. Adjoining properties to the north consist of residential subdivisions and commercial properties. Adjoining properties to the south and west consist of rural residential and agricultural properties. U. S. Highway 101 and State of California Right-of-Way are located along the west boundary of the Property. Mark West Springs Road forms the northern Property boundary.

3.0 RECORDS REVIEW

3.1 PREVIOUS ENVIRONMENTAL REPORTS

Two reports (Referenced) prepared for the Property were reviewed for this phase one assessment. ENGEO Incorporated (ENGEO) prepared a Phase One Environmental Site Assessment dated December 28, 2004, for the Sutter Medical Center of Santa Rosa/Luther Burbank Center for the Arts. The 2004 Phase One Environmental Site Assessment identified the Study area as a 54-acre property consisting of five parcels identified as APN 058-040-023, 058-040-026, 058-040-027, 058-040-045 and a portion of APN 058-040-050.

Site development and land use was described as the Luther Burbank Center For The Arts (LBC), an 85,000-square-foot cultural and performing arts event center (APN 058-040-045), a rural residence with barn, out buildings and undeveloped pasture land (APN 058-040-026 and 058-040-027), and a single-family home that was used as law offices (APN 058-040-023). A part of the LBC Property was reported as leased to the Sonoma Academy, an independent college-preparatory high school. A portion of the study area was reported to include approximately 38.8 acres that are occupied by asphalt-covered parking areas, an athletic field, and wastewater treatment facility ponds. The rural residential portion of the site consists of approximately 13.6 acres in the western portion of the Property. The homestead parcel was utilized in part by the LBC as a maintenance and storage area.

During the site reconnaissance, chemical storage was noted in one location, a small wooded shed on the west side of the northern wastewater treatment pond. These containers consisted of eight compressed chlorine gas bottles used as part of the wastewater treatment. Seven drums (30- to 55-gallon), consisting of four metal 55-gallon drums, one plastic 55-gallon drum, and two plastic 30-gallon drums, were found adjacent to the LBC physical plant building. Labeling on all of these drums was either illegible or not visible.

Petroleum product containers were observed in two locations within the Property. These containers were found in a storage area within the barn and outside of the Physical Plant building of the LBC. These containers consisted of five 2-gallon metal gasoline containers within the storage area of the barn; several small plastic containers with motor oil, brake fluid and other automotive fluids stored on a shelf within the barn storage area; two 5-gallon motor oil containers stored on the concrete slab outside of the LBC physical plant building. Minor staining (less than 1 square foot) was noted on the concrete slab outside of the Physical Plant building.

No areas of stressed vegetation were observed within the Property at the time of the reconnaissance. Several piles of solid waste were observed near the barn structure within the homestead area of the Property. This solid waste consisted of several empty chlorine liquid bottles, five discarded lead-acid batteries, broken concrete, miscellaneous wood debris, and a pile of green waste. No storage tanks were observed on the Property during the reconnaissance.

The report indicated that there were two active septic systems located within the homestead parcel of the Property located on the west and east sides of the residence. One well was reportedly located on the LBC parcel. An asbestos and lead-based paint survey was not conducted as part of the assessment. The report included a statement that, given the age of the structures, it is likely that asbestos-containing materials (ACM) and lead-based paint were used for the construction of these structures.

A review of aerial photographs and database research found no off-site facilities that would be expected to significantly impact the Property.

Based on the findings of the 2004 site assessment, ENGEO identified one Recognized Environmental Condition and four items of concern within the Property. The REC and items of concern are listed below:

- The historic Property use as an orchard may indicate that pesticides were applied according the regulations governing the application of agricultural chemical. We found no evidence indicating pesticides may have been improperly applied, spilled or disposed within the Property. However, there is a potential that residues of the agricultural chemicals may remain in shallow soil. The potential threat posed to human health and the environment by such residues is dependent on the future Property use, exposure pathways and receptors. It is recommended that soil sampling should be considered if human exposure to shallow soil that was historically occupied by orchard will occur as a result of the future land use.

The four items of concern within the Property were identified as follows:

1. The operation of the on-site wastewater treatment facility has included the use of chlorine gas to treat effluent water. This may have resulted in the production of trihalomethane (THM) compounds such as chloroform in the soil beneath the wastewater treatment ponds. Currently, there is no Closure Plan in place for the decommissioning and removal of this facility. As such, it is recommended that a “Closure Plan” be developed, approved and implemented for this facility in accordance with requirements of North Coast Regional Water Quality Control Board and the Sonoma County Permit and Resource Management Department (PRMD). As required by the regulatory agencies, further environmental characterization and site assessment may be necessary to comply with decommissioning and closure requirements. We understand that closure of this facility will follow re-direction of wastewater sewer servicing this Property to another off-site facility, at which time closure and decommissioning can be performed.

2. The structures located within the homestead parcel of the Property were constructed at a time when asbestos-containing building materials (ACBM) and lead-based paints may have been used during their construction. It is recommended that a Cal-OSHA Certified ACBM, and lead-based paint contractor, be retained to assess the structures prior to any renovation or demolition activities. Removal and disposal of ACBM, if encountered, should be performed by the asbestos abatement contractor in accordance with regulatory requirements.

3. Discarded batteries observed within the homestead area of the Property represent a potential source of soil contamination. We recommend this debris be properly disposed of and the surrounding soil be assessed for evidence of contamination. Local removal and disposal of soils impacted with hazardous materials from the batteries should be performed in accordance with regulatory requirements.

4. Any septic systems and related leach fields located within the homestead and the law office parcels at the site should be removed and disposed of in accordance with permitting requirements of Sonoma County, once these are no longer in use, and backfill requirements conform to recommendations of the Geotechnical Engineer.

In order to address the REC identified in the 2004 phase one assessment, ENGEO performed a limited phase two environmental study of the site (Reference 2). The phase two study was comprised of an agrichemical study and included an impact evaluation associated with the improper storage of lead acid battery casings. The agrichemical study evaluated two areas for the presence of persistent organochlorine pesticides and CAM 17 metals. Area 1 was identified as an approximately 12-acre area that historically supported orchard activities but was not disturbed by grading activities. For the Area 1 evaluation, two samples were collected from each of 24 locations (S-1 through S-24) and were composited at a ratio of 6:1 for a total of eight composite samples submitted for laboratory analysis. Four of the composite samples were comprised of samples collected from depths of 0 to 6 inches below ground surface (bgs) and four composite samples were comprised of samples collected from depths of 24 to 30 inches bgs.

Area 2, an approximately 10-acre area, historically supported orchard activities that was identified as later covered by approximately 3 feet of imported engineered fill. For the Area 2 evaluation, two samples were collected from each of 10 samples and were composited at a ratio of 10:1 for a total for two composite samples submitted for laboratory analysis. One composite sample was comprised of samples collected from the northern 5 acres of Area 2, including five samples from depths of 0 to 6 inches bgs and five samples from depths of 24 to 30 inches bgs. One composite sample was comprised of samples collected from the southern 5 acres of Area 2, consisting of five samples from depths of 0 to 6 inches bgs and five samples from depths of 24 to 30 inches bgs.

The lead acid battery impact evaluation was performed in a small area near the residential structures where improper storage of lead acid battery casings was observed. The battery impact evaluation area was referred to as Area 3 in the phase two assessment. The scope of the battery impact evaluation consisted of the recovery of two samples from an area west of the barn, including one sample from a depth of 0 to 6 bgs and one sample from depth of 24 to 30 inches bgs. The samples were submitted for analysis of the cadmium, chromium, copper, lead, zinc, and pH.

The result of the soil sample analysis for organochlorine pesticides and metals identified the presence of Dichlorodiphenyltrichloroethane (DDT), Dichlorodiphenyldichloroethylene (DDE), and Dichlorodiphenyldichloroethane (DDD) in the four composite shallow samples from Area 1 and from the composite sample from the northern 5 acres of Area 2. Concentrations of DDT were reported in three composite samples a levels ranging from 0.0015 milligram per kilogram (mg/kg) to 0.022 mg/kg. Concentrations of DDD were reported in two composite samples at 0.0038 mg/kg and 0.0043 mg/kg. Levels of DDE were reported in five composite samples at levels ranging from 0.0015 mg/kg to 0.047 mg/kg. All composite samples from Areas 1 and 2 were found to have concentrations exceeding laboratory detection limits for the metals barium, chromium, cobalt, copper, lead, nickel, vanadium, zinc, and mercury.

The two samples from Area 3 exhibited concentrations exceeding laboratory detection limits for the following metals: chromium, copper, lead, zinc. The laboratory reported slightly greater metal concentrations in the sample collected from 0 to 6 inches bgs than in the sample collected from 24 to 30 inches bgs. The soil pH was slightly lower in 0 to 6 inches bgs sample (pH = 6.16) than in sample collected from 24 to 30 inches bgs (pH = 6.44). The metals concentrations from the Area 3 samples were generally present in greater concentrations than found in soil samples collected from other locations within the Property.

A risk analysis was evaluated for each soil composite sample to determine the potential carcinogenic and hazard risk of exposure to the soil. The evaluation was performed using the equations presented in the California Department of Toxic Substances Control document entitled, "*Preliminary Endangerment Assessment Guidance Manual*" dated January 1994. The report stated that both risk and hazard were calculated as the sum derived for each compound present in each sample. The calculated cancer risks and hazard quotients were well below the acceptable risk levels of one in a million (10^{-6}) ranged and a quotient of one, indicating that the soils at the site did not pose an unacceptable risk to human health. The 2005 ENGEO Phase Two report concluded that the low detections of pesticides could be attributed to the orchard and that the Area 3 samples suggest that a limited quantity of battery acid may have been released to soil; however, the metal concentrations are relatively low and are below cancer and hazard thresholds.

3.2 PROPERTY RECORDS

3.2.1 Environmental Liens

The Sonoma County Recorders Office was contacted for information related to environmental liens associated with the Property. No environmental liens associated with the Property APN(s) were identified. In addition, a questionnaire completed by the Client or authorized representative indicated that they are not aware of any environmental cleanup liens recorded against the Property.

3.2.2 Title Report/Ownership

The Title Report lists recorded land title detail, ownership fees, leases, land contracts, easements, liens, deficiencies, and other encumbrances attached to or recorded against a subject property. Laws and regulations pertaining to land trusts vary from state to state and the detail of information presented in a Title Report can vary greatly by jurisdiction. As a result, ENGEO utilizes a Title Report, when provided to us, as a supplement to other historical record sources. A Preliminary Title Report was not provided by the time of report preparation.

3.3 HISTORICAL RECORD SOURCES

The purpose of the historical record review is to develop a history of the previous uses or occupancies of the Property and surrounding area in order to identify those uses or occupancies that are likely to have led to recognized environmental conditions on the Property.

3.3.1 Historical Topographic Maps

Historical USGS topographic maps were reviewed to determine if discernible changes in topography or improvements pertaining to the Property had been recorded. The Property straddles two adjoining topographic maps- the Santa Rosa and the Sebastopol quadrangle maps. The adjacent northern quadrangles are the Mark West Springs and the Healdsburg 7.5-minute maps. The following maps were provided to us through an EDR Historical Topographic Map Report, presented in Appendix C.

QUAD	YEAR	SERIES	SCALE
Santa Rosa	1944	15’	1:62,500
Santa Rosa	1954	15’	1:62,500
Santa Rosa	1954	7.5’	1:24,000
Sebastopol	1954	7.5’	1:24,000
Santa Rosa	1968	7.5’	1:24,000
Sebastopol	1968	7.5’	1:24,000
Santa Rosa	1973	7.5’	1:24,000
Santa Rosa	1980	7.5’	1:24,000
Sebastopol	1980	7.5’	1:24,000

<u>1944 Santa Rosa Map</u> – The Property is viewed as relatively level at an elevation of 155 feet above msl. A structure is depicted on the Property along Mark West Springs Road. No land use is evident.

<u>1954 – 1973 Santa Rosa and 1954 – 1968 Sebastopol Maps</u> – No structures are shown on the Property. Land use of the Property is depicted as orchard. No changes to site topography are discerned.

<u>1980 Santa Rosa and 1980 Sebastopol Maps</u> – Structures having the shape and in the location of the Wells Fargo Center for the Arts, access roads, and the WWTP ponds are shown on the Property. A pond is depicted in the center of the WFC parcel. Land use of the western portion of the Property is depicted as orchard. No changes to site topography are discerned.

3.3.2 Aerial Photographs

The following aerial photographs, provided by EDR, were reviewed for information regarding past conditions and land use at the Property and in the immediate vicinity. These photographs are presented in Appendix E.

FLYER	YEAR	SCALE
Pacific Air	1953	1" = 555'
Cartwright	1965	1" = 333'
NASA	1974	1" = 541'
USGS	1982	1" = 666'
USGS	1993	1" = 666'
USGS	1998	1" = 666'
EDR	2005	1" = 484'

1953 – 1965 Photographs –The Property is developed as an orchard. Several structures are visible within the Property. A ranch compound, including two middle-sized and a few smaller structures, are visible on the south side of a primary road in the location of the existing Mark West Springs Road. The ranch compound is situated at the present location of the main entrance to the WFC. A larger structure is located approximately 1,100 feet south of the ranch property. Two smaller outbuildings are visible on the eastern portion of the Property, approximately 1,000 feet south of Mark West Springs Road. Several north-south and east-west trending secondary roads are visible within the Property. The surrounding properties are developed as orchards. Several small- to medium-sized structures are visible on adjoining properties. A main road in the location of Old Redwood Highway is visible to the east of the Property. Highway 101 is viewed on the 1965 and later aerial photographs at the current location. Commercial development is visible to the north and east across Mark West Springs Road on the 1965 photograph.

1974 – 1982 Photographs –The western portion of the Property is viewed as an orchard on the 1974 aerial photograph and as an open field on the 1982 and later photographs. Structures within the ranch compound are visible. Development of structures, parking, and access roads are viewed at the approximate location of the WFC. Two rectangular basins are visible to the north of the WFC on the 1982 and later photographs. The eastern portions of the Property appear undeveloped. A small southwest-trending drainage swale is visible in the central-eastern Property area. Rural residential home sites abut the northeastern portion of the Property. Lands to the west, south and southeast are visible as orchards on the 1974 photograph, with decreasing areas under cultivation viewed to the south on the 1982 photograph. Increased residential and commercial development is viewed to the north and northeast.

1993 – 2005 Photographs –The Property appears as currently developed, with the addition of structures visible on the field south of the WFC. No structures are viewed on the south field on the 2005 photograph. Lands to the south, west and southeast are viewed as agriculturally developed or open space. Rural residential home sites continue to abut the northeastern portion of the Property, with residential development beyond. Lands to the north are residential and commercial developments.

3.3.3 Fire Insurance Maps

EDR prepared a Sanborn Fire insurance map search for the Property and surrounding properties. EDR reported that no maps were available for the Property and surrounding properties.

3.3.4 City Directory

City Directories, published since the 18th century for major towns and cities, lists the name of the resident or business associated with each address. A city directory search conducted by EDR is located in Appendix F. The EDR city directory search resulted in address listings for the Property or vicinity for the years 1965 through 2006. The following listings were located for the Property addresses:

50 MARK WEST SPRINGS RD

Year	*Uses*
2006	Wells Fargo Center for the Arts
1994	Sonoma Country Day School
	California Museum of Art
	Luther Burbank Center for the Arts
	Sonoma County
	Calvary Chapel of Santa Rosa Symphony
	Church of Religious Science
	Actors Theatre of Santa Rosa
	Sonoma Country Day School
	California Museum of Art
	Luther Burbank Center for the Arts
	Sonoma County
	Calvary Chapel
	Santa Rosa Symphony
	Church of Religious Science
	Actors Theatre of Santa Rosa
1990	Actors Theatre of Sonoma County
	Resurrection Life Center Church
	Luther Burbank Center For The Arts
	Sonoma County Wine Growers Association
	Sonoma County Day School
	Sonoma County Wine Showcase & Auction
	A Childs World
	Santa Rosa Symphony Association
1987	Luther Burbank Center for Performing
	Resurrection Life Center Church

K C L B 92 F M Radio Station
Center For Positive Living
Carters West College
Sonoma County Day School
Childrens World Day Care Center

1981 Christian Life Bookstore
Christian Life Center
Christian Life Elementary Jr High School
Storyland Pre School
Muster Fred A Rev

1976 Christian Life Center
Christian Life Elementary School

100 MARK WEST SPRINGS

Year	***Uses***
2006	Sigrist Chris & Tracy
	Signorelli C
1994	Itf Construction Co
1990	Eilken Wm E
1987	Luther Burbank Memorial banks
1981	Chilson Jerry D
1976	Harvest House
1970	Buttitta Pietro

3.3.5 Government Agencies

The following agencies were contacted pertaining to possible past development and/or activity at the Property.

- Sonoma County Assessor's Office
- Sonoma County Building/Planning Departments
- Sonoma County Department of Environmental Health
- Sonoma County Department of Emergency Services
- California Regional Water Quality Control Board
- Department of Toxic Substances Control
- California Environmental Protection Agency

Sonoma County Assessor's Office personnel identified the physical addresses and size of the four parcels comprising the Property and confirmed the parcel owners for the Property. The Assessor's Office information is provided in the following table:

APN	PHYSICAL ADDRESS	PARCEL SIZE (AC)	PARCEL OWNER
058-040-058	100 Mark West Springs Road	15	Sutter Medical Center
058-040-059	Mark West Springs Road	10	Sutter Medical Center
058-040-060	50 Mark West Springs Road	25.01	Luther Burbank Memorial Foundation
058-040-061	Mark West Springs Road	3.01	Luther Burbank Memorial Foundation

Sonoma County Department of Emergency Services was contacted for information pertaining to hazardous materials use, storage, unauthorized releases, and incident responses at the Property. The Department of Emergency Services includes the County Fire Department, whose files would include hazardous materials inventories, locations, and the presence of underground storage tanks. In addition, the Department would respond to incidents pertaining to leaks or releases of hazardous materials. Department personnel indicated no information was on file regarding hazardous materials or underground storage tanks at the subject Property.

Sonoma County Building/Planning Departments were contacted for information pertaining to property development. The WFC & SMC properties are part of the Larkfield-Wikiup Specific Plan. Recent permit listings include items related to the operation of the Wells Fargo Center, primarily for tenant improvements and specials event zoning, and items related to the Sutter Medical Center project, such as EIR, lot line adjustments, geotechnical studies and demolition permits associated with the removal of ranch compound structures. Environmentally related permits include a septic tank removal at the ranch compound and asbestos removal associated with the ranch compound structures and for remodeling at the WFC.

Sonoma County Department of Environmental Health (DEH) was contacted for information pertaining to the Property. Information in the DEH would include underground storage tank files. The DEH responded verbally that their files for the Property only included food preparation-related permits.

3.4 ENVIRONMENTAL RECORD SOURCES

EDR performed a search of federal, tribal, state, and local databases regarding the Property and nearby properties. Details regarding the databases searched by EDR are provided in Appendix A. A list of the facilities documented by EDR within the approximate minimum search distance of the Property is provided below:

3.4.1 Federal ASTM Standard/Supplemental Sources

3.4.1.1 Subject Property

The Property is not listed on the Federal ASTM Standard or supplemental sources.

3.4.1.2 Other Properties

No database listing within the appropriate ASTM search distances of the Property on Federal ASTM Standard or supplemental sources were identified.

3.4.2 State ASTM Standard/Supplemental Sources

3.4.2.1 Subject Property

The Property is listed on the following State ASTM Standard or supplemental source databases:

- CA WDS: Waste Discharge System for Sites - sites which have been issued waste discharge requirements. The list is maintained by the State Water Resources Control Board. The listing is for the WWTP operated on the Property. No violations were listed in the EDR CA WDS database review.

- HAZNET: Facility and Manifest Data - The data is extracted from copies of hazardous waste manifests received each year by the DTSC. There are two Property listings, both for the 50 Mark West Springs Road address, for this database. One listing is associated with the removal of 1.2915 tons of Polychlorinated biphenyls (PCBs) and material containing PCBs. The second listing is for the removal/disposal of 1.6 tons of asbestos-containing waste. According to Mr. Marc Hagenlocher, WFC Operations Director, the asbestos listing is for remodeling activities at the Center. Mr. Hagenlocher has been associated with the Property for 22 years. He was unaware of the PCB-related listing. ENGEO contacted CAL-EPA for additional information regarding the PCB disposal. A uniform Hazardous Waste Manifest dated September 29, 1998, was located which documents the removal of four drums of light ballasts removed from overhead light fixtures. The ballasts were removed for processing by a licensed disposal/recycling facility. A copy of the CAL-EPA profile and the 1998 manifest are provided in Appendix G.

3.4.2.2 Other Properties

The following databases include facilities listed within the appropriate ASTM search distances of the Property on State ASTM Standard or supplemental sources (the number of facilities is reported in parentheses). Details regarding the listings are provided in Appendix A.

- HIST Cal-Sites (1)
- LUST (10)

- CA FID UST (3)
- UST (2)
- HIST UST (5)
- SWEEPS UST (3)
- NOTIFY 65 (2)
- RESPONSE (1)
- ENVIROSTOR (1)

3.4.3 Local ASTM Supplemental Sources

3.4.3.1 Subject Property

The Property is not listed on Local ASTM supplemental databases.

3.4.3.2 Other Properties

The following databases include facilities listed within the appropriate ASTM search distances of the Property on Local ASTM Standard or supplemental sources (the number of facilities is reported in parentheses). Details regarding the listings are provided in Appendix A.

- SONOMA COUNTY Leaking Underground Storage Tank Sites (5)

Two leaking underground storage tank sites are identified within the immediate vicinity of the Property.

A former Texaco station was located at 4601 Old Redwood Highway at the southwest corner of the intersection of the Old Redwood Highway and Mark West Springs Road. The facility location was across East Fulton Road near the northeast corner of the Property. The Texaco service station operated four 6,000-gallon fuel tanks and a 550-gallon waste oil tank from the mid-1960s through 1990. The facility was identified as a leaking underground tank (LUST) site in 1986. Cleanup for fuel leakage at the facility included the excavation of about 10,400 cubic yards of soil during the period of 1990 through 1997, and the removal of almost 2.1 million gallons of groundwater between 1993 and 1995. A total of 22 groundwater monitoring wells were installed for the impact study associated with the LUST facility, which underwent verification monitoring from 2003 through 2006. Groundwater movement was reported to be variable, but with a westward component. The subject Property is located in the reported downgradient to cross-gradient direction of groundwater movement. Two of the monitoring wells were located adjacent to the Property near the intersection of Mark West Springs Road and East Fulton Road. These wells were not reported to contain detectable levels of petroleum hydrocarbons. The wells were destroyed after several years of monitoring. The cleanup of the facility was deemed complete and the facility granted closure - no further action - in May 2007. The site is currently the location of a small retail strip complex. The water well at the subject Property (50 Mark West Springs Road) was sampled in 2003 for the presence of petroleum fuel and fuel components. The fuel and fuel components concentrations were below the laboratory reporting limit. The former Texaco site would not be expected to affect the subject Property, or impact future use of the Property.

An active UNOCAL gas station is located at 4605 Old Redwood Highway at the northwest corner of the intersection of the Old Redwood Highway and Mark West Springs Road. The facility was identified as a LUST site in 1988 and was remediated through the early 1990s. The case was closed in 1997, re-opened in 2001, and closed again in 2003. This facility is in the cross-gradient to down-gradient direction of reported groundwater direction. The UNOCAL site would not be expected to affect the subject Property or impact future use of the Property.

Based on the distances to the identified database sites, regional topographic gradient, and the EDR findings, it is unlikely that the other above-stated database sites pose an environmental risk to the Property. Properties that are on the "Orphan Summary" list within the ASTM search distances are unlikely to pose an environmental risk or appear to be located beyond the ASTM recommended radius search criteria.

4.0 SITE RECONNAISSANCE

4.1 METHODOLOGY

ENGEO conducted a reconnaissance of the Property on April 20, 2009. Mr. Marc Hagenlocher, Operations Director for the Wells Fargo Center, accompanied ENGEO personnel during a portion of the reconnaissance. The Property was viewed for hazardous materials storage, superficial staining or discoloration, debris, stressed vegetation, or other conditions that may be indicative of potential sources of soil or groundwater contamination. The site was also checked for evidence of fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks. Photographs taken during the site reconnaissance are presented in Figures 4 though 6.

Portions of the site were inaccessible due the presence of dense vegetation. Access to the roof and the eastern modules WFC occupied by the Santa Rosa Christian School were unavailable at the time of the site reconnaissance. The physical plant module of the WFC was the only portion of the interior of the WFC available for viewing.

4.2 GENERAL SITE SETTING

The Property consists of a total of approximately 53 acres located at the southeast corner of Mark West Springs Road and Highway 101 in Sonoma County, California. The Property is bounded by Mark West Springs Road on the north, Highway 101 on the west, rural residential properties on the south, residential development and a park on the east. The relatively level Property is accessed from the north via two paved driveways, one connecting with Mark West Springs Road and one with East Fulton Road. Site development consists of a barn, storage shed, and two WWTP ponds on the eastern portion of the 058-040-058 parcel and the Wells Fargo Center for the Arts (WFC) on the northwestern area of the 058-040-060 parcel. Paved parking areas are located to the northwest and east of the WFC. A manicured athletic field is located on the northern portion of the 058-040-059 parcel. Parcel 058-040-061 and the southern area of 058-040-060 are graded areas used for event parking and special event staging areas. The western area of parcel 058-040-058 is an undeveloped field.

4.3 EXTERIOR OBSERVATIONS

4.3.1 Structures

Four structures were observed during the site reconnaissance. The structures are the WFC, a modular 85,000-square-foot cultural and performing arts center, an approximately 2,400-square-foot barn/storage building, a 220-square-foot out-building, and a storage shed. The WFC appears as a masonry block and stucco structure. The barn and shed are both wood-framed wood-sided structures. The western third of the barn has a concrete floor while the eastern section is on a raised wood floor. The barn roof is corrugated metal. The shed has a concrete floor. The out-building is a masonry block structure with a concrete floor. It appears unmaintained and has no roof. Several locked metal storage containers were observed on the Property. Site personnel identified the units as used for special events materials storage. The units are not used to store chemicals or perishable items.

4.3.2 Hazardous Substances and Petroleum Products in Connection with Identified Uses

Hazardous substances or petroleum products were observed within the Property during the site reconnaissance. The materials were observed in eastern and western barn areas, the storage shed the physical plant module of the WFC, and in a utility closet adjacent to the physical plant module. The barn is used for material storage, office space and equipment maintenance.

Hazardous substances or petroleum products observed in the eastern portion of the barn include approximately 200 gallons of assorted paints in assorted pail and can sizes, approximately 30 pounds and 2 gallons of insecticide, 5 gallons of flooring adhesive, 3 gallons of sealer/primer, less than 1 gallon each of herbicide, PVC cement, and alcohol. Hazardous substances or petroleum products viewed in the western barn area include less than 15 gallons of gasoline stored in a metal flammable storage cabinet, less than 15 gallons of assorted vehicle lubricants, less than 10 gallons each of hydraulic fluid and paint (including aerosols),approximately 2 gallons of liquid labeled waste oil, less than 1 gallon of penetrating solvents, and two welding gas tanks - one for oxygen and one containing acetylene.

Six lead-acid batteries were observed in the covered storage area adjacent to the barn. Four additional batteries were noted in weeds about 20 feet west of the barn structure. Six cylinders of chlorine gas were noted in the storage shed adjacent to the WWTP ponds. Materials observed in the WFC physical plant module include three 30-gallon plastic drums of *multisolve* light degreaser and approximately 40 gallons of foam agent for water treatment. Materials observed in the utility closet adjacent to the physical plant module included approximately 30 gallons of paint and less than 10 gallons of gasoline. The gasoline was stored in appropriate fuel containers within a metal flammable storage cabinet.

4.3.3 Storage Tanks

Two above-ground storage tanks (AGTs) were observed on the Property. One AGT was adjacent to the WFC physical plant module. The tank, having an estimated capacity of between 2,000 and 5,000 gallons, is a pressurized tank used for water storage. A pad-mounted AGT used for the storage of diesel fuel was observed as the basal unit of a backup generator. The generator is located in the vicinity of the WFC physical plant. No evidence of existing underground storage tanks was observed during the site reconnaissance.

4.3.4 Odors

No odors indicative of hazardous materials or petroleum material impacts were noted at the time of the reconnaissance.

4.3.5 Pools of Potentially Hazardous Liquid

No pools of potentially hazardous liquid were observed within the Property at the time of our reconnaissance.

4.3.6 Drums

Two metal drums were observed on the Property at the time of the reconnaissance. One empty 55-gallon drum was located in the covered storage area adjacent to the barn. A 30-gallon drum was located in the weeds approximately 30 feet west-northwest of the barn structure. The three 30-gallon aforementioned plastic drums of *multisolve* light degreaser were observed in the WFC physical plant.

4.3.7 Hazardous Substance and Petroleum Product Containers

Three empty fuel containers were viewed on the flammable materials cabinet in the barn. Two plastic containers, typically associated with waste oil storage and each having a capacity of about 2 gallons, were observed in weeds approximately 30 feet west-northwest of the barn structure. Approximately 20 unlabeled white one-gallon containers were noted in the weeds about 20 feet west of the barn structure. The white containers were reported to be spent chlorine bottles. Two dozen empty paint cans south of the barn were situated on a sheet of plywood. No spillage or runoff from the plywood was noted.

4.3.8 Polychlorinated Biphenyls (PCBs)

Three electrical transformers were observed on the Property during our site reconnaissance. One transformer, a pad-mounted Cutler-Hammer V48M28E75B, indicated it was a dry-type. A fence-post-mounted transformer, a Vista Professional Outdoor Lighting CT600, appeared to be a dry type. A PG&E pad-mounted transformer, T-1166, was observed near the west wing entrance to the WFC. No evidence of leakage was noted from the unit.

As noted in Section 3.4.2.1, ENGEO contacted CAL-EPA for additional information regarding the PCB disposal. A uniform Hazardous Waste Manifest dated September 29, 1998, was located which documents the removal of four drums of light ballasts from overhead light fixtures. A total of 1.2915 tons of Polychlorinated biphenyls (PCBs) was removed for processing by a licensed disposal/recycling facility. A copy of the CAL-EPA profile and the 1998 manifest are provided in Appendix G.

4.3.9 Pits, Ponds and Lagoons

One pit and two ponds were observed within the Property at the time of our reconnaissance. The pit, approximately 4 feet by 10 feet by 5 feet deep, was between the barn and Mark West Springs Road. Piping was observed at two ends of the pit. The pit is in the approximate location of a removed septic tank. Two open ponds associated with the WFC WWTP are located south of the barn. One pond serves as an aeration pond and one as a percolation pond. The ponds are enclosed by chain link fences and locked gates.

4.3.10 Stained Soil/Pavement

Minor localized staining from vehicle drippage was noted in the paved parking areas. No stained soil was visible within the Property at the time of our reconnaissance. Twelve stormwater catch basins were observed in the parking areas. Eleven of the basins appeared clear of debris. One basin contained a significant amount of pine needles. None of the catch basins exhibited staining characteristic of dumping.

4.3.11 Stressed Vegetation

No signs of stressed vegetation were observed on the Property at the time of our reconnaissance.

4.3.12 Solid Waste/Debris

Dumpsters were observed in a paved fenced compound. The compound was used for the storage of solid waste pending disposal. Several trash receptacles were observed on the Property, including the perimeter of the WFC and inside the barn. Several piles of solid waste were observed in the vicinity of the barn structure. This waste consisted of broken concrete and miscellaneous wood and metal debris. Empty containers were previously discussed.

4.3.13 Wastewater

A wastewater treatment system operated by the WFC consists of a closed-sump located within a separate building, and two open ponds that act as aeration and percolation ponds. We understand that the water treatment facility was constructed circa 1980.

Two septic disposal systems are believed to have serviced former structures in the vicinity of the barn. One septic system was removed at the time of the structure demolition in 2008.

4.3.14 Wells

One well was found within the Property during our site reconnaissance. Data provided by Brelje & Race Consulting Engineers indicates that this well is constructed to a depth of 400 feet, and is equipped with a submersible pump capable of delivering approximately 200 gallons per minute (gpm).

4.3.15 Septic Systems

No evidence of a septic system was observed during the site reconnaissance. Two septic disposal systems are believed to have serviced structures in the vicinity of the barn. One system was removed at the time of the 2008 demolition of a residence and two outbuildings.

4.4 INTERIOR OBSERVATIONS

The interiors of four site structures were observed during the reconnaissance. The barn has a raised wood floor and much of the interior walls were sided with sheet rock. The raised floor appeared in good condition. The western portion of the barn is a slab-on-grade concrete floor. No significant cracking, staining, or through floor drains were evident in/on the concrete floor.

The chiller room portion of the WFC and an adjacent utility closet were entered for viewing. The chiller room, housing the air conditioning equipment, has a concrete slab-on-grade floor. The floor was in good condition with no significant cracking or staining. No through-floor drains were observed in the room. Most of the piping in the room appeared to be insulated with a fibrous blanket wrapping. The utility closet adjacent to the physical plant building was used to store paints, grounds maintenance equipment, and gasoline. No through-floor drains were observed in the room. Some dried spilled paint was noted on the concrete floor of the utility closet.

The interiors of two small outbuildings were viewed: a shed in the vicinity of the aeration pond and a structure along the eastern property boundary, east of the WFC. The shed is a wood-walled structure and the eastern building a roof-less masonry-wall structure. Both structures are on a concrete slab-on-grade foundation.

4.5 ASBESTOS-CONTAINING MATERIALS AND LEAD-BASED PAINT

An asbestos and lead-based paint survey was not conducted as part of this assessment. No obvious asbestos-containing material was observed on the Property. Permits for the removal of asbestos were issued for tenant improvement/interior remodeling of the WFC and for the demolition of the structures in the vicinity of the barn. Given the age of the existing structures, it is conceivable that asbestos-containing materials and lead-based paint materials may exist within the structures.

4.6 INDOOR AIR QUALITY

An evaluation of indoor air quality, mold, or radon was not included as part of the contracted scope of services. The California Department of Health Services has conducted studies of radon risks throughout the state, sorted by zip code. Results of the studies indicate that nine tests were conducted within the Property zip code, with no tests exceeding the current EPA action level of 4 picocuries per liter [pCi/L]1).

5.0 INTERVIEWS

Mr. Marc Hagenlocher, Director of Operations for the Wells Fargo Center, completed two environmental site assessment questionnaires pertaining to user-related applicable environmental information regarding the Property. In the questionnaire, Mr. Hagenlocher did not identify potential environmentally related issues with the Property. The questionnaire is presented in its entirety in Appendix F.

Mr. Marc Hagenlocher was also interviewed in person during the course of the site reconnaissance. Mr. Hagenlocher identified himself as a person having been associated with the Property for approximately 22 years. Mr. Hagenlocher was aware that asbestos containing material was encountered during a bathroom renovation at the WFC building. He was unaware of the reason for HAZNET listing documenting 1.2915 tons of PCB and material containing PCBs. Mr. Hagenlocher was not aware of previous use of the out-building located east of the WFC. He stated the structure was always roof-less and was not used since he was associated with the Property. Mr. Hagenlocher was familiar with the presence of one water well on the Property, and he thought two septic systems were located in the vicinity of the former ranch compound.

Pacific Gas and Electric Company personnel were contacted for information regarding pad-mounted transformer, T-1166. PG&E had not responded to our request by the time of report preparation.

[1] California Department of Health Services – Division of Drinking Water and Environmental Management – Radon (http://ww2.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf).

6.0 FINDINGS

The reconnaissance and records research did not find documentation or physical evidence of soil or groundwater impairments associated with the current or past use of the Property. A review of regulatory databases maintained by county, state and federal agencies found no documentation of hazardous materials violations or discharge on the Property. No documentation of significant soil or groundwater contamination associated with abutting properties, which could be expected to affect the subject Property was found from the records research.

The orchard occupying parts of the Property in the 1950s through 1980s was previously identified as a historical REC. Two agrichemical studies were performed at the Property, one in 2005 and another concurrent with this assessment. Based on the findings of the studies, there is no evidence of significant impacts associated with the historical orchard.

7.0 OPINIONS AND DATA GAPS

It is our opinion that the findings of this study are based on a sufficient level of information obtained during our contracted scope of services to render a conclusion as to whether additional appropriate investigation is required to identify the presence or likely presence of a REC. The following data gaps were identified for the Property:

- The Property straddles two topographic maps. Two map years, 1944 and 1973, do not have both sets of maps for full Property coverage.
- Pacific Gas & Electric Company was contacted for transformer and PCB information at the Property. PG&E has not responded to our request for information.
- Access to interior of the WFC was incomplete.
- The WFC roof was inaccessible.
- A Preliminary Title Report was not provided for review.

The data gaps identified during this process do not affect the conclusions as to the presence or lack of presence of RECs at the Property.

8.0 CONCLUSIONS

The study included a review of local, state and federal environmental record sources, standard historical sources, aerial photographs, fire insurance maps and physical setting sources, a reconnaissance of the Property to review site use and current conditions to check for the storage, use, production or disposal of hazardous or potentially hazardous materials and interview with persons knowledgeable about current and past site use.

The site reconnaissance and records review did not find documentation or physical evidence of soil or groundwater impairments associated with the use of the Property. A review of regulatory databases maintained by county, state, and federal agencies found no documentation of hazardous materials violations or discharge on the Property. A review of regulatory agency records and available databases did not identify contaminated facilities within the appropriate ASTM search distances that would be expected to impact the Property.

Based on the findings of this assessment, no Recognized Environmental Conditions (RECs) and no historical RECs were identified for the Property.

Based on the review of regulatory databases and site reconnaissance, we present information on features of potential environmental concern that were either contained in the databases or observed on the Property. These features were not considered to be RECs. We briefly discuss each feature below:

- The operation of the on-site wastewater treatment facility has included the use of chlorine gas to treat effluent water. This may have resulted in the production of trihalomethane (THM) compounds such as chloroform in the soil and groundwater beneath the WWTP ponds.

- Property structures were constructed at a time when asbestos-containing building materials (ACBM) and lead-based paints may have been used in building materials.

- Batteries and an assortment of containers were viewed in the vicinity of the barn. Improper material storage may lead to release of contents by spillage or structural failure of the container.

- A remnant septic system was reported to be located in the vicinity of the barn.

ENGEO has performed a phase one environmental site assessment of the Property in general conformance with the scope and limitations of ASTM E 1527-05 "Standard Practice for Environmental Site Assessments" and USEPA "Standards and Practices for All Appropriate Inquires", 40 CFR Part 312. Based on the findings of this assessment, ENGEO provides the following recommendations:

- The operation of the on-site wastewater treatment facility has included the use of chlorine gas to treat effluent water. ENGEO understands a Closure Plan for the plant decommissioning and removal is under development. Environmental characterization, including the testing for trihalomethane compounds should be conducted in accordance with Regional Water Quality Control Board requirements. We understand this work is currently in progress.

- Prior to structure demolition, the property structures should be evaluated for the presence of asbestos-containing building materials (ACBM) and lead-based paints prior to their renovation of demolition. The evaluation should be conducted by a Cal-OSHA Certified ACBM and lead-based paint contractor.

- We recommend materials no longer in use be properly disposed. Batteries located near the barn should be disposed of in accordance with regulatory requirements.

- Empty containers for paint and chlorine should be property disposed.

- Any septic systems and related leach fields located within the Property should be removed in accordance with permitting requirements of Sonoma County, once these are no longer in use. Backfill requirements should conform to recommendations of the Geotechnical Engineer.

- Areas of the Property were not viewed due to the presence of structures or dense vegetation. These areas should be viewed by an environmental professional should the structures or vegetation be removed.

SELECTED REFERENCES

ENGEO Incorporated, 2004; Phase One Environmental Site Assessment, Sutter Medical Center of Santa Rosa/Luther Burbank Center For the Arts, Project No. 6486.2.001.01, December 28, 2004.

ENGEO Incorporated, 2005; Phase Two Environmental Site Assessment Report, Sutter Medical Center of Santa Rosa, Project No. 6486.2.002.01, February 24, 2005.

ENGEO Incorporated, 2009A; Agrichemical Assessment Report WFC / SMCSR Properties, April 27, 2009.

ENGEO Incorporated, 2009B; Supplemental Geotechnical Investigation (In progress).

Wagner, D.L. and E.J. Bortugno, 1982; Regional Geologic Map of the Santa Rosa Quadrangle, State of California, Department of Conservation, Division of Mines and Geology

Google Maps (http://maps.google.com)

California Department of Water Resources (http://wdl.water.ca.gov)

United States Environmental Protection Agency Indoor Air Quality Website (http://ww2.cdph.ca.gov/HealthInfo/environhealth/Documents/Radon/CaliforniaRadonDatabase.pdf)

USGS 15' Santa Rosa Quadrangle-Sonoma County Maps dated 1944, and 1954

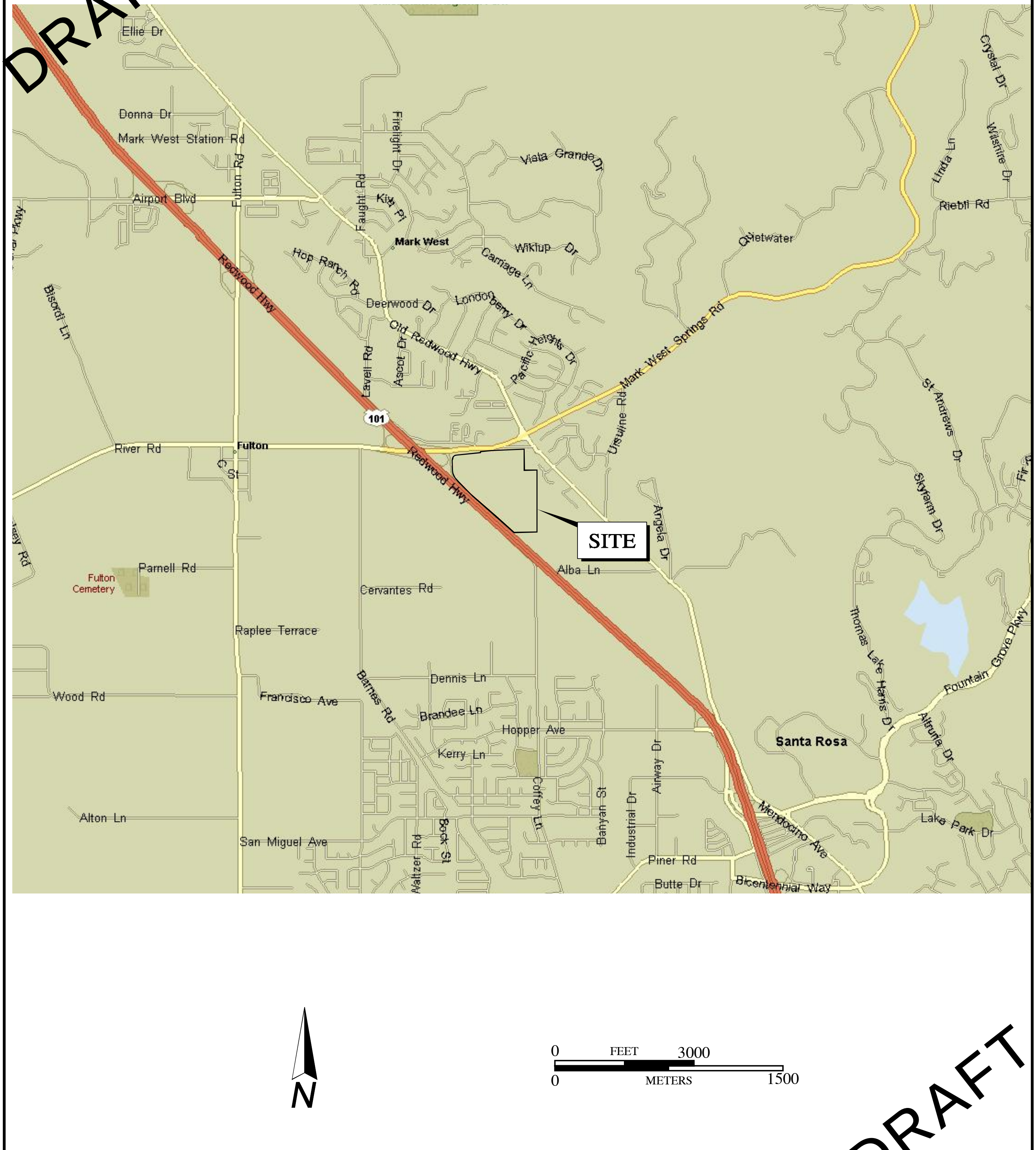
USGS 7.5' Santa Rosa Quadrangle-Sonoma County Maps dated 1954, 1968, 1973, and 1980

USGS 7.5' Sebastopol Quadrangle-Sonoma County Maps dated 1954, 1968, and 1980

LIST OF FIGURES

Figure 1	**Vicinity Map**
Figure 2	**Assessor's Parcel Map**
Figure 3	**Topographic Map**
Figure 4	**Site Photographs – Exterior Views**
Figure 5	**Site Photographs– Exterior**
Figure 6	**Site Photographs– Exterior**

F I G U R E S



BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO Expect Excellence	VICINITY MAP WFC-SMCSR PROPERTY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.201.102 DATE: APRIL 2009 DRAWN BY: SRP CHECKED BY: SM	FIGURE NO 1

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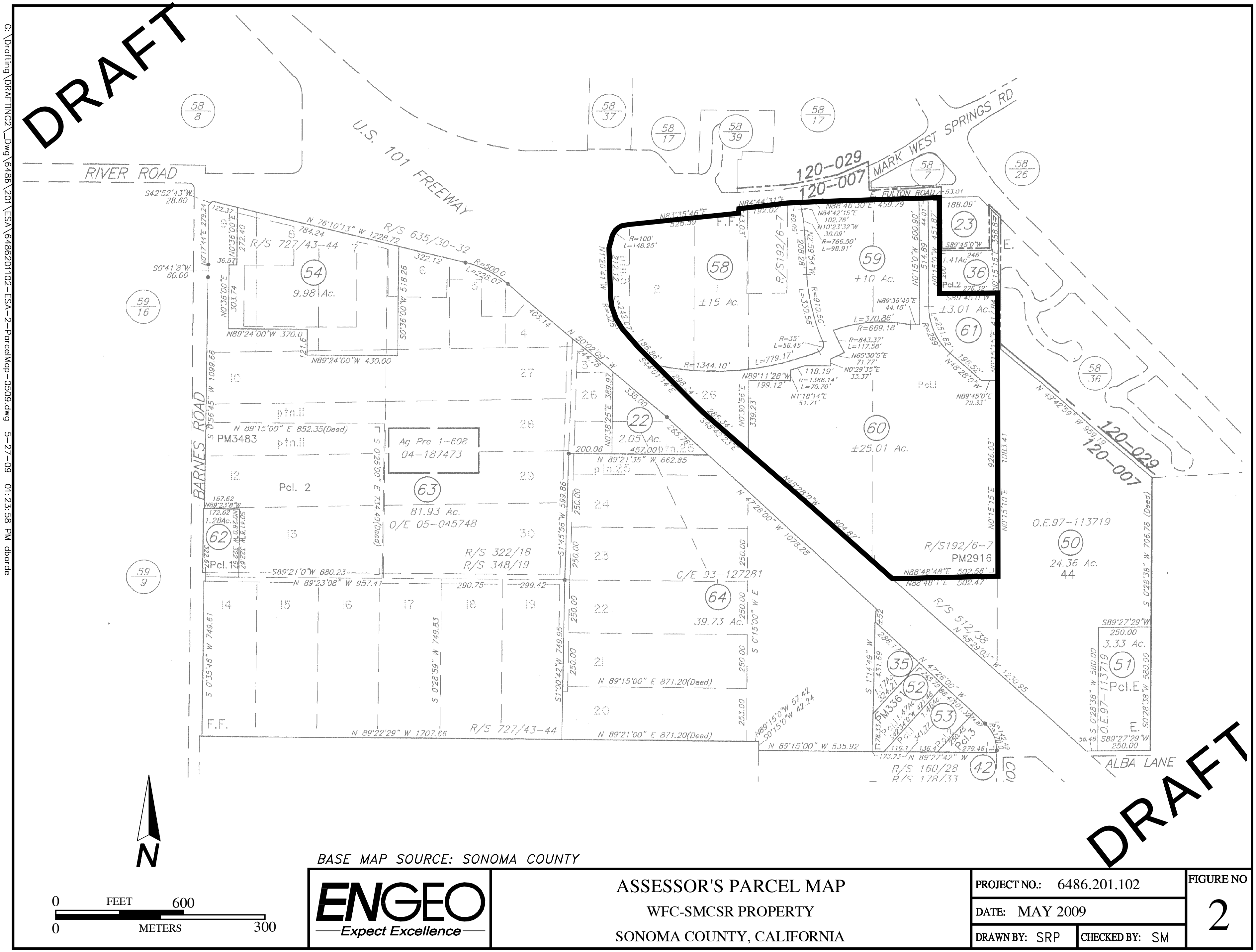

ENGEO
Expect Excellence

ASSESSOR'S PARCEL MAP

WFC-SMCSR PROPERTY

SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.201.102	FIGURE NO 2
DATE: MAY 2009	
DRAWN BY: SRP	CHECKED BY: SM

ORIGINAL FIGURE PRINTED IN COLOR

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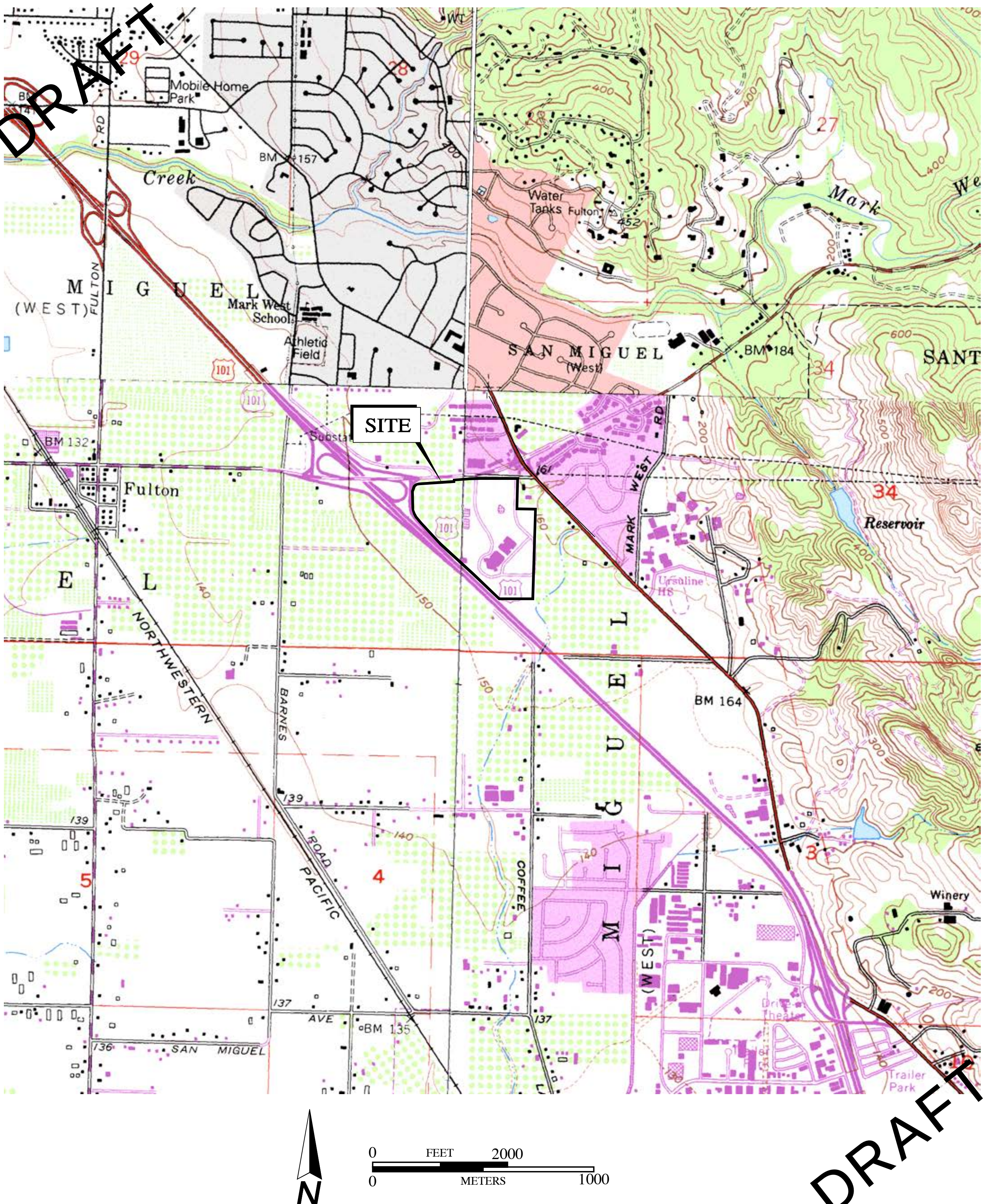

BASE MAP SOURCE: USGS

ENGEO Expect Excellence	TOPOGRAPHIC MAP WFC-SMCSR PROPERTY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.201.102 DATE: MAY 2009 DRAWN BY: SRP CHECKED BY: SM	FIGURE NO. 3

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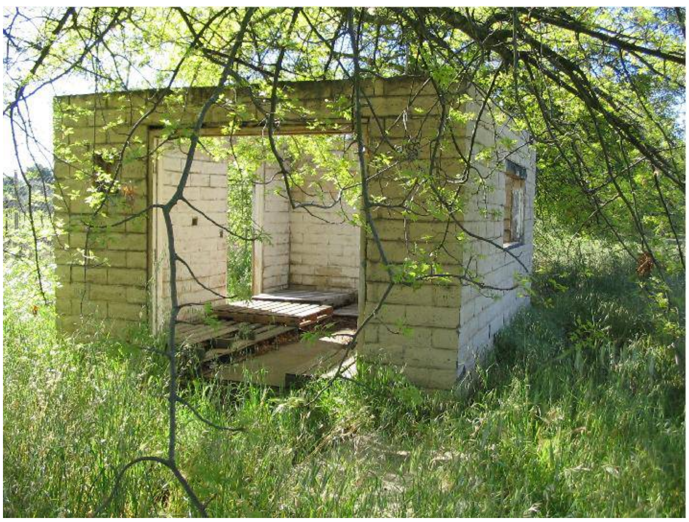
ORIGINAL FIGURE PRINTED IN COLOR

WELLS FARGO CENTER FOR THE ARTS

BARN



OUT BUILDING ALONG EASTERN PROPERTY BOUNDARY

WWTP AERATION POND WITH STORAGE SHED IN BACKGROUND

STORAGE CONTAINERS EAST OF WFC

LOOKING SOUTH ACROSS WESTERN FIELD

DRAFT

ENGEO
Expect Excellence

SITE PHOTOGRAPHS
WFC-SMCSR PROPERTY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.201.102		FIGURE NO.	4
DATE: MAY 2009			
DRAWN BY: SRP	CHECKED BY: SM		

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ORIGINAL FIGURE PRINTED IN COLOR

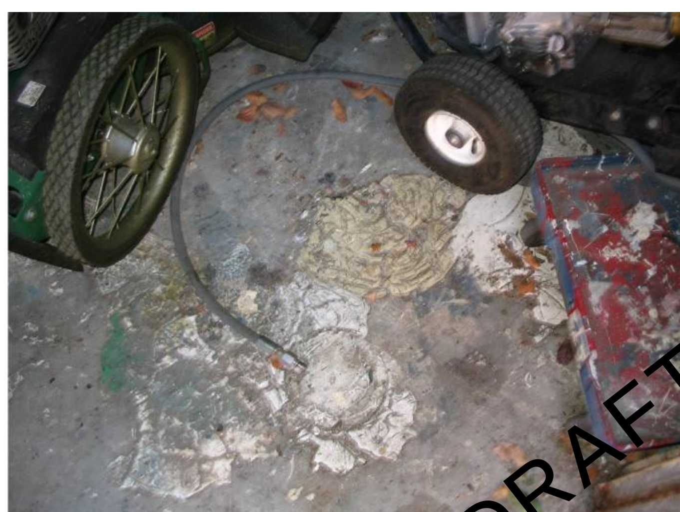

SOLVENT DRUMS - PHYSICAL PLANT BUILDING


CHILLER ROOM- PHYSICAL PLANT BUILDING


CHLORINE CYLINDERS- WWTP STORAGE SHED

PAINT STORAGE- EAST ROOM OF BARN


PAINT STORAGE-PHYSICAL PLANT BUILDING
UTILITY CLOSET


PAINT SPILLAGE- PHYSICAL PLANT
BUILDING UTILITY CLOSET

ENGEO
Expect Excellence

SITE PHOTOGRAPHS
WFC-SMCSR PROPERTY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.:	6486.201.102
DATE:	MAY 2009
DRAWN BY: SRP	CHECKED BY: SM
FIGURE NO.	5

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ORIGINAL FIGURE PRINTED IN COLOR

DRUM IN GRASS WEST OF BARN

BATTERIES AND EMPTY CONTAINERS WEST OF BARN

WFC PAD-MOUNTED TRANSFORMER

WFC BACKUP GENERATOR WITH BASAL DIESEL TANK

PAINT EMPTIES ON PLYWOOD SOUTH OF BARN

BATTERIES ADJACENT TO BARN

ENGEO Expect Excellence	SITE PHOTOGRAPHS WFC-SMCSR PROPERTY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.201.102 DATE: MAY 2009 DRAWN BY: SRP CHECKED BY: SM	FIGURE NO 6

G:\Drafting\DRAFTING2_Dwg\6486\201\ESA\6486201102-ESA-6-SitePhotos-0509.dwg 5-27-09 01:24:51 PM dborde

ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

ENVIRONMENTAL DATA RESOURCES, INC.

Radius Map Report

APPENDIX A

LBC / SMC-SR Properties
50 Mark West Springs Road
Santa Rosa, CA 95403

Inquiry Number: 02469780.1r
April 16, 2009

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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GEOCHECK ADDENDUM

Physical Setting Source Addendum	**A-1**
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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

50 MARK WEST SPRINGS ROAD
SANTA ROSA, CA 95403

COORDINATES

Latitude (North):	38.494500 - 38˚ 29' 40.2''
Longitude (West):	122.750000 - 122˚ 45' 0.0''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521801.7
UTM Y (Meters):	4260506.0
Elevation:	159 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
North Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
West Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
Northwest Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005
Source:	USDA

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 7 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
LUTHER BURBANK CENTER 50 MARK WEST SPRINGS RD SANTA ROSA, CA 95401	CA WDS	N/A
LUTHER BURBANK MEMORIAL FOUNDATIO 50 MARK WEST SPRINGS RD SANTA ROSA, CA 95403	HAZNET	N/A

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL - - - - - - - - - National Priority List
Proposed NPL - - - - - - Proposed National Priority List Sites
NPL LIENS - - - - - - - Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL - - - - - - National Priority List Deletions

Federal CERCLIS list

CERCLIS - - - - - - - - Comprehensive Environmental Response, Compensation, and Liability Information System

Federal CERCLIS NFRAP site List

CERC-NFRAP - - - - - - CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS - - - - - - - Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF - - - - - - - RCRA - Transporters, Storage and Disposal

Federal RCRA generators list

RCRA-LQG - - - - - - - RCRA - Large Quantity Generators
RCRA-SQG - - - - - - - RCRA - Small Quantity Generators
RCRA-CESQG - - - - - - RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS - - - Engineering Controls Sites List
US INST CONTROL - - - Sites with Institutional Controls

Federal ERNS list

ERNS - - - - - - - - - Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists

SWF/LF - - - - - - - - Solid Waste Information System

EXECUTIVE SUMMARY

State and tribal leaking storage tank lists

SLIC - Statewide SLIC Cases
INDIAN LUST - - - - - - - - - - - - - - - Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

AST - Aboveground Petroleum Storage Tank Facilities
INDIAN UST - - - - - - - - - - - - - - - - - Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

VCP - Voluntary Cleanup Program Properties
INDIAN VCP - - - - - - - - - - - - - - - - - Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS - - - - - - - - - - A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 - - - - - - - - - - Torres Martinez Reservation Illegal Dump Site Locations
ODI - Open Dump Inventory
WMUDS/SWAT - - - - - - - - - - - - - - Waste Management Unit Database
SWRCY - Recycler Database
HAULERS - Registered Waste Tire Haulers Listing
INDIAN ODI - - - - - - - - - - - - - - - - - Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL - Clandestine Drug Labs
SCH - School Property Evaluation Program
Toxic Pits - Toxic Pits Cleanup Act Sites
CDL - Clandestine Drug Labs

Local Land Records

LIENS 2 - CERCLA Lien Information
LUCIS - Land Use Control Information System
LIENS - Environmental Liens Listing
DEED - Deed Restriction Listing

Records of Emergency Release Reports

HMIRS - Hazardous Materials Information Reporting System
CHMIRS - California Hazardous Material Incident Report System
LDS - Land Disposal Sites Listing
MCS - Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen - - - - - - - - - - - - - - RCRA - Non Generators

EXECUTIVE SUMMARY

DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
CA BOND EXP. PLAN	Bond Expenditure Plan
Cortese	"Cortese" Hazardous Waste & Substances Sites List
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants ..... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

State- and tribal - equivalent NPL

EXECUTIVE SUMMARY

RESPONSE: Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

A review of the RESPONSE list, as provided by EDR, and dated 02/23/2009 has revealed that there is 1 RESPONSE site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
FOUNTAINGROVE PLAZA SITE	***3975 OLD REDWOOD HIGHWA***	***SE 1/2 - 1 (0.755 mi.)***	***22***	***25***

State- and tribal - equivalent CERCLIS

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 02/23/2009 has revealed that there is 1 ENVIROSTOR site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
FOUNTAINGROVE PLAZA SITE	***3975 OLD REDWOOD HIGHWA***	***SE 1/2 - 1 (0.755 mi.)***	***22***	***25***
Status: Certified / Operation & Maintenance				

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 01/06/2009 has revealed that there are 10 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TEXACO (REDWOOD HIGHWAY, 4601)	REDWOOD HIGHWAY, OLD 46	N 0 - 1/8 (0.011 mi.)	B3	8
UNOCAL #5142	REDWOOD HIGHWAY, OLD 46	N 0 - 1/8 (0.011 mi.)	B4	8
TEXACO	***4601 OLD REDWOOD HWY***	***N 0 - 1/8 (0.075 mi.)***	***C6***	***10***
Status: Completed - Case Closed				
UNION 76 #5142	4605 OLD REDWOOD HWY	N 0 - 1/8 (0.095 mi.)	C7	14
Status: Completed - Case Closed				
CARDINAL NEWMAN SCHOOL	URSULINE ROAD 50	ENE 1/4 - 1/2 (0.256 mi.)	D16	22
CARDINAL NEWMAN HIGH SCH.	50 URSULINE RD	ENE 1/4 - 1/2 (0.256 mi.)	D17	22
Status: Completed - Case Closed				
BP, LARKFIELD / REDWOOD OIL	REDWOOD HIGHWAY, OLD 48	N 1/4 - 1/2 (0.313 mi.)	18	23
CHEVRON #9-8270	REDWOOD HIGHWAY, OLD 48	N 1/4 - 1/2 (0.377 mi.)	19	23

EXECUTIVE SUMMARY

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD CHEVRON #9-8270 Status: Completed - Case Closed	4840 OLD REDWOOD HWY	N 1/4 - 1/2 (0.378 mi.)	E20	23
LARKFIELD BP Status: Open - Remediation	***4856 OLD REDWOOD HIGHWA***	***N 1/4 - 1/2 (0.382 mi.)***	***E21***	***24***

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 01/06/2009 has revealed that there are 2 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD UNION 76 #255142	4605 OLD REDWOOD HWY	N 0 - 1/8 (0.095 mi.)	C9	15
FACILITY 49-000-005546	4732 OLD REDWOOD HWY	N 1/8 - 1/4 (0.234 mi.)	13	21

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Hazardous waste / Contaminated Sites

HIST Cal-Sites: Formerly known as ASPIS, this database contains both known and potential hazardous substance sites. The source is the California Department of Toxic Substance Control. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

A review of the HIST Cal-Sites list, as provided by EDR, and dated 08/08/2005 has revealed that there is 1 HIST Cal-Sites site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
FOUNTAINGROVE PLAZA SITE	***3975 OLD REDWOOD HIGHWA***	***SE 1/2 - 1 (0.755 mi.)***	***22***	***25***

Local Lists of Registered Storage Tanks

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 3 CA FID UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***N 0 - 1/8 (0.075 mi.)***	***C6***	***10***
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***N 0 - 1/8 (0.095 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***N 1/8 - 1/4 (0.155 mi.)***	***12***	***19***

EXECUTIVE SUMMARY

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 5 HIST UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	4601 OLD REDWOOD HWY	N 0 - 1/8 (0.075 mi.)	C5	9
UNION OIL SS# 5142	4605 OLD REDWOOD HWY	N 0 - 1/8 (0.095 mi.)	C8	14
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***N 0 - 1/8 (0.095 mi.)***	***C11***	***17***
FINLEY RANCH	280 ULSULINE RD	NE 1/8 - 1/4 (0.245 mi.)	14	21
RINCON VALLEY FIRE ST 2	45-LARK CENTER DRIVE	N 1/8 - 1/4 (0.246 mi.)	15	21

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 3 SWEEPS UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***N 0 - 1/8 (0.075 mi.)***	***C6***	***10***
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***N 0 - 1/8 (0.095 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***N 1/8 - 1/4 (0.155 mi.)***	***12***	***19***

Other Ascertainable Records

Notify 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, and dated 10/21/1993 has revealed that there are 2 Notify 65 sites within approximately 1 mile of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD BP	***4856 OLD REDWOOD HIGHWA***	***N 1/4 - 1/2 (0.382 mi.)***	***E21***	***24***

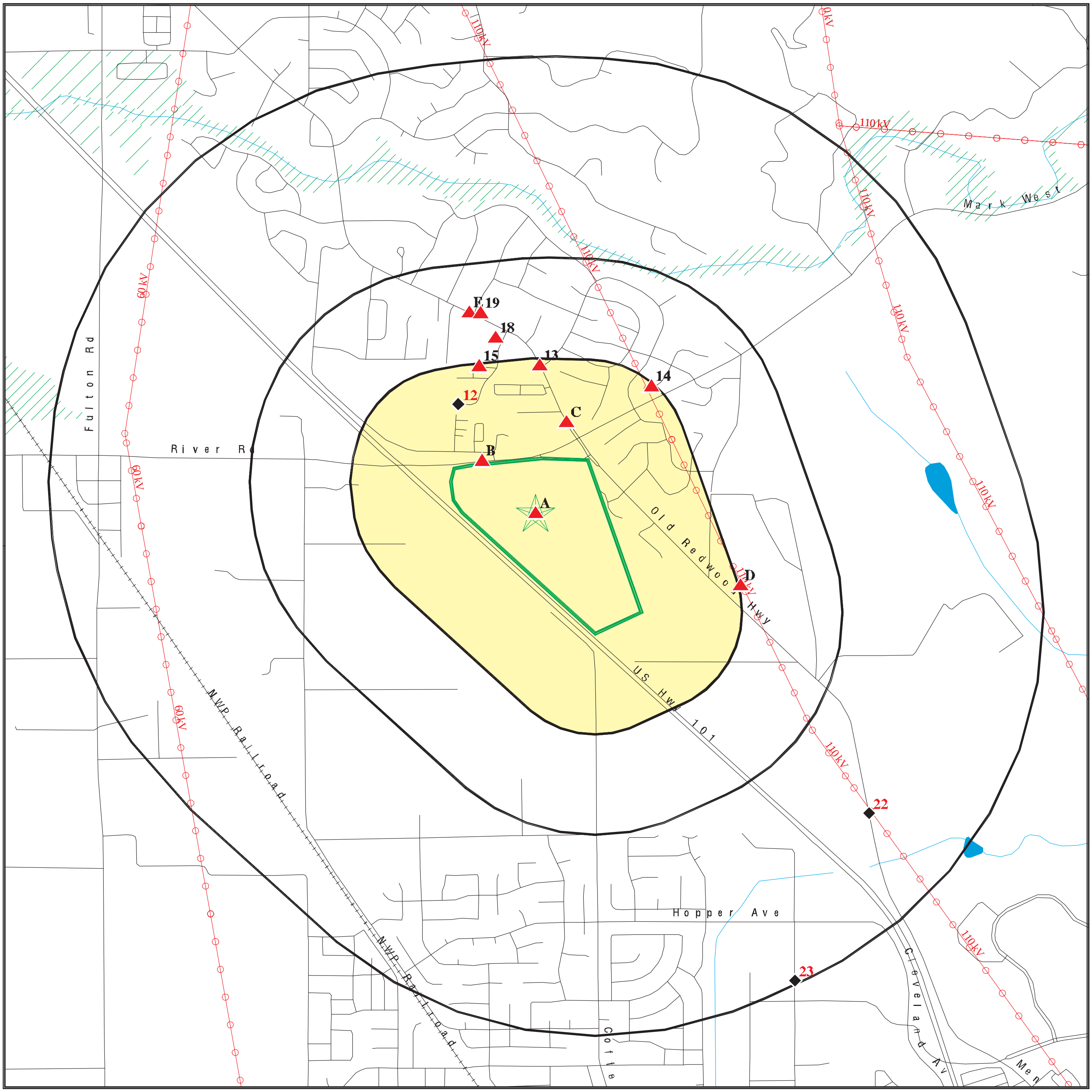
Lower Elevation	Address	Direction / Distance	Map ID	Page
H & C METALS	***AIRWAY DRIVE 3555***	***SSE 1/2 - 1 (0.991 mi.)***	***23***	***45***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
SHELL (DUTTON)	Notify 65, LUST, SLIC
EMPIRE BUILDING	LUST, SLIC
MISSION ARBORS	LUST
AUTO EXCHANGE	LUST
FAST & EASY MART	LUST
YOLO, DANIEL	LUST
STEVENSON EQUIPMENT	LUST
PINE CREEK PROPERTIES INC	HAZNET
SONOMA 101 HIGHWAY WIDENING	RCRA-LQG
LOS GUILICOS	SLIC
SANTA ROSA COMMUNITY DEVELOPMENT S	SLIC
SANTA ROSA COMMUNITY DEVELOPMENT S	SLIC
SCDPW LARKFIELD SEWER	SLIC
UNITY CHURCH	SLIC
REED, LILLIE	SLIC

OVERVIEW MAP - 02469780.1r

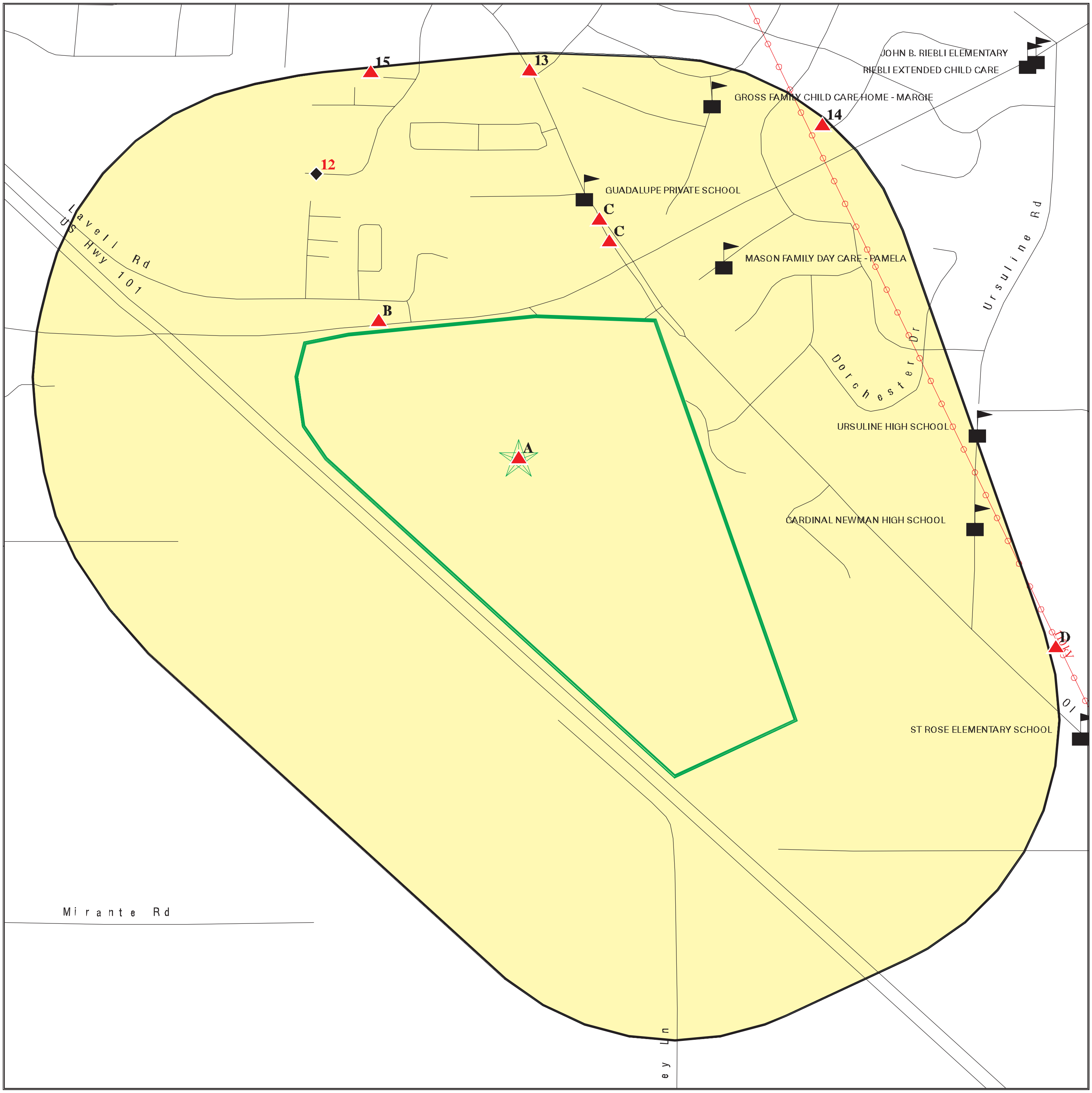


- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: LBC / SMC-SR Properties	CLIENT: Engeo Inc.
ADDRESS: 50 Mark West Springs Road Santa Rosa CA 95403	CONTACT: Keith Nowell
	INQUIRY #: 02469780.1r
LAT/LONG: 38.4945 / 122.7500	DATE: April 16, 2009 1:36 pm

DETAIL MAP - 02469780.1r



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

0 1/8 1/4 1/2 Miles

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: LBC / SMC-SR Properties	CLIENT: Engeo Inc.
ADDRESS: 50 Mark West Springs Road Santa Rosa CA 95403	CONTACT: Keith Nowell
	INQUIRY #: 02469780.1r
LAT/LONG: 38.4945 / 122.7500	DATE: April 16, 2009 1:37 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	0	0	NR	NR	NR	0
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	1	NR	1
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	0	1	NR	1
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	4	0	6	NR	NR	10
SLIC		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
State and tribal registered storage tank lists								
UST		0.250	1	1	NR	NR	NR	2
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP		0.500	0	0	0	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	1	NR	1
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	2	1	NR	NR	NR	3
HIST UST		0.250	3	2	NR	NR	NR	5
SWEEPS UST		0.250	2	1	NR	NR	NR	3
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS	X	TP	NR	NR	NR	NR	NR	0
Cortese		0.500	0	0	0	NR	NR	0
Notify 65		1.000	0	0	1	1	NR	2
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET	X	TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
A1 **Target** **Property**	**LUTHER BURBANK CENTER** **50 MARK WEST SPRINGS RD** **SANTA ROSA, CA 95401**	**CA WDS**	**S102007528** **N/A**

Site 1 of 2 in cluster A

Actual:
159 ft.

CA WDS:

Facility ID:	North Coastal 82012OSON
Facility Type:	Municipal/Domestic - Facility that treats sewage or a mixture of predominantly sewage and other waste from districts, municipalities, communities, hospitals, schools, and publicly or privately owned systems (excluding individual subsurface leaching systems disposing of less than 1,000 gallons per day).
Facility Status:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
NPDES Number:	Not reported
Subregion:	1
Facility Telephone:	Not reported
Facility Contact:	MARK MORRISETTE
Agency Name:	LUTHER BURBANK CENTER
Agency Address:	50 MARK WEST SPRINGS RD
Agency City,St,Zip:	SANTA ROSA 95403
Agency Contact:	DAN BARR
Agency Telephone:	Not reported
Agency Type:	Private
SIC Code:	8641
SIC Code 2:	Not reported
Primary Waste:	Domestic Sewage
Primary Waste Type:	Designated/Influent or Solid Wastes that pose a significant threat to water quality because of their high concentrations (E.G., BOD, Hardness, TRF, Chloride). 'Manageable' hazardous wastes (E.G., inorganic salts and heavy metals) are included in this category.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Design Flow:	0
Baseline Flow:	0
Reclamation:	Producer-User: Reclamation requirements that have been issued to a producer of reclaimed water who also uses the product.
POTW:	The facility is not a POTW.
Treat To Water:	Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.
Complexity:	Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities.

A2
Target
Property

LUTHER BURBANK MEMORIAL FOUNDATION
50 MARK WEST SPRINGS RD
SANTA ROSA, CA 95403

HAZNET **S103975646**
N/A

Site 2 of 2 in cluster A

Actual:
159 ft.

HAZNET:

Gepaid:	CAC002619637
Contact:	MARC HAGENIOCHER
Telephone:	7075277006
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	50 MARK WEST SPRINGS RD
Mailing City,St,Zip:	SANTA ROSA, CA 95403
Gen County:	Sonoma
TSD EPA ID:	CAD982042475
TSD County:	Solano
Waste Category:	Asbestos-containing waste
Disposal Method:	H132
Tons:	1.6
Facility County:	Sonoma

Gepaid:	CAC002100480
Contact:	LUTHER BURBANK MEMORIAL FOUND
Telephone:	7075277006
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	50 MARK WEST SPRINGS RD
Mailing City,St,Zip:	SANTA ROSA, CA 954030000
Gen County:	Sonoma
TSD EPA ID:	NYD986980233
TSD County:	99
Waste Category:	Polychlorinated biphenyls and material containing PCB's
Disposal Method:	Not reported
Tons:	1.2915
Facility County:	Sonoma

B3
North
< 1/8
0.011 mi.
59 ft.

TEXACO (REDWOOD HIGHWAY, 4601)
REDWOOD HIGHWAY, OLD 4601
SANTA ROSA, CA

LUST **S101304960**
N/A

Site 1 of 2 in cluster B

Relative:
Higher

Actual:
159 ft.

LUST REG 1:

Region:	1
Facility ID:	1TSO072
Staff Initials:	HAZ

B4
North
< 1/8
0.011 mi.
59 ft.

UNOCAL #5142
REDWOOD HIGHWAY, OLD 4605
SANTA ROSA, CA

LUST **S101304961**
N/A

Site 2 of 2 in cluster B

Relative:
Higher

Actual:
159 ft.

LUST REG 1:

Region:	1
Facility ID:	1TSO165
Staff Initials:	Closed

C5 **North** **< 1/8** **0.075 mi.** **394 ft.**	**TEXACO** **4601 OLD REDWOOD HWY** **SANTA ROSA, CA 95401** **Site 1 of 7 in cluster C**	**HIST UST**	**U001609317** **N/A**

Relative:
Higher

Actual:
164 ft.

HIST UST:

Region:	STATE
Facility ID:	00000016174
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0004
Contact Name:	HASSAN KAZEMINI
Telephone:	7075789866
Owner Name:	TEXACO U.S.A.
Owner Address:	3350 WILSHIRE BLVD.
Owner City,St,Zip:	LOS ANGELES, CA 90010

Tank Num:	001
Container Num:	#1
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	002
Container Num:	#2
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	003
Container Num:	#3
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	004
Container Num:	#4
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

C6 **TEXACO** **LUST** **S101595370**
North **4601 OLD REDWOOD HWY** **CA FID UST** **N/A**
< 1/8 **SANTA ROSA, CA 95401** **SWEEPS UST**
0.075 mi.
394 ft. **Site 2 of 7 in cluster C**

Relative:
Higher

Actual:
164 ft.

LUST:

Region:	STATE
Global Id:	T0609700047
Latitude:	38.496737871
Longitude:	-122.748286288
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2007-05-24 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO072
LOC Case Number:	00001435
File Location:	Local Agency Warehouse
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO072
Closed or Referred:	Y
Date:	5/24/2007
LOP Number:	00001435
Funding Fed / State:	Federal
Staff:	Not reported
Global ID:	T0609700047

CA FID UST:

Facility ID:	49001037
Regulated By:	UTNKI
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075789866
Mail To:	Not reported
Mailing Address:	P O BOX
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95403
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Inactive

Facility ID:	49001037
Regulated By:	UTNKA
Regulated ID:	00016174
Cortese Code:	Not reported
SIC Code:	Not reported

TEXACO (Continued) **S101595370**

Facility Phone: 7075789866
Mail To: Not reported
Mailing Address: 4601 OLD REDWOOD HWY
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95401
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000001
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: 5

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000002
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported

TEXACO (Continued) **S101595370**

Swrcb Tank Id: 49-000-001435-000003
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000004
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000005
Actv Date: Not reported
Capacity: 550
Tank Use: OIL
Stg: WASTE
Content: WASTE OIL
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #1
Swrcb Tank Id: 49-060-016174-000001
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED

TEXACO (Continued) **S101595370**

Number Of Tanks: 4

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #2
Swrcb Tank Id: 49-060-016174-000002
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #3
Swrcb Tank Id: 49-060-016174-000003
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #4
Swrcb Tank Id: 49-060-016174-000004
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

C7 **North** **< 1/8** **0.095 mi.** **501 ft.**

UNION 76 #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 3 of 7 in cluster C

LUST **S105124635** **N/A**

Relative: Higher

Actual: 165 ft.

LUST:

Region:	STATE
Global Id:	T0609700129
Latitude:	38.497296735
Longitude:	-122.748862148
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2003-05-06 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO165
LOC Case Number:	00001461
File Location:	Local Agency
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO165
Closed or Referred:	Y
Date:	5/6/2003
LOP Number:	00001461
Funding Fed / State:	Federal
Staff:	Not reported
Global ID:	T0609700129

C8 **North** **< 1/8** **0.095 mi.** **501 ft.**

UNION OIL SS# 5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 4 of 7 in cluster C

HIST UST **U001609326** **N/A**

Relative: Higher

Actual: 165 ft.

HIST UST:

Region:	STATE
Facility ID:	00000057100
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0001
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST., SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111

Tank Num:	001
Container Num:	5142-10-1
Year Installed:	Not reported
Tank Capacity:	00000000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Tank Construction:	6 inches

UNION OIL SS# 5142 (Continued) **U001609326**

Leak Detection: Visual

C9 **LARKFIELD UNION 76 #255142** **UST** **U003981902**
North **4605 OLD REDWOOD HWY** **N/A**
< 1/8 **SANTA ROSA, CA 95403**
0.095 mi.
501 ft. **Site 5 of 7 in cluster C**

Relative:
Higher

Actual:
165 ft.

UST:

Global ID:	11133
Latitude:	38.49773
Longitude:	-122.7486

C10 **UNION OIL SS #5142** **CA FID UST** **S101627228**
North **4605 OLD REDWOOD HWY** **SWEEPS UST** **N/A**
< 1/8 **SANTA ROSA, CA 95401**
0.095 mi.
501 ft. **Site 6 of 7 in cluster C**

Relative:
Higher

Actual:
165 ft.

CA FID UST:

Facility ID:	49003529
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	2175 N CALIF BLVD
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

Facility ID:	49000740
Regulated By:	UTNKA
Regulated ID:	00033679
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	4605 OLD REDWOOD HWY
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

UNION OIL SS #5142 (Continued) **S101627228**

SWEEPS UST:

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-1-1
Swrcb Tank Id:	49-000-033679-000001
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	3

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-2-1
Swrcb Tank Id:	49-000-033679-000002
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-4-1
Swrcb Tank Id:	49-000-033679-000003
Actv Date:	07-01-85
Capacity:	280
Tank Use:	OIL
Stg:	W
Content:	WASTE OIL
Number Of Tanks:	Not reported

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
C11 **North** **< 1/8** **0.095 mi.** **501 ft.**	**UNION OIL SS #5142** **4605 OLD REDWOOD HWY** **SANTA ROSA, CA 95401** **Site 7 of 7 in cluster C**	**CHMIRS** **HIST UST**	**U001609325** **N/A**

Relative:
Higher

Actual:
165 ft.

CHMIRS:

OES Incident Number:	01-5581
OES notification:	10/2/200105:12:39 PM
OES Date:	Not reported
OES Time:	Not reported
Incident Date:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
Special Studies 1:	Not reported
Special Studies 2:	Not reported
Special Studies 3:	Not reported
Special Studies 4:	Not reported
Special Studies 5:	Not reported
Special Studies 6:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA/DOT/PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Comments:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No
Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	Responsible Party
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	2001
Agency:	TOSCO Marketing
Incident Date:	10/2/200112:00:00 AM
Admin Agency:	Santa Rosa Fire Department
Amount:	Not reported

UNION OIL SS #5142 (Continued) **U001609325**

Contained:	Yes
Site Type:	Refinery
E Date:	Not reported
Substance:	Gasoline
Quantity Released:	Not reported
BBLS:	0
Cups:	0
CUFT:	0
Gallons:	5
Grams:	0
Pounds:	0
Liters:	0
Ounces:	0
Pints:	0
Quarts:	0
Sheen:	0
Tons:	0
Unknown:	0.000000
Description:	Not reported
Evacuations:	0
Number of Injuries:	0
Number of Fatalities:	0
Description:	A fuel tanker truck was dispensing material and a hose connection failed.

HIST UST:

Region:	STATE
Facility ID:	00000033679
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0003
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST. SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111

Tank Num:	001
Container Num:	5142-1-1
Year Installed:	1965
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

Tank Num:	002
Container Num:	5142-2-1
Year Installed:	1965
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

Tank Num:	003
Container Num:	5142-4-1

UNION OIL SS #5142 (Continued) **U001609325**

Year Installed: Not reported
Tank Capacity: 00000280
Tank Used for: WASTE
Type of Fuel: WASTE OIL
Tank Construction: Not reported
Leak Detection: Stock Inventor

12
North
1/8-1/4
0.155 mi.
821 ft.

CHEVRON U.S.A. INC.
668 LARKFIELD CENTER
SANTA ROSA, CA 95401

CA FID UST **S101595415**
SWEEPS UST **N/A**

Relative:
Lower

Actual:
158 ft.

CA FID UST:

Facility ID: 49002401
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075427101
Mail To: Not reported
Mailing Address: 2 ANNABEL LN
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95401
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

Facility ID: 49002401
Regulated By: UTNKA
Regulated ID: 00063091
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075427101
Mail To: Not reported
Mailing Address: 668 LARKFIELD CENTER
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95401
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported

CHEVRON U.S.A. INC. (Continued) **S101595415**

Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 1
Swrcb Tank Id: 49-060-063091-000001
Actv Date: 07-01-85
Capacity: 1000
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: 4

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 2
Swrcb Tank Id: 49-060-063091-000002
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 3
Swrcb Tank Id: 49-060-063091-000003
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-060-063091-000004
Actv Date: 07-01-85
Capacity: 10000

CHEVRON U.S.A. INC. (Continued) **S101595415**

Tank Use:	UNKNOWN
Stg:	P
Content:	Not reported
Number Of Tanks:	Not reported

13
North
1/8-1/4
0.234 mi.
1236 ft.

FACILITY 49-000-005546
4732 OLD REDWOOD HWY
SANTA ROSA, CA 95403

UST **U004050346** **N/A**

Relative: **Higher**

Actual: **164 ft.**

UST:

Global ID:	11511
Latitude:	38.49991
Longitude:	-122.74984

14
NE
1/8-1/4
0.245 mi.
1292 ft.

FINLEY RANCH
280 ULSULINE RD
SANTA ROSA, CA 95401

HIST UST **U001609204** **N/A**

Relative: **Higher**

Actual: **170 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000038450
Facility Type:	Other
Other Type:	RANCH
Total Tanks:	0001
Contact Name:	WILLIAM H LANE
Telephone:	7075444453
Owner Name:	WILLIAM H & BARBARA LANE
Owner Address:	280 URSULINE RD
Owner City,St,Zip:	SANTA ROSA, CA 95401

Tank Num:	001
Container Num:	1
Year Installed:	1974
Tank Capacity:	00000500
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	None

15
North
1/8-1/4
0.246 mi.
1301 ft.

RINCON VALLEY FIRE ST 2
45-LARK CENTER DRIVE
SANTA ROSA, CA 95401

HIST UST **U001609282** **N/A**

Relative: **Higher**

Actual: **161 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000023741
Facility Type:	Other
Other Type:	FIRE DEPT.
Total Tanks:	0001

RINCON VALLEY FIRE ST 2 (Continued) **U001609282**

Contact Name: CHIEF CARL-HARRISON
Telephone: 7075391801
Owner Name: RINCON VALLEY FIRE DISTRICT
Owner Address: 91-MIDDLE RINCON ROAD
Owner City,St,Zip: SANTA ROSA, CA 95405

Tank Num: 001
Container Num: 002
Year Installed: 1970
Tank Capacity: 00000550
Tank Used for: PRODUCT
Type of Fuel: PREMIUM
Tank Construction: Not reported
Leak Detection: None

D16
ENE
1/4-1/2
0.256 mi.
1352 ft.

CARDINAL NEWMAN SCHOOL
URSULINE ROAD 50
SANTA ROSA, CA

Site 1 of 2 in cluster D

LUST **S104163182**
N/A

Relative:
Higher

Actual:
163 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO096
Staff Initials: HAZ

D17
ENE
1/4-1/2
0.256 mi.
1354 ft.

CARDINAL NEWMAN HIGH SCH.
50 URSULINE RD
SANTA ROSA, CA 95403

Site 2 of 2 in cluster D

LUST **S104227935**
N/A

Relative:
Higher

Actual:
163 ft.

LUST:
Region: STATE
Global Id: T0609700069
Latitude: 38.492901383
Longitude: -122.7410976
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 2001-10-02 00:00:00
Lead Agency: SONOMA COUNTY LOP
Case Worker: Not reported
Local Agency: SONOMA COUNTY LOP
RB Case Number: 1TSO096
LOC Case Number: 00009667
File Location: Stored electronically as an E-file
Potential Media Affect: Soil
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO096
Closed or Referred: Y
Date: 10/2/2001
LOP Number: 00009667

CARDINAL NEWMAN HIGH SCH. (Continued) **S104227935**

Funding Fed / State: Federal
Staff: Not reported
Global ID: T0609700069

18
North
1/4-1/2
0.313 mi.
1651 ft.

BP, LARKFIELD / REDWOOD OIL
REDWOOD HIGHWAY, OLD 4856
SANTA ROSA, CA

LUST **S101304962**
N/A

Relative: Higher

Actual: 163 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO344
Staff Initials: HAZ

19
North
1/4-1/2
0.377 mi.
1991 ft.

CHEVRON #9-8270
REDWOOD HIGHWAY, OLD 4840
SANTA ROSA, CA

LUST **S101309833**
N/A

Relative: Higher

Actual: 163 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO101
Staff Initials: HAZ

E20
North
1/4-1/2
0.378 mi.
1994 ft.

LARKFIELD CHEVRON #9-8270
4840 OLD REDWOOD HWY
SANTA ROSA, CA 95403

LUST **S103817497**
N/A

Site 1 of 2 in cluster E

Relative: Higher

Actual: 163 ft.

LUST:
Region: STATE
Global Id: T0609700074
Latitude: 38.501765333
Longitude: -122.752551367
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 2007-10-29 00:00:00
Lead Agency: SONOMA COUNTY LOP
Case Worker: Not reported
Local Agency: SONOMA COUNTY LOP
RB Case Number: 1TSO101
LOC Case Number: 00001964
File Location: Local Agency Warehouse
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline, Diesel
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO101
Closed or Referred: Y

LARKFIELD CHEVRON #9-8270 (Continued) **S103817497**

Date: 10/29/2007
LOP Number: 00001964
Funding Fed / State: State
Staff: Not reported
Global ID: T0609700074

E21	**LARKFIELD BP**	**Notify 65**	**S100179481**
North	**4856 OLD REDWOOD HIGHWAY**	**LUST**	**N/A**
1/4-1/2	**SANTA ROSA, CA 93582**		
0.382 mi.			
2016 ft.	**Site 2 of 2 in cluster E**		

Relative:
Higher

Actual:
162 ft.

Notify 65:
Date Reported: Not reported
Staff Initials: Not reported
Board File Number: Not reported
Facility Type: Not reported
Discharge Date: Not reported
Incident Description: 93582

LUST:
Region: STATE
Global Id: T0609700252
Latitude: 38.501947928
Longitude: -122.753080642
Case Type: LUST Cleanup Site
Status: Open - Remediation
Status Date: 1992-09-30 00:00:00
Lead Agency: SONOMA COUNTY LOP
Case Worker: Not reported
Local Agency: SONOMA COUNTY LOP
RB Case Number: 1TSO344
LOC Case Number: 00002395
File Location: Local Agency
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO344
Closed or Referred: Not reported
Date: Not reported
LOP Number: 00002395
Funding Fed / State: State
Staff: CI
Global ID: T0609700252

22 **SE** **1/2-1** **0.755 mi.** **3987 ft.**	**FOUNTAINGROVE PLAZA SITE** **3975 OLD REDWOOD HIGHWAY** **SANTA ROSA, CA 95403**	**RESPONSE** **DEED** **ENVIROSTOR** **HIST Cal-Sites**	**S102564485** **N/A**

Relative:
Lower

Actual:
152 ft.

RESPONSE:

Facility ID:	49650001
Site Type:	State Response
Site Type Detail:	State Response ERAP
Acres:	4.34
National Priorities List:	NO
Cleanup Oversight Agencies:	SMBRP, RWQCB 1 - North Coast
Lead Agency:	SMBRP
Lead Agency Description:	DTSC - Sit
Project Manager:	JANET NAITO
Supervisor:	Barbara Cook
Division Branch:	Berkeley
Site Code:	290002
Assembly:	07
Senate:	02
Special Program Status:	Designation of Single Agency
Status:	Certified / Operation & Maintenance
Status Date:	1999-03-01 00:00:00
Restricted Use:	YES
Funding:	Responsible Party
Latitude:	38.4841333162913
Longitude:	-122.737607633446
Alias Name:	FOUNTAINGROVE PLAZA
Alias Type:	Alternate Name
Alias Name:	290002
Alias Type:	Project Code (Site Code)
Alias Name:	110033614792
Alias Type:	EPA (FRS #)
Alias Name:	058-035-24
Alias Type:	APN
Alias Name:	058-035-24.
Alias Type:	APN
Alias Name:	49650001
Alias Type:	Envirostor ID Number
APN:	058-035-24., 058-035-24
APN Description:	Not reported
APN Description:	Not reported
Comments:	Approved 5 Year Review.Approved PEA documenting PCE contamination.Approved Public Participation Plan.Report approved with modifications and requirements for subsequent reports.Report accepted, SCS will submit proposal for repair/replacement of damaged well.DTSC reviewed the responses to our comments sent via email by G. Suemnicht and determined that they addressed our comments.Report approved with modifications.Workplan for inspecting wells noted as being damaged approved for implementation with modifications.Workplan to repair damaged wells is being implemented. All wells except one should be available for sounding as part of September sounding event.Report includes the information required in a monthly report. However, the groundwater extraction system has not yet been restarted.Insufficient information and analysis has been submitted to support the document's conclusion that the Site has achieved asymptotic levels. The groundwater extraction system has not

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

operated continuously over the past year within the operating paraApproved Implementation Report. Approximately 3 to 6 gallons per minute of groundwater removed fom the extraction trench and disposed to the sanitary sewer under permit from the City.Approved RAP requiring installation of groundwater extraction from a trench and direct discharge to sanitary sewer under a permit from the City of Santa Rosa.Signed Expedited Remedial Action Enforceable Agreement with Fountaingrove Plaza Associates.Plan concluded an Allocation of Liability allocating 26 to Fountaingrove Plaza and 74 to Orphan Share.Signed O&M Agreement with Fountaingrove Plaza Associates for operation, maintenance and monitoring of the groundwater extraction system.Three comments sent via email. 1. Table 2, Cumulative Groundwater Treatment System Results. Subsequent reports including this table should include the restart date for the groundwater extraction and treatment system in the notes for 10/27/2006.The groundwater elevation in Table 1A for MW-24 is correct (139.34 feet MSL). This groundwater elevation was usd to determine the isopleths and flow directions on Figure 3. SCS staff indicated that the groundwater elevation for MW-24 shown on FiguInvestigation found the TCE plume was contained on-site. TCE found in shallow groundwater at concentrations up to 1300 parts per billion (ug/L).Site Screening noted VOCs problem.Report submitted late. Comment letter combined with comments on other documents. Report indicates that required capture zone has not been achieved.Report submitted late. Comment letter combined with comments on other documents. Report indicates that required capture zone has not been achieved.Report approved with requirements for subsequent reportsComments to be addressed in subsequent reports.Report reviewed. No significant comments.Installation of an additional monitoring well approved. Work Plan approved with modifications and comments.Report approved with modifications. Work Plan to achieve required capture zone was required on 12/5/2006.DTSC received notification that project manager for SCS Engineers changed from Gene Suemnicht, CEG, to Karin Fresnel, CEG #2264.Consultant notified on 3/13 via email that sampling event would occur on 3/15/07.Designated for ERAP pilot project.2. Figure 3, Site Plan with Groundwater Elevation Contours for April 2007. The capture zone for the groundwater extraction trench is required on this figure. I am going to need a revised figure showing this in next month’s monthly report. 3.re 4 is a typographical error that was not caught during internal QA/QC.meters outlined in the RAP. Therefore, recommendations not approved.It looks like SCS is consistently conducting the sounding events in the middle of the month. Therefore, would it make sense to revise the existing requirement to require sounding in the middle of the month instead of during the first full week of the month?

Completed Info:

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Remedial Investigation / Feasibility Study
Completed Date:	1997-09-30 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	1996-04-01 00:00:00
Completed Area Name:	PROJECT WIDE

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Sub Area Name: Not reported
Completed Document Type: 5 Year Review Reports
Completed Date: 2004-03-26 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Manual
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Completion Report
Completed Date: 1999-02-26 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 1996-10-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-06-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-07-31 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-08-23 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-06-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Workplan
Completed Date: 2006-08-17 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Workplan
Completed Date: 2006-08-28 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2007-01-05 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Date: 2007-10-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2007-05-23 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2007-07-30 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: AB 2061 - Designation
Completed Date: 1996-05-29 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operation & Maintenance Order/Agreement
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Allocation of Liability for SB 923 Sites
Completed Date: 1998-02-24 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: CEQA - Notice of Exemption
Completed Date: 1998-02-24 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Certification
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Voluntary Cleanup Agreement
Completed Date: 1997-01-07 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Conferences for SB 923 Sites
Completed Date: 1996-08-21 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Plan
Completed Date: 1998-02-24 00:00:00

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Preliminary Endangerment Assessment Report
Completed Date: 1996-04-30 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-05-11 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-05-11 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-06-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-10-25 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-09-19 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Workplan
Completed Date: 2006-08-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2007-01-05 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Fieldwork
Completed Date: 2007-03-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2007-02-05 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-12-20 00:00:00

Confirmed: 30027
Confirmed Description: Trichloroe

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Future Area Name: PROJECT WIDE
Future Sub Area Name: Not reported
Future Document Type: 5 Year Review Reports
Future Due Date: 2009
Media Affected: OTH
Media Affected Desc: Other Grou

Management:
Management Required: REM, LUC, MON, GW, OIL, NOWN, NDAM, NUSE, EXT
Management Required Desc: Activities
Management Required Desc: Land Use c
Management Required Desc: Maintain m
Management Required Desc: No groundw
Management Required Desc: No oil or
Management Required Desc: Notify aft
Management Required Desc: Notify dam
Management Required Desc: Notify pri
Management Required Desc: Only extra
Potential: 30027
Potenital Description: Trichloroe
Schedule Area Name: Not reported
Schedule Sub Area Name: Not reported
Schedule Document Type: Not reported
Schedule Due Date: Not reported
Schedule Revised Date: Not reported
PastUse: ENGINE TESTING/REPAIR, RETAIL - VEHICLES, VEHICLE MAINTENANCE

DEED:
Area: PROJECT WIDE
Sub Area: Not reported
Site Type: STATE RESPONSE
Status: CERTIFIED / OPERATION & MAINTENANCE
Deed Date(s): 3/1/1999

ENVIROSTOR:
Site Type: State Response
Site Type Detailed: State Response ERAP
Acres: 4.34
NPL: NO
Regulatory Agencies: SMBRP, RWQCB 1 - North Coast
Lead Agency: SMBRP
Program Manager: JANET NAITO
Supervisor: Barbara Cook
Division Branch: Berkeley
Facility ID: 49650001
Site Code: 290002
Assembly: 07
Senate: 02
Special Program: Designation of Single Agency
Status: Certified / Operation & Maintenance
Status Date: 1999-03-01 00:00:00
Restricted Use: YES
Funding: Responsible Party
Latitude: 38.4841333162913
Longitude: -122.737607633446
Alias Name: FOUNTAINGROVE PLAZA
Alias Type: Alternate Name

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Alias Name:	290002
Alias Type:	Project Code (Site Code)
Alias Name:	110033614792
Alias Type:	EPA (FRS #)
Alias Name:	058-035-24
Alias Type:	APN
Alias Name:	058-035-24.
Alias Type:	APN
Alias Name:	49650001
Alias Type:	Envirostor ID Number

APN:	058-035-24., 058-035-24
APN Description:	Not reported
APN Description:	Not reported
Comments:	Approved 5 Year Review.Approved PEA documenting PCE contamination.Approved Public Participation Plan.Report approved with modifications and requirements for subsequent reports.Report accepted, SCS will submit proposal for repair/replacement of damaged well.DTSC reviewed the responses to our comments sent via email by G. Suemnicht and determined that they addressed our comments.Report approved with modifications.Workplan for inspecting wells noted as being damaged approved for implementation with modifications.Workplan to repair damaged wells is being implemented. All wells except one should be available for sounding as part of September sounding event.Report includes the information required in a monthly report. However, the groundwater extraction system has not yet been restarted.Insufficient information and analysis has been submitted to support the document’s conclusion that the Site has achieved asymptotic levels. The groundwater extraction system has not operated continuously over the past year within the operating paraApproved Implementation Report. Approximately 3 to 6 gallons per minute of groundwater removed fom the extraction trench and disposed to the sanitary sewer under permit from the City.Approved RAP requiring installation of groundwater extraction from a trench and direct discharge to sanitary sewer under a permit from the City of Santa Rosa.Signed Expedited Remedial Action Enforceable Agreement with Fountaingrove Plaza Associates.Plan concluded an Allocation of Liability allocating 26 to Fountaingrove Plaza and 74 to Orphan Share.Signed O&M Agreement with Fountaingrove Plaza Associates for operation, maintenance and monitoring of the groundwater extraction system.Three comments sent via email. 1. Table 2, Cumulative Groundwater Treatment System Results. Subsequent reports including this table should include the restart date for the groundwater extraction and treatment system in the notes for 10/27/2006.The groundwater elevation in Table 1A for MW-24 is correct (139.34 feet MSL). This groundwater elevation was usd to determine the isopleths and flow directions on Figure 3. SCS staff indicated that the groundwater elevation for MW-24 shown on FiguInvestigation found the TCE plume was contained on-site. TCE found in shallow groundwater at concentrations up to 1300 parts per billion (ug/L).Site Screening noted VOCs problem.Report submitted late. Comment letter combined with comments on other documents. Report indicates that required capture zone has not been achieved.Report submitted late. Comment letter combined with comments on other documents. Report indicates that required capture zone has not been achieved.Report approved with requirements for subsequent reportsComments to be addressed in subsequent reports.Report reviewed. No significant

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

comments.Installation of an additional monitoring well approved. Work Plan approved with modifications and comments.Report approved with modifications. Work Plan to achieve required capture zone was required on 12/5/2006.DTSC received notification that project manager for SCS Engineers changed from Gene Suemnicht, CEG, to Karin Fresnel, CEG #2264.Consultant notified on 3/13 via email that sampling event would occur on 3/15/07.Designated for ERAP pilot project.2. Figure 3, Site Plan with Groundwater Elevation Contours for April 2007. The capture zone for the groundwater extraction trench is required on this figure. I am going to need a revised figure showing this in next month's monthly report. 3.re 4 is a typographical error that was not caught during internal QA/QC.meters outlined in the RAP. Therefore, recommendations not approved.It looks like SCS is consistently conducting the sounding events in the middle of the month. Therefore, would it make sense to revise the existing requirement to require sounding in the middle of the month instead of during the first full week of the month?

Completed Info:

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Investigation / Feasibility Study
Completed Date: 1997-09-30 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Site Screening
Completed Date: 1996-04-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: 5 Year Review Reports
Completed Date: 2004-03-26 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Manual
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Remedial Action Completion Report
Completed Date: 1999-02-26 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Public Participation Plan / Community Relations Plan
Completed Date: 1996-10-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-06-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Other Report
Completed Date: 2006-07-31 00:00:00

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-08-23 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2006-06-15 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Workplan
Completed Date: 2006-08-17 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Technical Workplan
Completed Date: 2006-08-28 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2007-01-05 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operations and Maintenance Report
Completed Date: 2007-10-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2007-05-23 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Long Term Monitoring Report
Completed Date: 2007-07-30 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: AB 2061 - Designation
Completed Date: 1996-05-29 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Land Use Restriction
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported
Completed Document Type: Operation & Maintenance Order/Agreement
Completed Date: 1999-03-01 00:00:00

Completed Area Name: PROJECT WIDE
Completed Sub Area Name: Not reported

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Document Type:	Allocation of Liability for SB 923 Sites
Completed Date:	1998-02-24 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	CEQA - Notice of Exemption
Completed Date:	1998-02-24 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Certification
Completed Date:	1999-03-01 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Voluntary Cleanup Agreement
Completed Date:	1997-01-07 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Conferences for SB 923 Sites
Completed Date:	1996-08-21 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Remedial Action Plan
Completed Date:	1998-02-24 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Preliminary Endangerment Assessment Report
Completed Date:	1996-04-30 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Other Report
Completed Date:	2006-05-11 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Other Report
Completed Date:	2006-05-11 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Other Report
Completed Date:	2006-06-15 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Operations and Maintenance Report
Completed Date:	2006-10-25 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Operations and Maintenance Report
Completed Date:	2006-09-19 00:00:00

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Technical Workplan
Completed Date:	2006-08-01 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Other Report
Completed Date:	2007-01-05 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Fieldwork
Completed Date:	2007-03-15 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Operations and Maintenance Report
Completed Date:	2007-02-05 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Operations and Maintenance Report
Completed Date:	2006-12-20 00:00:00
Confirmed:	30027
Confirmed Description:	Trichloroe
Future Area Name:	PROJECT WIDE
Future Sub Area Name:	Not reported
Future Document Type:	5 Year Review Reports
Future Due Date:	2009
Media Affected:	OTH
Media Affected Desc:	Other Grou

Management:

Management Required:	REM, LUC, MON, GW, OIL, NOWN, NDAM, NUSE, EXT
Management Required Desc:	Activities
Management Required Desc:	Land Use c
Management Required Desc:	Maintain m
Management Required Desc:	No groundw
Management Required Desc:	No oil or
Management Required Desc:	Notify aft
Management Required Desc:	Notify dam
Management Required Desc:	Notify pri
Management Required Desc:	Only extra
Potential:	30027
Potenital Description:	Trichloroe
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported
PastUse:	ENGINE TESTING/REPAIR, RETAIL - VEHICLES, VEHICLE MAINTENANCE

HISTORICAL CAL-SITES:

Facility ID:	49650001
Region:	2

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Region Name: BERKELEY
Branch: NC
Branch Name: NORTH COAST
File Name: FOUNTAINGROVE PLAZA SITE
State Senate District: 03011999
Status: COM - CERTIFIED OPERATION AND MAINTENANCE, ALL PLANNED ACTIVITIES IMPLEMENTED REMEDIATION CONTINUES
Status Name: CERTIFIED / OPERATION & MAINTENANCE
Lead Agency: DTSC
Lead Agency: DEPT OF TOXIC SUBSTANCES CONTROL
Facility Type: ERAP
Type Name: EXPEDITED REMEDIAL ACTION PROGRAM
NPL: Not Listed
SIC Code: 65
SIC Name: REAL ESTATE
Access: Controlled
Cortese: Not reported
Hazardous Ranking Score: Not reported
Date Site Hazard Ranked: Not reported
Groundwater Contamination: Not reported
Staff Member Responsible for Site: JNAITO
Supervisor Responsible for Site: Not reported
Region Water Control Board: NC
Region Water Control Board Name: NORTH COAST
Lat/Long Direction: Not reported
Lat/Long (dms): 0 0 0 / 0 0 0
Lat/long Method: Not reported
Lat/Long Description: Not reported
State Assembly District Code: 07
State Senate District Code: 02
Facility ID: 49650001
Activity: PEA
Activity Name: PRELIMINARY ENDANGERMENT ASSESSMENT
AWP Code: Not reported
Proposed Budget: 0
AWP Completion Date: Not reported
Revised Due Date: Not reported
Comments Date: 04301996
Est Person-Yrs to complete: 0
Estimated Size: Not reported
Request to Delete Activity: Not reported
Activity Status: COM
Definition of Status: CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals): 0
Liquids Treated (Gals): 0
Action Included Capping: Not reported
Well Decommissioned: Not reported
Action Included Fencing: Not reported
Removal Action Certification: Not reported
Activity Comments: Not reported
For Commercial Reuse: 0
For Industrial Reuse: 0
For Residential Reuse: 0
Unknown Type: 0
Facility ID: 49650001
Activity: SS
Activity Name: SITE SCREENING

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	04011996
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	PRP
Activity Name:	POTENTIAL RESPONSIBLE PARTY SEARCH
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	08211996
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	CONF
Activity Name:	SITE CONFERENCES FOR SB 923 SITES
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	08211996
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	ORDER
Activity Name:	I/SE, IORSE, FFA, FFSRA, VCA, EA
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	01071997
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	PPP
Activity Name:	PUBLIC PARTICIPATION PLAN
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	10151996
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	RIFS
Activity Name:	REMEDIAL INVESTIGATION / FEASIBILITY STUDY
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	09301997
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	RAP
Activity Name:	REMEDIAL ACTION PLAN / RECORD OF DECISION
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	02241998
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	RMDL
Activity Name:	REMEDIAL ACTION (RAP REQUIRED)
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Revised Due Date:	Not reported
Comments Date:	02261999
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	N
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	CERT
Activity Name:	CERTIFICATION
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03011999
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	14
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	CEQA
Activity Name:	CEQA INCLUDING NEGATIVE DECS
AWP Code:	NOE
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	02241998
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	ALLOC
Activity Name:	ALLOCATION OF LIABILITY FOR SB 923 SITES
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	02241998
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	ORDER
Activity Name:	I/SE, IORSE, FFA, FFSRA, VCA, EA
AWP Code:	OM
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03011999
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Facility ID:	49650001
Activity:	DEED
Activity Name:	DEED RESTRICTIONS
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03011999
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	OM
Activity Name:	OPERATION & MAINTENANCE
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03011999
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	5YEAR
Activity Name:	FIVE-YEAR REVIEW REQUIRED BY CERCLA
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	03262004
Est Person-Yrs to complete:	0

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	2061
Activity Name:	AB 2061 DESIGNATION
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	Not reported
Revised Due Date:	Not reported
Comments Date:	05291996
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported
Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Facility ID:	49650001
Activity:	5YEAR
Activity Name:	FIVE-YEAR REVIEW REQUIRED BY CERCLA
AWP Code:	Not reported
Proposed Budget:	0
AWP Completion Date:	02262009
Revised Due Date:	Not reported
Comments Date:	Not reported
Est Person-Yrs to complete:	0
Estimated Size:	Not reported
Request to Delete Activity:	Not reported
Activity Status:	COM
Definition of Status:	CERTIFIED / OPERATION & MAINTENANCE
Liquids Removed (Gals):	0
Liquids Treated (Gals):	0
Action Included Capping:	Not reported
Well Decommissioned:	Not reported
Action Included Fencing:	Not reported

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Removal Action Certification:	Not reported
Activity Comments:	Not reported
For Commercial Reuse:	0
For Industrial Reuse:	0
For Residential Reuse:	0
Unknown Type:	0
Alternate Address:	3975 OLD REDWOOD HIGHWAY
Alternate City,St,Zip:	SANTA ROSA, CA 95403
Background Info:	The site consists of approximately 9 acres of flat vacant land and located on the outskirts of the City of Santa Rosa. Based on a review of historical records, it was determined that a gasoline service station operated at the site from at least the 1950's - 1964. Stevenson Equipment Company, Inc. owned the property from 1962 - 1986. Stevenson Equipment was in the business of repairing heavy equipment and selling new equipment and is no longer in business.
Comments Date:	01071997
Comments:	Signed Expedited Remedial Agreement.
Comments Date:	02241998
Comments:	Approved RAP requiring installation of groundwater extraction
Comments Date:	02241998
Comments:	from a trench and direct discharge to sanitary sewer under a
Comments Date:	02241998
Comments:	permit from the City of Santa Rosa. Plan concluded an
Comments Date:	02241998
Comments:	Allocation of Liability allocating 26% to Fountaingrove Plaza
Comments Date:	02241998
Comments:	and 74% to Orphan Share.
Comments Date:	02261999
Comments:	Approved Implementation Plan. Approximately 3 to 6 gallons per
Comments Date:	02261999
Comments:	minute of groundwater discharges into the trench.
Comments Date:	03011999
Comments:	Approved O&M Plan covering groundwater extraction and monitoring
Comments Date:	03011999
Comments:	program. Also Deed Restriction recorded prohibiting use of
Comments Date:	03011999
Comments:	shallow groundwater and prohibit disturbance of extraction.
Comments Date:	03011999
Comments:	Signed O&M Agreement covering system.
Comments Date:	03262004
Comments:	Approved 5 Year Review.
Comments Date:	04011996
Comments:	Site Screening noted VOCs problem.
Comments Date:	04301996
Comments:	Approved PEA documenting PCE contamination.
Comments Date:	05291996
Comments:	Designated for ERAP pilot project.
Comments Date:	08211996
Comments:	Conducted site conference with appropriate regulatory agencies
Comments Date:	08211996
Comments:	and completed PRP search.
Comments Date:	09301997
Comments:	Investigation found the TCE plume was contained on-site. TCE
Comments Date:	09301997
Comments:	found in shallow groundwater at concentrations up to 1300 parts
Comments Date:	09301997

FOUNTAINGROVE PLAZA SITE (Continued) **S102564485**

Comments: per billion (ug/L).
Comments Date: 10151996
Comments: Approved Public Participation Plan.
ID Name: CALSTARS CODE
ID Value: 290002
Alternate Name: FOUNTAINGROVE PLAZA SITE
Special Programs Code: Not reported
Special Programs Name: Not reported

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23 SSE 1/2-1 0.991 mi. 5234 ft.	**H & C METALS AIRWAY DRIVE 3555 SANTA ROSA, CA**	**Notify 65 LUST SWEEPS UST**	**S100236151 N/A**

Relative: Lower

Actual: 137 ft.

Notify 65:
Date Reported: Not reported
Staff Initials: Not reported
Board File Number: Not reported
Facility Type: Not reported
Discharge Date: Not reported
Incident Description: 93582

LUST:
Region: STATE
Global Id: T0609700623
Latitude: 38.478691
Longitude: -122.7381736
Case Type: LUST Cleanup Site
Status: Completed - Case Closed
Status Date: 1996-02-14 00:00:00
Lead Agency: NORTH COAST RWQCB (REGION 1)
Case Worker: Not reported
Local Agency: SANTA ROSA, CITY OF
RB Case Number: 1TSR112
LOC Case Number: Not reported
File Location: Not reported
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST REG 1:
Region: 1
Facility ID: 1TSR112
Staff Initials: Closed

SWEEPS UST:
Status: Not reported
Comp Number: 302
Number: Not reported
Board Of Equalization: Not reported
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported

H & C METALS (Continued) **S100236151**

Swrcb Tank Id:	49-060-000302-000001
Actv Date:	Not reported
Capacity:	4000
Tank Use:	M.V. FUEL
Stg:	PRODUCT
Content:	REG UNLEADED
Number Of Tanks:	1

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
SANTA ROSA	1009398328	SONOMA 101 HIGHWAY WIDENING	ROUTE 101	95403	RCRA-LQG
SANTA ROSA	S106235093	LOS GUILICOS	HWY 12 / PYTHIAN RD		SLIC
SANTA ROSA	S108753065	PINE CREEK PROPERTIES INC	3358 COFFEY LN STE C	95403	HAZNET
SANTA ROSA	S101309809	EMPIRE BUILDING	COURTHOUSE SQU., OLD 37		LUST, SLIC
SANTA ROSA	S101304919	SHELL (DUTTON)	DUTTON AVENUE 255		Notify 65, LUST, SLIC
SANTA ROSA	S105051171	SANTA ROSA COMMUNITY DEVELOPMENT S	LUDWIG ROAD/WRIGHT ROAD/HIGHWA		SLIC
SANTA ROSA	S109118026	SANTA ROSA COMMUNITY DEVELOPMENT S	LUDWIG ROAD/WRIGHT ROAD/HIGHWA		SLIC
SANTA ROSA	S104857240	MISSION ARBORS	MISSION BLVD AT HIGHWAY 12 100		LUST
SANTA ROSA	S104857236	AUTO EXCHANGE	OLD REDWOOD HIGHWAY 5352		LUST
SANTA ROSA	S103393013	SCDPW LARKFIELD SEWER	REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S105051009	UNITY CHURCH	4351 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S105051166	REED, LILLIE	5716 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S102429807	FAST & EASY MART	REDWOOD HIGHWAY, OLD 5321		LUST
SANTA ROSA	S104163196	YOLO, DANIEL	REDWOOD HIGHWAY, OLD 5807		LUST
SANTA ROSA	S104163195	STEVENSON EQUIPMENT	REDWOOD HIGHWAY, OLD 3975		LUST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 02/02/2009
Date Data Arrived at EDR: 02/12/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 46

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 02/02/2009
Date Data Arrived at EDR: 02/12/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 46

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 02/02/2009
Date Data Arrived at EDR: 02/12/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 46

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/07/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 53

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/30/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/17/2008
Date Data Arrived at EDR: 12/22/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 98

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Transporters, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 118

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 118

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 118

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 118

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/30/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 02/23/2009
Date Data Arrived at EDR: 02/24/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 43

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/24/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 02/23/2009
Date Data Arrived at EDR: 02/24/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 43

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/24/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 03/09/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 03/10/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 02/02/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Varies

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

LUST: Geotracker's Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 19

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/06/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 19

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2008
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 03/03/2009
Date Data Arrived at EDR: 03/04/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 26

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 03/13/2009
Date Data Arrived at EDR: 03/17/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 13

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 12/15/2008
Date Data Arrived at EDR: 12/16/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 90

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 06/06/2008
Date Data Arrived at EDR: 10/09/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 41

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Semi-Annually

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 02/15/2009
Date Data Arrived at EDR: 02/27/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 17

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 12/03/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 20

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/20/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 01/06/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/30/2009
Number of Days to Update: 22

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 11/01/2007
Date Data Arrived at EDR: 02/10/2009
Date Made Active in Reports: 04/14/2009
Number of Days to Update: 63

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/19/2009
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 25

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 06/06/2008
Date Data Arrived at EDR: 10/09/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 41

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 11/25/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 27

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 12/30/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 76

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/20/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 03/13/2009
Date Data Arrived at EDR: 03/17/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 13

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 03/03/2009
Date Data Arrived at EDR: 03/04/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 26

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/15/2008
Date Data Arrived at EDR: 12/16/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 90

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 02/23/2009
Date Data Arrived at EDR: 02/24/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 43

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/24/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 11/14/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 02/10/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 03/04/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 01/05/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 19

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 12/22/2008
Date Data Arrived at EDR: 12/22/2008
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 36

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/26/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 02/23/2009
Date Data Arrived at EDR: 02/24/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 43

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/24/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs
A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 04/03/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/29/2008
Date Data Arrived at EDR: 12/29/2008
Date Made Active in Reports: 01/30/2009
Number of Days to Update: 32

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Varies

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990’s. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 11/20/2008
Date Data Arrived at EDR: 12/23/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 03/09/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 02/13/2009
Date Data Arrived at EDR: 02/17/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 50

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/02/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 8

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 34

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 04/16/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 05/09/2008
Date Made Active in Reports: 06/20/2008
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 01/06/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 19

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 01/06/2009
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 19

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/18/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 118

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/25/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 05/14/2008
Date Data Arrived at EDR: 05/28/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 72

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/24/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 02/06/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 11/03/2008
Date Data Arrived at EDR: 01/06/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 83

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 10/21/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 55

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Varies

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 10/31/2008
Date Data Arrived at EDR: 12/23/2008
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 97

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/24/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 04/09/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 04/14/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 12/04/2008
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 08/13/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 02/02/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 01/07/2009
Date Data Arrived at EDR: 01/15/2009
Date Made Active in Reports: 03/30/2009
Number of Days to Update: 74

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/30/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/30/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/19/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 01/21/2009
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner’s agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/23/2008
Date Data Arrived at EDR: 09/24/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 5

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 10/31/2008
Date Data Arrived at EDR: 11/03/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 23

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 02/17/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 50

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 02/17/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 41

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 02/06/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 12/08/2008
Date Data Arrived at EDR: 12/09/2008
Date Made Active in Reports: 03/16/2009
Number of Days to Update: 97

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Varies

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 02/06/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: N/A

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/23/2009
Date Data Arrived at EDR: 01/23/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 75

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

Underground Tanks
Underground storage tank sites located in Alameda county.

Date of Government Version: 01/23/2009
Date Data Arrived at EDR: 01/23/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 76

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 02/24/2009
Date Data Arrived at EDR: 02/25/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 42

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 01/14/2009
Date Data Arrived at EDR: 01/15/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 12

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 02/02/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 9

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 07/07/1999
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 11/26/2008
Date Data Arrived at EDR: 01/27/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 71

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 11/10/2008
Date Data Arrived at EDR: 11/25/2008
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 63

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 02/11/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 03/10/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/14/2008
Date Data Arrived at EDR: 04/10/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 26

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 02/09/2009
Date Data Arrived at EDR: 02/17/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 51

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 02/09/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 02/20/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 02/23/2009
Date Data Arrived at EDR: 02/24/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 44

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/11/2009
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 02/05/2009
Date Data Arrived at EDR: 02/17/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 51

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Semi-Annually

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Annually

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 03/02/2009
Date Data Arrived at EDR: 03/18/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 21

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 03/05/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Date Data Arrived at EDR: 03/27/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 12

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 03/05/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities

Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 03/02/2009
Date Data Arrived at EDR: 03/18/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 22

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities

List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 01/26/2009
Date Data Arrived at EDR: 02/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 57

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 04/03/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites

Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Date Data Arrived at EDR: 11/17/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 9

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Quarterly

Underground Storage Tank Tank List

Underground storage tank sites located in Riverside county.

Date of Government Version: 02/19/2009
Date Data Arrived at EDR: 02/20/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 48

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Contaminated Sites

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 01/30/2009
Date Data Arrived at EDR: 02/03/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 64

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/30/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

ML - Regulatory Compliance Master List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 01/30/2009
Date Data Arrived at EDR: 02/03/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 64

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 01/30/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 01/07/2009
Date Data Arrived at EDR: 01/09/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 18

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 04/03/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 11/01/2008
Date Data Arrived at EDR: 12/23/2008
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 35

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 01/22/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 8

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 03/31/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 12

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 02/10/2009
Date Data Arrived at EDR: 02/25/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 43

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 01/29/2009
Date Data Arrived at EDR: 01/30/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 68

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Annually

Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Date Data Arrived at EDR: 01/06/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 21

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Date Data Arrived at EDR: 12/29/2008
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 29

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Varies

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 03/03/2009
Date Data Arrived at EDR: 03/03/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 36

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 03/03/2009
Next Scheduled EDR Contact: 06/01/2009
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Date Data Arrived at EDR: 01/30/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 68

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Quarterly

Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Date Data Arrived at EDR: 02/03/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 65

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Date Data Arrived at EDR: 01/21/2009
Date Made Active in Reports: 01/27/2009
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 04/01/2009
Date Data Arrived at EDR: 04/02/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 7

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 03/30/2009
Next Scheduled EDR Contact: 06/29/2009
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 02/26/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 8

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/10/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/16/2009
Next Scheduled EDR Contact: 05/18/2009
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 06/09/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 12/29/2008
Date Data Arrived at EDR: 01/08/2009
Date Made Active in Reports: 01/30/2009
Number of Days to Update: 22

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 04/08/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 01/14/2009
Date Data Arrived at EDR: 02/06/2009
Date Made Active in Reports: 04/09/2009
Number of Days to Update: 62

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 04/13/2009
Next Scheduled EDR Contact: 07/13/2009
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 12/11/2008
Date Made Active in Reports: 03/19/2009
Number of Days to Update: 98

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 03/13/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 09/30/2007
Date Data Arrived at EDR: 12/04/2007
Date Made Active in Reports: 12/31/2007
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 02/20/2009
Next Scheduled EDR Contact: 05/04/2009
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/27/2009
Date Data Arrived at EDR: 02/25/2009
Date Made Active in Reports: 03/12/2009
Number of Days to Update: 15

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/25/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/11/2008
Date Made Active in Reports: 10/02/2008
Number of Days to Update: 21

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 03/09/2009
Next Scheduled EDR Contact: 06/08/2009
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2008
Date Data Arrived at EDR: 02/12/2009
Date Made Active in Reports: 03/11/2009
Number of Days to Update: 27

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 03/16/2009
Next Scheduled EDR Contact: 06/15/2009
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/08/2008
Number of Days to Update: 17

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 04/07/2009
Next Scheduled EDR Contact: 07/06/2009
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association’s annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ® - PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

LBC / SMC-SR PROPERTIES
50 MARK WEST SPRINGS ROAD
SANTA ROSA, CA 95403

TARGET PROPERTY COORDINATES

Latitude (North):	38.49450 - 38˚ 29’ 40.2’’
Longitude (West):	122.75 - 122˚ 45’ 0.0’’
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521801.7
UTM Y (Meters):	4260506.0
Elevation:	159 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
North Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
West Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
Northwest Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

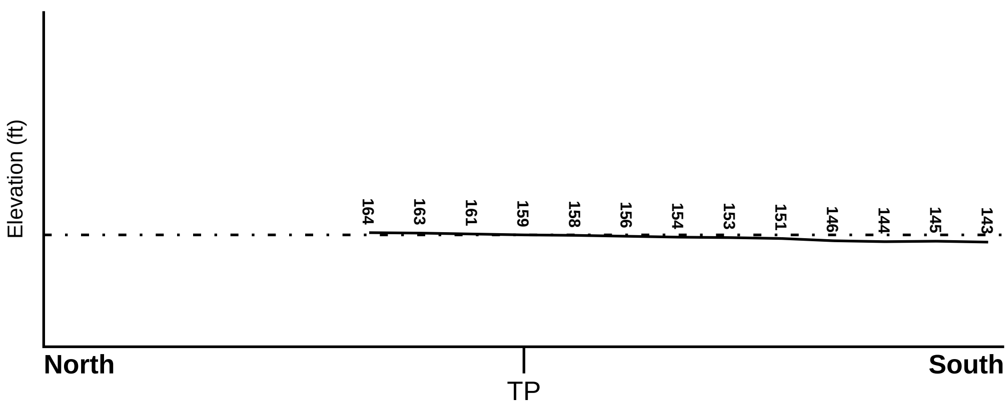
TOPOGRAPHIC INFORMATION

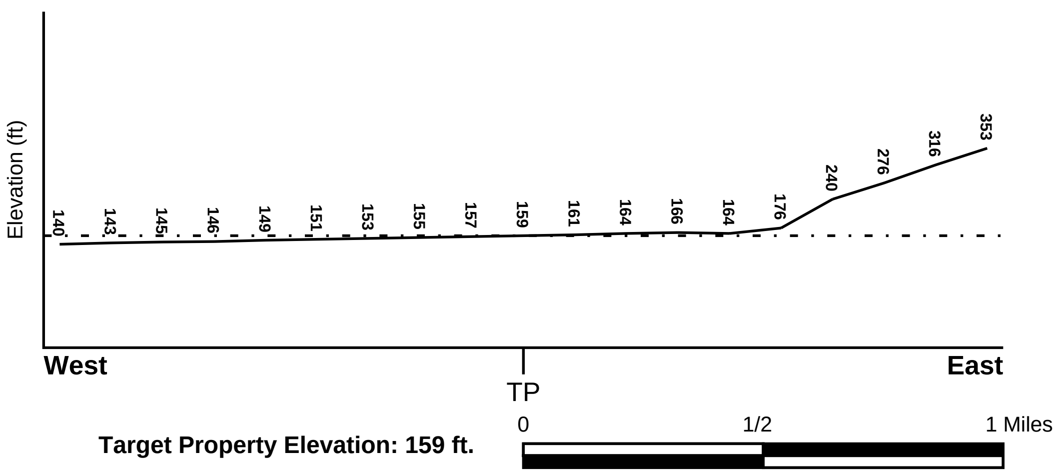
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General SW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 159 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
SONOMA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 0603750725B

Additional Panels in search area: 0603750545B
0603750565B
0603750685B
0603810005B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
SANTA ROSA	Not Available

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
B3	1/8 - 1/4 Mile North	Not Reported
B4	1/8 - 1/4 Mile North	NNE
B5	1/8 - 1/4 Mile North	Varies
B6	1/8 - 1/4 Mile NNE	NNE
8	1/4 - 1/2 Mile NNW	SW
9	1/2 - 1 Mile NNW	Varies

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

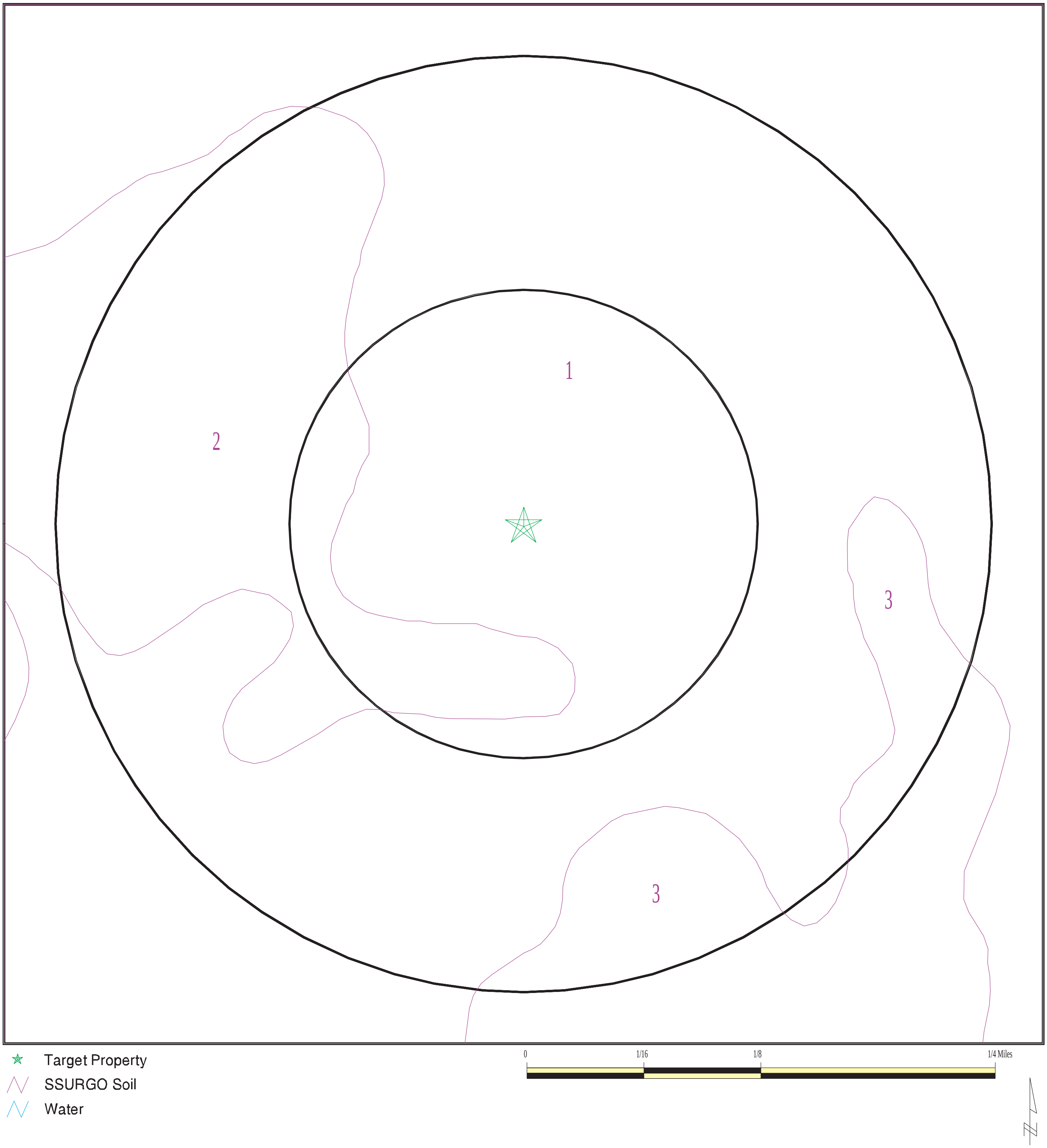
Era: Cenozoic
System: Tertiary
Series: Pliocene volcanic rocks
Code: Tpv *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Volcanic Rocks

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 02469780.1r



SITE NAME: LBC / SMC-SR Properties	CLIENT: Engeo Inc.
ADDRESS: 50 Mark West Springs Road	CONTACT: Keith Nowell
Santa Rosa CA 95403	INQUIRY #: 02469780.1r
LAT/LONG: 38.4945 / 122.7500	DATE: April 16, 2009 1:37 pm

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: YOLO

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	7 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 2

Soil Component Name: YOLO

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 3

Soil Component Name: CORTINA

Soil Surface Texture: very gravelly sandy loam

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	very gravelly sandy loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 5.6
2	7 inches	59 inches	stratified very gravelly loamy sand to very gravelly loam	Granular materials (35 pct. or less passing No. 200), Stone Fragments, Gravel and Sand.	COARSE-GRAINED SOILS, Gravels, Gravels with fines, Silty Gravel	Max: 42 Min: 14	Max: 7.3 Min: 5.6

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	USGS3236471	0 - 1/8 Mile SSE
C10	USGS3236492	1/2 - 1 Mile NW
C11	USGS3236493	1/2 - 1 Mile NW
15	USGS3236507	1/2 - 1 Mile North
E20	USGS3236508	1/2 - 1 Mile NNW

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

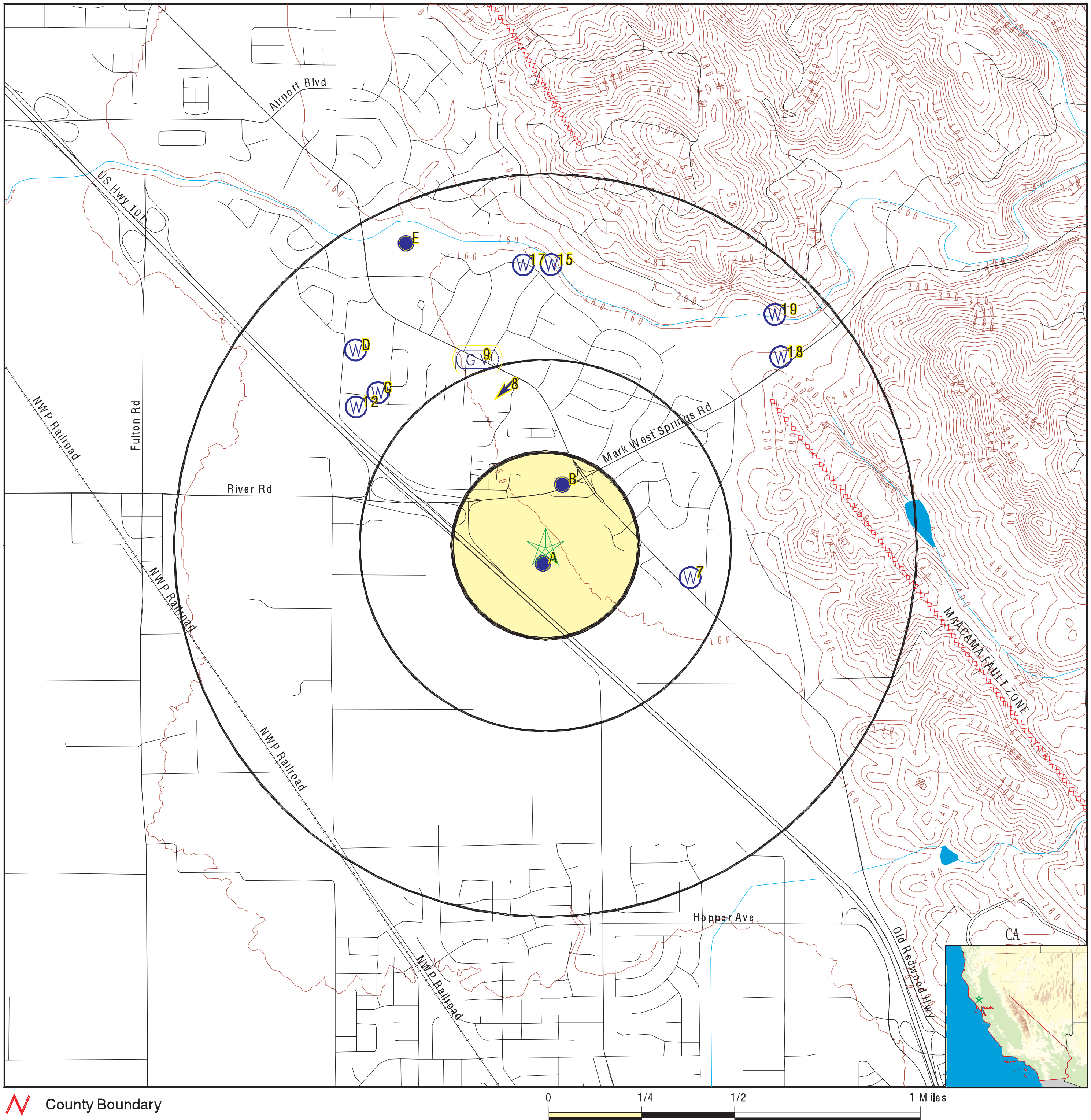
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A2	8409	0 - 1/8 Mile SW
7	8408	1/4 - 1/2 Mile ESE
12	20765	1/2 - 1 Mile NW
D13	8407	1/2 - 1 Mile NW
D14	8406	1/2 - 1 Mile NW
D16	8401	1/2 - 1 Mile NW
17	8400	1/2 - 1 Mile North
18	8410	1/2 - 1 Mile NE
19	20766	1/2 - 1 Mile NE
E21	8399	1/2 - 1 Mile NNW

PHYSICAL SETTING SOURCE MAP - 02469780.1r



County Boundary
Major Roads
Contour Lines
Earthquake Fault Lines
Earthquake epicenter, Richter 5 or greater
Water Wells
Public Water Supply Wells
Cluster of Multiple Icons

Groundwater Flow Direction
Indeterminate Groundwater Flow at Location
Groundwater Flow Varies at Location
Closest Hydrogeological Data
Oil, gas or related wells

SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa CA 95403 LAT/LONG: 38.4945 / 122.7500	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02469780.1r DATE: April 16, 2009 1:37 pm

Map ID Direction Distance Elevation	Database	EDR ID Number
A1 **SSE** **0 - 1/8 Mile** **Higher**	**FED USGS**	**USGS3236471**

Agency cd:	USGS	Site no:	382938122445401
Site name:	008N008W33K001M		
Latitude:	382938		
Longitude:	1224454	Dec lat:	38.49379952
Dec lon:	-122.74943211	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWSES 33T 08NR 08WM
Location map:	SANTA ROSA	Map scale:	24000
Altitude:	155		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19731023
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	400	Hole depth:	400
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1973-10-01	Ground water data end date:	1973-10-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1973-10-01	15.00	

Map ID Direction Distance Elevation	Database	EDR ID Number
A2 **SW** **0 - 1/8 Mile** **Higher**	**CA WELLS**	**8409**

Water System Information:

Prime Station Code:	08N/08W-33K01 M	User ID:	49C
FRDS Number:	4900685001	County:	Sonoma
District Number:	79	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382938.0 1224459.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		

System Number:	4900685		
System Name:	LUTHER BURBANK CENTER		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		
Sample Collected:	08/10/2007 00:00:00	Findings:	320 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/10/2007 00:00:00	Findings:	6.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	08/10/2007 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/10/2007 00:00:00	Findings:	119 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/10/2007 00:00:00	Findings:	190 UG/L
Chemical:	IRON		
Sample Collected:	08/10/2007 00:00:00	Findings:	91 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/10/2007 00:00:00	Findings:	230 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/10/2007 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

B3
North
1/8 - 1/4 Mile
Higher

AQUIFLOW 70934

Site ID:	Not Reported
Groundwater Flow:	Not Reported
Shallow Water Depth:	8.75
Deep Water Depth:	9
Average Water Depth:	Not Reported
Date:	04/30/1993

B4
North
1/8 - 1/4 Mile
Higher

AQUIFLOW 54266

Site ID:	Not Reported
Groundwater Flow:	NNE
Shallow Water Depth:	Not Reported
Deep Water Depth:	Not Reported
Average Water Depth:	Not Reported
Date:	11/24/1998

Map ID Direction Distance Elevation			Database	EDR ID Number
B5 **North** **1/8 - 1/4 Mile** **Higher**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Varies Not Reported Not Reported 10 06/18/1999	**AQUIFLOW**	**54544**
B6 **NNE** **1/8 - 1/4 Mile** **Higher**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported NNE Not Reported Not Reported Not Reported 11/24/1998	**AQUIFLOW**	**54267**
7 **ESE** **1/4 - 1/2 Mile** **Higher**			**CA WELLS**	**8408**

Water System Information:

Prime Station Code:	08N/08W-33J01 M	User ID:	RXR
FRDS Number:	4900869001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382936.0 1224430.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4900869		
System Name:	LA MANCHA APARTMENTS		
Organization That Operates System:			
	P.O. BOX 11427 SANTA ROSA, CA 95406		
Pop Served:	140	Connections:	1
Area Served:	Not Reported		
Sample Collected:	02/13/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	02/13/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		
Sample Collected:	02/12/2003 00:00:00	Findings:	5 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/12/2003 00:00:00	Findings:	9 UG/L
Chemical:	VANADIUM		
Sample Collected:	02/12/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	02/12/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		

8 **NNW** **1/4 - 1/2 Mile** **Higher**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported SW 11 14 Not Reported 04/26/1991	**AQUIFLOW**	**54548**

Map ID Direction Distance Elevation			Database	EDR ID Number
9 **NNW** **1/2 - 1 Mile** **Higher**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Varies 8 11 Not Reported 06/05/1996	**AQUIFLOW**	**54550**

C10
NW
1/2 - 1 Mile
Higher

FED USGS **USGS3236492**

Agency cd:	USGS	Site no:	383002122452501
Site name:	008N008W33D004M		
Latitude:	383002		
Longitude:	1224525	Dec lat:	38.5004661
Dec lon:	-122.75804356	Coor meth:	M
Coor accr:	T	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	360	Hole depth:	484
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

C11
NW
1/2 - 1 Mile
Higher

FED USGS **USGS3236493**

Agency cd:	USGS	Site no:	383002122452701
Site name:	008N008W33D003M		
Latitude:	383002		
Longitude:	1224527	Dec lat:	38.5004661
Dec lon:	-122.75859914	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19620601
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	380	Hole depth:	380
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

12
NW
1/2 - 1 Mile
Higher

CA WELLS 20765

Water System Information:

Prime Station Code:	4910023-005	User ID:	RXR
FRDS Number:	4910023005	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383000.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 05		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	11/15/2007 00:00:00	Findings:	1360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2007 00:00:00	Findings:	2069 UG/L
Chemical:	MANGANESE		

Sample Collected:	08/07/2007 00:00:00	Findings:	1829 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	1090 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1805 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1609 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1580 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	2093 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	1370 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	15 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	26 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	310 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		

Sample Collected:	07/11/2006 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	114 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1020 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1873 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	33 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	1697 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	900 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	1184 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/07/2005 00:00:00	Findings:	1257 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	340 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	1086 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

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Sample Collected:	02/09/2005 00:00:00	Findings:	860 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	1596 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	1333 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	370 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	1306 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	470 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	200 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.29
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	25 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	34.5 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		

Sample Collected: Chemical:	07/20/2004 00:00:00 SILICA	Findings:	82 MG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 ARSENIC	Findings:	6 UG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 BARIUM	Findings:	159 UG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 BORON	Findings:	112 UG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 IRON	Findings:	560 UG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 MANGANESE	Findings:	1545 UG/L
Sample Collected: Chemical:	07/20/2004 00:00:00 ZINC	Findings:	57 UG/L
Sample Collected: Chemical:	07/08/2004 00:00:00 IRON	Findings:	620 UG/L
Sample Collected: Chemical:	07/08/2004 00:00:00 ARSENIC	Findings:	5 UG/L
Sample Collected: Chemical:	07/08/2004 00:00:00 MANGANESE	Findings:	1690 UG/L
Sample Collected: Chemical:	05/04/2004 00:00:00 ARSENIC	Findings:	5 UG/L
Sample Collected: Chemical:	05/04/2004 00:00:00 IRON	Findings:	570 UG/L
Sample Collected: Chemical:	05/04/2004 00:00:00 MANGANESE	Findings:	1578 UG/L
Sample Collected: Chemical:	02/10/2004 00:00:00 IRON	Findings:	990 UG/L
Sample Collected: Chemical:	02/10/2004 00:00:00 ARSENIC	Findings:	6 UG/L
Sample Collected: Chemical:	02/10/2004 00:00:00 MANGANESE	Findings:	1814 UG/L
Sample Collected: Chemical:	11/04/2003 00:00:00 ARSENIC	Findings:	7 UG/L
Sample Collected: Chemical:	11/04/2003 00:00:00 MANGANESE	Findings:	942 UG/L
Sample Collected: Chemical:	11/04/2003 00:00:00 GROSS ALPHA COUNTING ERROR	Findings:	.63 PCI/L
Sample Collected: Chemical:	08/07/2003 00:00:00 GROSS ALPHA COUNTING ERROR	Findings:	.61 PCI/L
Sample Collected: Chemical:	08/04/2003 00:00:00 ARSENIC	Findings:	6 UG/L
Sample Collected: Chemical:	08/04/2003 00:00:00 MANGANESE	Findings:	864 UG/L
Sample Collected: Chemical:	05/27/2003 00:00:00 ARSENIC	Findings:	4 UG/L
Sample Collected: Chemical:	05/12/2003 00:00:00 GROSS ALPHA COUNTING ERROR	Findings:	.49 PCI/L
Sample Collected: Chemical:	02/25/2003 00:00:00 SPECIFIC CONDUCTANCE	Findings:	320 US

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Sample Collected:	02/25/2003 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	22 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	240 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	- .4
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/25/2003 00:00:00	Findings:	.2 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	.6 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	19 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	15 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	15.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	89 MG/L
Chemical:	SILICA		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/2003 00:00:00	Findings:	102 UG/L
Chemical:	BARIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	156 UG/L
Chemical:	BORON		
Sample Collected:	02/25/2003 00:00:00	Findings:	1115 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYBDENUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	.16 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		

Sample Collected:	02/06/2003 00:00:00	Findings:	6.2 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	118 UG/L
Chemical:	BARIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	22 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	12.3 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	.16 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	15 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1589 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

D13
NW
1/2 - 1 Mile
Higher

CA WELLS 8407

Water System Information:

Prime Station Code:	08N/08W-33D04 M	User ID:	RXR
FRDS Number:	4910023003	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383006.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 03		

System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

D14
NW
1/2 - 1 Mile
Higher

CA WELLS 8406

Water System Information:

Prime Station Code:	08N/08W-33D01 M	User ID:	RXR
FRDS Number:	4901048001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Untreated
Source Lat/Long:	383009.0 1224529.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4901048		
System Name:	MARK WEST SCHOOL		
Organization That Operates System:			
	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

15
North
1/2 - 1 Mile
Higher

FED USGS USGS3236507

Agency cd:	USGS	Site no:	383020122445501
Site name:	008N008W28Q001M		
Latitude:	383020		
Longitude:	1224455	Dec lat:	38.50546595
Dec lon:	-122.74970994	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWSWSES 28T 08NR 08WM
Location map:	MARK WEST SPRINGS	Map scale:	24000
Altitude:	160		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	20		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19590319
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	332	Hole depth:	332
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00

Peak flow data count: 0
Water quality data begin date: 0000-00-00
Water quality data end date: 0000-00-00
Water quality data count: 0
Ground water data begin date: 0000-00-00
Ground water data end date: 0000-00-00
Ground water data count: 0

Ground-water levels, Number of Measurements: 0

D16
NW
1/2 - 1 Mile
Higher

CA WELLS 8401

Water System Information:

Prime Station Code:	08N/08W-28Q02 M	User ID:	RXR
FRDS Number:	4910023002	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383009.9 1224531.1	Precision:	100 Feet (one Second)
Source Name:	WELL 02		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

17
North
1/2 - 1 Mile
Higher

CA WELLS 8400

Water System Information:

Prime Station Code:	08N/08W-28Q01 M	User ID:	RXR
FRDS Number:	4910023001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383020.5 1224500.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

18
NE
1/2 - 1 Mile
Higher

CA WELLS 8410

Water System Information:

Prime Station Code:	08N/08W-34D01 M	User ID:	RXR
FRDS Number:	4900890001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383007.0 1224414.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		

System Number:	4900890		
System Name:	REDWOOD JUNIOR ACADEMY		
Organization That Operates System:			
	385 MARK WEST SPRINGS RD.		
	SANTA ROSA, CA 95404		
Pop Served:	300	Connections:	1
Area Served:	Not Reported		
Sample Collected:	09/21/2005 00:00:00	Findings:	6.9 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	06/23/2004 00:00:00	Findings:	5.8 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.8 UG/L
Chemical:	BROMODICHLORMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	1.9 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.1 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	6.8 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	01/31/2002 00:00:00	Findings:	3.1 MG/L
Chemical:	NITRATE (AS NO3)		

19
NE
1/2 - 1 Mile
Higher

CA WELLS 20766

Water System Information:

Prime Station Code:	4910023-006	User ID:	RXR
FRDS Number:	4910023006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383013.0 1224415.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	11/12/2007 00:00:00	Findings:	770 UG/L
Chemical:	IRON		
Sample Collected:	11/12/2007 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/12/2007 00:00:00	Findings:	858 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	680 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	410 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	320 UG/L
Chemical:	IRON		

Sample Collected:	05/08/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	716 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	300 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	735 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	350 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	5 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	8.1
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	190 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	230 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	160 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.72
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.81 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	11.2 MG/L
Chemical:	CHLORIDE		

Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	161 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	213 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	380 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	819 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	490 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	827 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/26/2006 00:00:00	Findings:	805 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	03/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/14/2006 00:00:00	Findings:	2040 UG/L
Chemical:	IRON		
Sample Collected:	03/14/2006 00:00:00	Findings:	928 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/14/2006 00:00:00	Findings:	771 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	1930 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	940 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	782 UG/L
Chemical:	MANGANESE		

Sample Collected:	07/07/2005 00:00:00	Findings:	893 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	07/07/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	17 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	882 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	04/12/2005 00:00:00	Findings:	874 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/12/2005 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/12/2005 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	560 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	724 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/08/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/13/2004 00:00:00	Findings:	1130 UG/L
Chemical:	IRON		
Sample Collected:	12/13/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/13/2004 00:00:00	Findings:	739 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/08/2004 00:00:00	Findings:	749 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/08/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	11/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	480 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	804 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/07/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		

Sample Collected:	09/07/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/07/2004 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	719 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	500 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	590 UG/L
Chemical:	IRON		
Sample Collected:	07/20/2004 00:00:00	Findings:	768 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	170 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.52
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	4.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	33 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	12.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		

Sample Collected:	07/20/2004 00:00:00	Findings:	83 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	142 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	216 UG/L
Chemical:	BORON		
Sample Collected:	07/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	764 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/08/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	06/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	06/08/2004 00:00:00	Findings:	759 UG/L
Chemical:	MANGANESE		
Sample Collected:	06/08/2004 00:00:00	Findings:	580 UG/L
Chemical:	IRON		
Sample Collected:	05/04/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	891 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	1850 UG/L
Chemical:	IRON		
Sample Collected:	03/24/2004 00:00:00	Findings:	.55 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	01/12/2004 00:00:00	Findings:	1371 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	914 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	7120 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	1783 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	3770 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	7.2 UG/L
Chemical:	XYLENES (TOTAL)		
Sample Collected:	12/08/2003 00:00:00	Findings:	4.7 UG/L
Chemical:	M,P-XYLENE		

Sample Collected:	12/08/2003 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/08/2003 00:00:00	Findings:	7300 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	1293 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/08/2003 00:00:00	Findings:	2.5 UG/L
Chemical:	O-XYLENE		
Sample Collected:	12/08/2003 00:00:00	Findings:	1.2 UG/L
Chemical:	1,2,4-TRIMETHYLBENZENE		
Sample Collected:	11/04/2003 00:00:00	Findings:	757 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.65 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	10/07/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/07/2003 00:00:00	Findings:	681 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/10/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/07/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	760 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/04/2003 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	06/24/2003 00:00:00	Findings:	.52 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/28/2003 00:00:00	Findings:	.7 UG/L
Chemical:	STYRENE		
Sample Collected:	05/27/2003 00:00:00	Findings:	27 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	28 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	23 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	34 MG/L
Chemical:	SODIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	11.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	05/12/2003 00:00:00	Findings:	91 MG/L
Chemical:	SILICA		
Sample Collected:	05/12/2003 00:00:00	Findings:	51 UG/L
Chemical:	ARSENIC		

Sample Collected:	05/12/2003 00:00:00	Findings:	209 UG/L
Chemical:	BORON		
Sample Collected:	05/12/2003 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	05/12/2003 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	05/12/2003 00:00:00	Findings:	1093 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/12/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	.32 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	05/12/2003 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	24 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	05/12/2003 00:00:00	Findings:	- .21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	05/12/2003 00:00:00	Findings:	4.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	05/12/2003 00:00:00	Findings:	10 UNITS
Chemical:	COLOR		
Sample Collected:	05/12/2003 00:00:00	Findings:	460 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	05/12/2003 00:00:00	Findings:	7.5
Chemical:	PH, LABORATORY		
Sample Collected:	12/17/2002 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	740 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	20 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	224 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	35 MG/L
Chemical:	SODIUM		

Sample Collected:	12/17/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	11.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	143 UG/L
Chemical:	BARIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.47 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	.7 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/30/2002 00:00:00	Findings:	450 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/18/2002 00:00:00	Findings:	.64 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .058
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.49 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/26/2002 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	37 MG/L
Chemical:	SODIUM		

Sample Collected:	02/26/2002 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	12 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	150 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	200 UG/L
Chemical:	BORON		
Sample Collected:	02/26/2002 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		

E20
NNW
1/2 - 1 Mile
Higher

FED USGS **USGS3236508**

Agency cd:	USGS	Site no:	383023122452001
Site name:	008N008W28N001M		
Latitude:	383023		
Longitude:	1224520	Dec lat:	38.50629934
Dec lon:	-122.75665469	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NESWSWS 28T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19741120
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	410	Hole depth:	462
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
E21 **NNW** **1/2 - 1 Mile** **Higher**	**CA WELLS**	**8399**

Water System Information:

Prime Station Code:	08N/08W-28N01 M	User ID:	RXR
FRDS Number:	4910023004	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383023.0 1224522.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 04A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	12/11/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/11/2007 00:00:00	Findings:	720 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	688 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	150 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	697 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	682 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	160 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	130 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	300 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.9
Chemical:	PH, LABORATORY		

Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.11 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .22 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	13.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	82 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	124 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	781 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	747 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .21 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	02/14/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

Sample Collected:	02/14/2006 00:00:00	Findings:	650 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	729 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	833 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	873 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	120 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	586 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	712 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.7
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		

Sample Collected:	07/20/2004 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	13.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	81 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	121 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	151 UG/L
Chemical:	BORON		
Sample Collected:	07/20/2004 00:00:00	Findings:	696 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/08/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	709 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	721 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/10/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/10/2004 00:00:00	Findings:	705 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	11/04/2003 00:00:00	Findings:	695 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	616 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/27/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

Sample Collected:	02/25/2003 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/2003 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	24 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	23 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	.087
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/25/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	19 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	12.3 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	86 MG/L
Chemical:	SILICA		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/2003 00:00:00	Findings:	115 UG/L
Chemical:	BARIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 UG/L
Chemical:	BORON		
Sample Collected:	02/25/2003 00:00:00	Findings:	743 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	.13 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		

Sample Collected:	02/06/2003 00:00:00	Findings:	5.4 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	158 UG/L
Chemical:	BARIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	119 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1722 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	548 UG/L
Chemical:	ZINC		
Sample Collected:	12/17/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	33.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.61 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.68 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	06/18/2002 00:00:00	Findings:	.69 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .49
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	100 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	02/26/2002 00:00:00	Findings:	4 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.42 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/26/2002 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	25 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	24 MG/L
Chemical:	SODIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	13 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	120 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	860 UG/L
Chemical:	MANGANESE		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
95403	8	0	0.00

Federal EPA Radon Zone for SONOMA County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 95403

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.575 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

LOS GUILICOS
HWY 12 / PYTHIAN RD
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **LOS GUILICOS** HWY 12 / PYTHIAN RD SANTA ROSA, CA EDR ID #S106235093
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

LOS GUILICOS
HWY 12 / PYTHIAN RD
SANTA ROSA, CA
EDR ID #S106235093

SLIC:

Region:	STATE
Facility Status:	Completed - Case Closed
Status Date:	1970-01-01 00:00:00
Global Id:	SL1822F633
Lead Agency:	SAN FRANCISCO BAY RWQCB (REGION 2)
Lead Agency Case Number:	Not reported
Latitude:	38.4493942611909
Longitude:	-122.699255886906
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	Not reported
RB Case Number:	49S0017
File Location:	Not reported
Potential Media Affected:	Not reported
Potential Contaminants of Concern:	Not reported
Site History:	Not reported

SLIC:

Region:	2
Facility ID:	49S0017
Facility Status:	Not reported
Date Closed:	Not reported
Local Case #:	Not reported
How Discovered:	GOV
Leak Cause:	Not reported
Leak Source:	Not reported
Date Confirmed:	Not reported
Date Prelim Site Assmnt Workplan Submitted:	Not reported
Date Preliminary Site Assessment Began:	Not reported
Date Pollution Characterization Began:	Not reported
Date Remediation Plan Submitted:	Not reported
Date Remedial Action Underway:	Not reported
Date Post Remedial Action Monitoring Began:	Not reported

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
Telephone: 866-480-1028
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/06/2009
Database Release Frequency: Varies
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2008

CA SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Database Release Frequency: Varies
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

SECTION 3: DATABASES AND UPDATE DATES

...Continued...

CA SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 05/18/2009

CA SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

EMPIRE BUILDING
COURTHOUSE SQU., OLD 37
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 6

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **EMPIRE BUILDING** COURTHOUSE SQU., OLD 37 SANTA ROSA, CA EDR ID #S101309809
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p5**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	2

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

EMPIRE BUILDING
COURTHOUSE SQU., OLD 37
SANTA ROSA, CA
EDR ID #S101309809

LUST:

Region:	STATE
Global Id:	T0609700672
Latitude:	38.435966
Longitude:	-122.7122341
Case Type:	LUST Cleanup Site
Status:	Open - Remediation
Status Date:	1993-08-11 00:00:00
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Case Worker:	Not reported
Local Agency:	SANTA ROSA, CITY OF
RB Case Number:	1TSR189
LOC Case Number:	Not reported
File Location:	Regional Board
Potential Media Affect:	Surface water
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST REG 1:

Region:	1
Facility ID:	1TSR189
Staff Initials:	JEF

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

EMPIRE BUILDING
COURTHOUSE SQU., OLD 37
SANTA ROSA, CA
EDR ID #S101309809

SLIC:

Region:	STATE
Facility Status:	Open - Verification Monitoring
Status Date:	1993-08-11 00:00:00
Global Id:	SL0002011100
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Lead Agency Case Number:	Not reported
Latitude:	38.4493942611909
Longitude:	-122.699255886906
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	Not reported
RB Case Number:	1NSR189
File Location:	Not reported
Potential Media Affected:	Aquifer used for drinking water supply, Surface water
Potential Contaminants of Concern:	* Petroleum - Automotive gasolines
Site History:	Not reported

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/05/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Database Release Frequency: Varies
Date of Last EDR Contact: 02/02/2009
Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA RIVERSIDE CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA SAN MATEO CO. LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

CA SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
Telephone: 866-480-1028
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/06/2009
Database Release Frequency: Varies
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2008

CA SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Database Release Frequency: Varies
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 05/18/2009

CA SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

MISSION ARBORS
MISSION BLVD AT HIGHWAY 12 100
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **MISSION ARBORS** MISSION BLVD AT HIGHWAY 12 100 SANTA ROSA, CA EDR ID #S104857240
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

MISSION ARBORS
MISSION BLVD AT HIGHWAY 12 100
SANTA ROSA, CA
EDR ID #S104857240

LUST REG 1:

Region:	1
Facility ID:	1TSR367
Staff Initials:	JLB

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/05/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 2: Fuel Leak List

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 3: Leaking Underground Storage Tank Database

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA LUST REG 4: Underground Storage Tank Leak List

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA LUST REG 5: Leaking Underground Storage Tank Database

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943

Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Database Release Frequency: Varies
Date of Last EDR Contact: 02/02/2009
Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA RIVERSIDE CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA SAN MATEO CO. LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

AUTO EXCHANGE
OLD REDWOOD HIGHWAY 5352
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **AUTO EXCHANGE** OLD REDWOOD HIGHWAY 5352 SANTA ROSA, CA EDR ID #S104857236
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

AUTO EXCHANGE
OLD REDWOOD HIGHWAY 5352
SANTA ROSA, CA
EDR ID #S104857236

LUST REG 1:

Region:	1
Facility ID:	1TSO770
Staff Initials:	HAZ

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/05/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Database Release Frequency: Varies
Date of Last EDR Contact: 02/02/2009
Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Database Release Frequency: No Update Planned
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CA RIVERSIDE CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA SAN MATEO CO. LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

FAST & EASY MART
REDWOOD HIGHWAY, OLD 5321
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **FAST & EASY MART** REDWOOD HIGHWAY, OLD 5321 SANTA ROSA, CA EDR ID #S102429807
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

FAST & EASY MART
REDWOOD HIGHWAY, OLD 5321
SANTA ROSA, CA
EDR ID #S102429807

LUST REG 1:

Region:	1
Facility ID:	1TSO608
Staff Initials:	HAZ

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/05/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Database Release Frequency: Varies
Date of Last EDR Contact: 02/02/2009
Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Database Release Frequency: No Update Planned
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SECTION 3: DATABASES AND UPDATE DATES

...Continued...

CA RIVERSIDE CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA SAN MATEO CO. LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

YOLO, DANIEL
REDWOOD HIGHWAY, OLD 5807
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **YOLO, DANIEL** REDWOOD HIGHWAY, OLD 5807 SANTA ROSA, CA EDR ID #S104163196
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

YOLO, DANIEL
REDWOOD HIGHWAY, OLD 5807
SANTA ROSA, CA
EDR ID #S104163196

LUST REG 1:

Region:	1
Facility ID:	1TSO394
Staff Initials:	Closed

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

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Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
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CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
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Date of Government Version: 02/01/2001
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Date of Last EDR Contact: 02/16/2009
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Date of Government Version: 05/19/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

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Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
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Date of Government Version: 07/01/2008
Database Release Frequency: Quarterly
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Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
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California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

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Database Release Frequency: Varies
Date of Last EDR Contact: 02/02/2009
Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

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Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

STEVENSON EQUIPMENT
REDWOOD HIGHWAY, OLD 3975
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **STEVENSON EQUIPMENT** REDWOOD HIGHWAY, OLD 3975 SANTA ROSA, CA EDR ID #S104163195
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	**YES - p4**
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility has reported leaking underground storage tank incidents

DATABASE: Leaking Petroleum Storage Tank Database (LUST)

STEVENSON EQUIPMENT
REDWOOD HIGHWAY, OLD 3975
SANTA ROSA, CA
EDR ID #S104163195

LUST REG 1:

Region:	1
Facility ID:	1TSR024
Staff Initials:	SKB

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA LUST: Geotracker's Leaking Underground Fuel Tank Report
Source: State Water Resources Control Board
Telephone: Not reported
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/06/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST REG 6L: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 6V: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA NAPA CO. LUST: Sites With Reported Contamination
Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA ORANGE CO. LUST: List of Underground Storage Tank Cleanups
Source: Health Care Agency
Telephone: 714-834-3446
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 03/02/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/05/2009
Date of Next Scheduled Update: 06/01/2009

CA LUST REG 1: Active Toxic Site Investigation
Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2009

CA LUST REG 2: Fuel Leak List
Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004 | Date of Last EDR Contact: 04/07/2009
Database Release Frequency: Quarterly | Date of Next Scheduled Update: 07/06/2009

CA LUST REG 3: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003 | Date of Last EDR Contact: 02/09/2009
Database Release Frequency: No Update Planned | Date of Next Scheduled Update: 05/11/2009

CA LUST REG 4: Underground Storage Tank Leak List
Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004 | Date of Last EDR Contact: 03/23/2009
Database Release Frequency: No Update Planned | Date of Next Scheduled Update: 06/22/2009

CA LUST REG 5: Leaking Underground Storage Tank Database
Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008 | Date of Last EDR Contact: 01/19/2009
Database Release Frequency: Quarterly | Date of Next Scheduled Update: 04/19/2009

CA LUST REG 7: Leaking Underground Storage Tank Case Listing
Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Leaking Underground Storage Tank locations.

Date of Government Version: 02/26/2004 | Date of Last EDR Contact: 02/16/2009
Database Release Frequency: No Update Planned | Date of Next Scheduled Update: 05/18/2009

CA LUST REG 8: Leaking Underground Storage Tanks
Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005 | Date of Last EDR Contact: 02/02/2009
Database Release Frequency: Varies | Date of Next Scheduled Update: 05/04/2009

CA LUST REG 9: Leaking Underground Storage Tank Report
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001 | Date of Last EDR Contact: 04/13/2009
Database Release Frequency: No Update Planned | Date of Next Scheduled Update: 07/13/2009

SECTION 3: DATABASES AND UPDATE DATES

...Continued...

CA RIVERSIDE CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Department of Public Health
Telephone: 951-358-5055
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/13/2009
Date of Next Scheduled Update: 07/13/2009

CA SAN MATEO CO. LUST: Fuel Leak List
Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/05/2009
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA LUST SANTA CLARA: LOP Listing
Source: Department of Environmental Health
Telephone: 408-918-3417
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 12/29/2008
Database Release Frequency: Varies
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 06/22/2009

CA SAN FRANCISCO CO. LUST: Local Oversite Facilities
Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/01/2009

CA SOLANO CO. LUST: Leaking Underground Storage Tanks
Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 01/09/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/23/2009
Date of Next Scheduled Update: 06/22/2009

CA SONOMA CO. LUST: Leaking Underground Storage Tank Sites
Source: Department of Health Services
Telephone: 707-565-6565
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/20/2009
Database Release Frequency: Quarterly
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA VENTURA CO. LUST: Listing of Underground Tank Cleanup Sites
Source: Environmental Health Division
Telephone: 805-654-2813
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 06/09/2009
Date of Next Scheduled Update: 06/08/2009

PINE CREEK PROPERTIES INC
3358 COFFEY LN STE C
SANTA ROSA, CA 95403

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
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All available detailed information from databases where sites are identified.

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Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **PINE CREEK PROPERTIES INC** 3358 COFFEY LN STE C SANTA ROSA, CA 95403 EDR ID #S108753065
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

PINE CREEK PROPERTIES INC
3358 COFFEY LN STE C
SANTA ROSA, CA 95403
EDR ID #S108753065

HAZNET:

Gepaid:	CAC002610829
Contact:	KEN MARTIN/VP
Telephone:	7074943939
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	PO BOX 11215
Mailing City,St,Zip:	SANTA ROSA, CA 954061215
Gen County:	Sonoma
TSD EPA ID:	TXD077603371
TSD County:	99
Waste Category:	Hydrocarbon solvents (benzene, hexane, Stoddard, etc.)
Disposal Method:	H06
Tons:	0.27
Facility County:	Sonoma

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA HAZNET: Facility and Manifest Data
Source: California Environmental Protection Agency
Telephone: 916-255-1136
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2007
Database Release Frequency: Annually

Date of Last EDR Contact: 02/17/2009
Date of Next Scheduled Update: 05/04/2009

SONOMA 101 HIGHWAY WIDENING
ROUTE 101
SANTA ROSA, CA 95403

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **SONOMA 101 HIGHWAY WIDENING** ROUTE 101 SANTA ROSA, CA 95403 EDR ID #1009398328 EPA #CAR000173278
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	**YES - p4**
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	NO
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility generates hazardous waste

DATABASE: Resource Conservation and Recovery Information (RCRAInfo)

SONOMA 101 HIGHWAY WIDENING
ROUTE 101
SANTA ROSA, CA 95403
EDR ID #1009398328

RCRA-LQG:

Date form received by agency:	04/28/2006
Facility name:	SONOMA 101 HIGHWAY WIDENING
Facility address:	ROUTE 101 STEEL LN UC TO BICENTENNIAL OC SANTA ROSA, CA 95403
EPA ID:	CAR000173278
Mailing address:	111 GRAND AVE 12TH FLOOR CALTRANS CONSTRUCTION OAKLAND, CA 94612
Contact:	JILL K POLLOCK
Contact address:	111 GRAND AVE 12TH FLOOR CALTRANS CONSTRUCTION OAKLAND, CA 94612
Contact country:	US
Contact telephone:	510-622-8750
Contact email:	JILL_POLLOCK@DOT.CA.GOV
EPA Region:	09
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	CALTRANS
Owner/operator address:	111 GRAND AVE 12TH FLOOR OAKLAND, CA 94612
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	State
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/1950
Owner/Op end date:	Not reported
Owner/operator name:	DALE LEGALLEE RE
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	State
Owner/Operator Type:	Operator
Owner/Op start date:	11/02/2005
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Hazardous Waste Summary:

Waste code:	D008
Waste name:	LEAD
Violation Status:	No violations found

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

RCRA-LQG: RCRA - Large Quantity Generators
Source: Environmental Protection Agency
Telephone: 703-308-0035
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 11/12/2008
Database Release Frequency: Quarterly
Date of Last EDR Contact: 03/25/2009
Date of Next Scheduled Update: 05/18/2009

SANTA ROSA COMMUNITY DEVELOPMENT
LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101
SANTA ROSA, CA 0

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

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Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **SANTA ROSA COMMUNITY DEVELOPMENT SW ARE** LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101 SANTA ROSA, CA 0 EDR ID #S105051171
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

SANTA ROSA COMMUNITY DEVELOPMENT SW AREA
LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101
SANTA ROSA, CA 0
EDR ID #S105051171

SLIC:

Region:	1
Facility ID:	1NSR218
Staff Initials:	WTE

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

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CA SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
Telephone: 866-480-1028
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/06/2009
Database Release Frequency: Varies
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2008

CA SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
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Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Database Release Frequency: Varies
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

SECTION 3: DATABASES AND UPDATE DATES

...Continued...

CA SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

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Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
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Date of Government Version: 04/03/2008
Database Release Frequency: Semi-Annually
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Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

SANTA ROSA COMMUNITY DEVELOPMENT
LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101
SANTA ROSA, CA

Inquiry Number:
April 17, 2009

EDR Site Report™

Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **SANTA ROSA COMMUNITY DEVELOPMENT SW ARE** LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101 SANTA ROSA, CA EDR ID #S109118026
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

SANTA ROSA COMMUNITY DEVELOPMENT SW AREA
LUDWIG ROAD/WRIGHT ROAD/HIGHWAY 12 / 101
SANTA ROSA, CA
EDR ID #S109118026

SLIC:

Region:	STATE
Facility Status:	Open - Site Assessment
Status Date:	1993-11-03 00:00:00
Global Id:	T0609793270
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Lead Agency Case Number:	Not reported
Latitude:	38.4035
Longitude:	-122.7686
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	SANTA ROSA, CITY OF
RB Case Number:	1NSR218
File Location:	Regional Board
Potential Media Affected:	Under Investigation
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

SECTION 3: DATABASES AND UPDATE DATES

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Date of Government Version: 01/06/2009
Database Release Frequency: Varies
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

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Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
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Date of Government Version: 04/01/2005
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CA SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
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CA SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
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Telephone: 760-346-7491
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Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
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Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

SCDPW LARKFIELD SEWER
REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
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All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	**FACILITY 1** **SCDPW LARKFIELD SEWER** REDWOOD HIGHWAY, OLD SANTA ROSA, CA 95403 EDR ID #S103393013
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

SCDPW LARKFIELD SEWER
REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403
EDR ID #S103393013

SLIC:

Region:	STATE
Facility Status:	Completed - Case Closed
Status Date:	1992-07-07 00:00:00
Global Id:	T0609793160
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Lead Agency Case Number:	Not reported
Latitude:	Not reported
Longitude:	Not reported
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY
RB Case Number:	1NSO511
File Location:	Regional Board
Potential Media Affected:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

SLIC:

Region:	1
Facility ID:	1NSO511
Staff Initials:	Facility Closed

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Database Release Frequency: Varies
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Telephone: 858-467-2980
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Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

UNITY CHURCH
4351 REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403

Inquiry Number:
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Name, source, update dates, contact phone number and description of each of the databases for this report.

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SECTION 1: FACILITY SUMMARY

AREA	FACILITY 1 **UNITY CHURCH** 4351 REDWOOD HIGHWAY, OLD SANTA ROSA, CA 95403 EDR ID #S105051009
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

UNITY CHURCH
4351 REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403
EDR ID #S105051009

SLIC:

Region:	STATE
Facility Status:	Completed - Case Closed
Status Date:	2000-04-03 00:00:00
Global Id:	T0609793365
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Lead Agency Case Number:	Not reported
Latitude:	38.493129
Longitude:	-122.743578
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY
RB Case Number:	1NSO621
File Location:	Regional Board
Potential Media Affected:	Soil
Potential Contaminants of Concern:	Gasoline
Site History:	Not reported

SLIC:

Region:	1
Facility ID:	1NSO621
Staff Initials:	Facility Closed

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Source: State Water Resources Control Board
Telephone: 866-480-1028
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/06/2009
Database Release Frequency: Varies
Date of Last EDR Contact: 04/08/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 1: Active Toxic Site Investigations
Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 02/16/2009
Date of Next Scheduled Update: 05/18/2008

CA SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Database Release Frequency: Quarterly
Date of Last EDR Contact: 04/07/2009
Date of Next Scheduled Update: 07/06/2009

CA SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 02/09/2009
Date of Next Scheduled Update: 05/11/2009

CA SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Database Release Frequency: Varies
Date of Last EDR Contact: 01/19/2009
Date of Next Scheduled Update: 04/19/2009

CA SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 6L: SLIC Sites
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 06/01/2009

CA SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 7: SLIC List
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Database Release Frequency: No Update Planned
Date of Last EDR Contact: 03/03/2009
Date of Next Scheduled Update: 05/18/2009

CA SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 03/30/2009
Date of Next Scheduled Update: 06/29/2009

CA SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Database Release Frequency: Annually
Date of Last EDR Contact: 02/23/2009
Date of Next Scheduled Update: 05/25/2009

REED, LILLIE
5716 REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403

Inquiry Number:
April 17, 2009

EDR Site Report™

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary . . . . Page 3

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports . . . . Page 4

All available detailed information from databases where sites are identified.

Section 3: Databases and Update Information. . . . . Page 5

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 **REED, LILLIE** 5716 REDWOOD HIGHWAY, OLD SANTA ROSA, CA 95403 EDR ID #S105051166
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	**YES - p4**
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

REED, LILLIE
5716 REDWOOD HIGHWAY, OLD
SANTA ROSA, CA 95403
EDR ID #S105051166

SLIC:

Region:	STATE
Facility Status:	Open - Inactive
Status Date:	2008-09-08 00:00:00
Global Id:	T0609793212
Lead Agency:	NORTH COAST RWQCB (REGION 1)
Lead Agency Case Number:	Not reported
Latitude:	38.521097
Longitude:	-122.774855
Case Type:	Cleanup Program Site
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY
RB Case Number:	1NSO336
File Location:	Regional Board
Potential Media Affected:	Under Investigation
Potential Contaminants of Concern:	* Other Spill
Site History:	Not reported

SLIC:

Region:	1
Facility ID:	1NSO336
Staff Initials:	AAA

SECTION 3: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA SLIC: Statewide SLIC Cases
Source: State Water Resources Control Board
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Date of Government Version: 09/10/2007
Database Release Frequency: Annually
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APPENDIX B

ENVIRONMENTAL DATA RESOURCES, INC.

Sanborn Map Report

APPENDIX B

LBC / SMC-SR Properties
50 Mark West Springs Road
Santa Rosa, CA 95403

Inquiry Number: 2468920.3
April 15, 2009

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

4/15/09

Site Name:	Client Name:
LBC / SMC-SR Properties	Engeo Inc.
50 Mark West Springs Road	2010 Crow Canyon Place
Santa Rosa, CA 95403	San Ramon, CA 94583
EDR Inquiry # 2468920.3	Contact: Keith Nowell

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Engeo Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name:	LBC / SMC-SR Properties
Address:	50 Mark West Springs Road
City, State, Zip:	Santa Rosa, CA 95403
Cross Street:	
P.O. #	6486.201.102
Project:	LBC / SMC-SR Pr
Certification #	AFD2-472C-987C

Sanborn® Library search results
Certification # AFD2-472C-987C

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

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APPENDIX C

ENVIRONMENTAL DATA RESOURCES, INC.

Historical Topographic Map Report

APPENDIX C

LBC / SMC-SR Properties
50 Mark West Springs Road
Santa Rosa, CA 95403

Inquiry Number: 2468920.4
April 16, 2009

The EDR Historical Topographic Map Report

EDR® Environmental Data Resources Inc

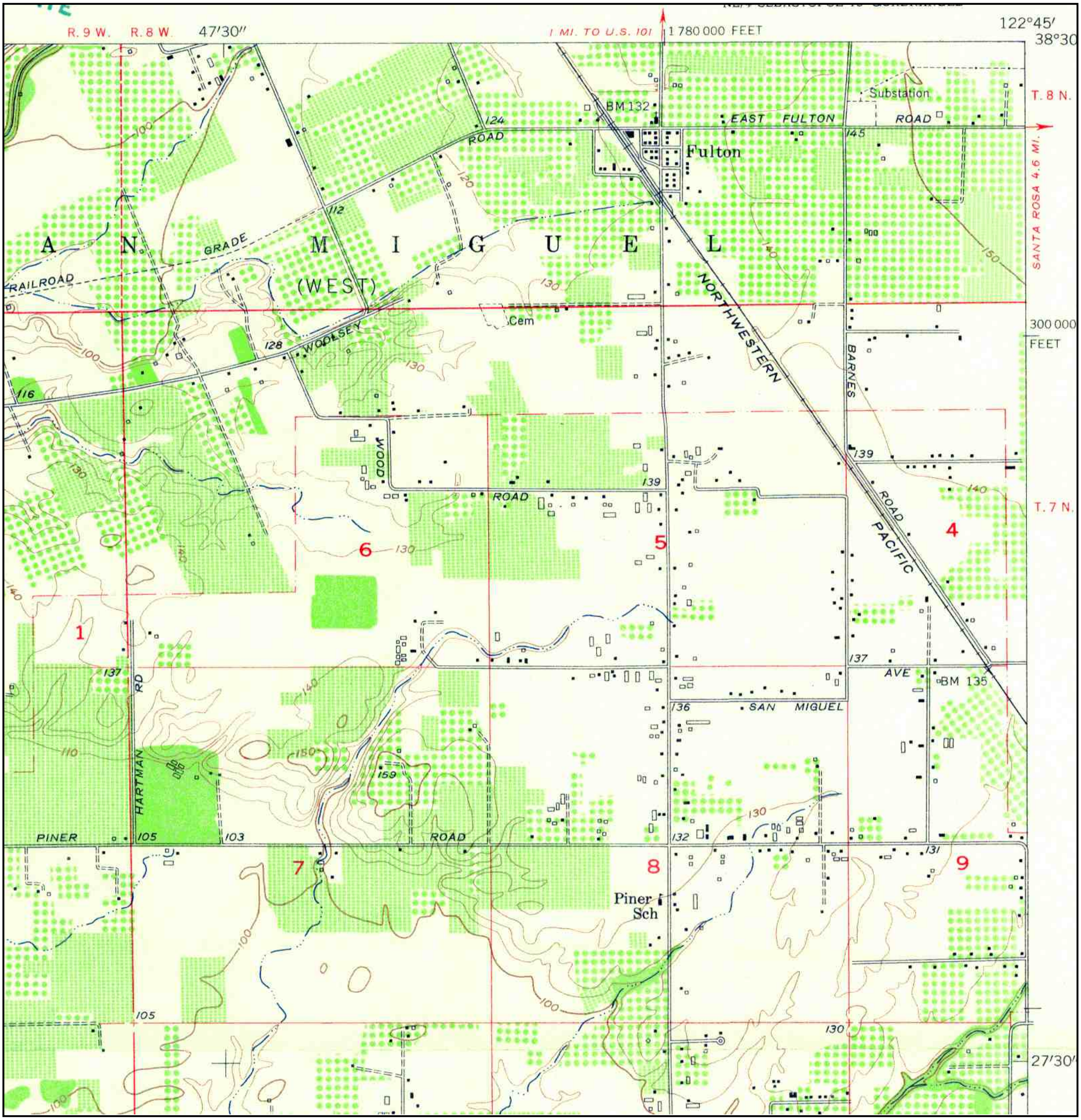
440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

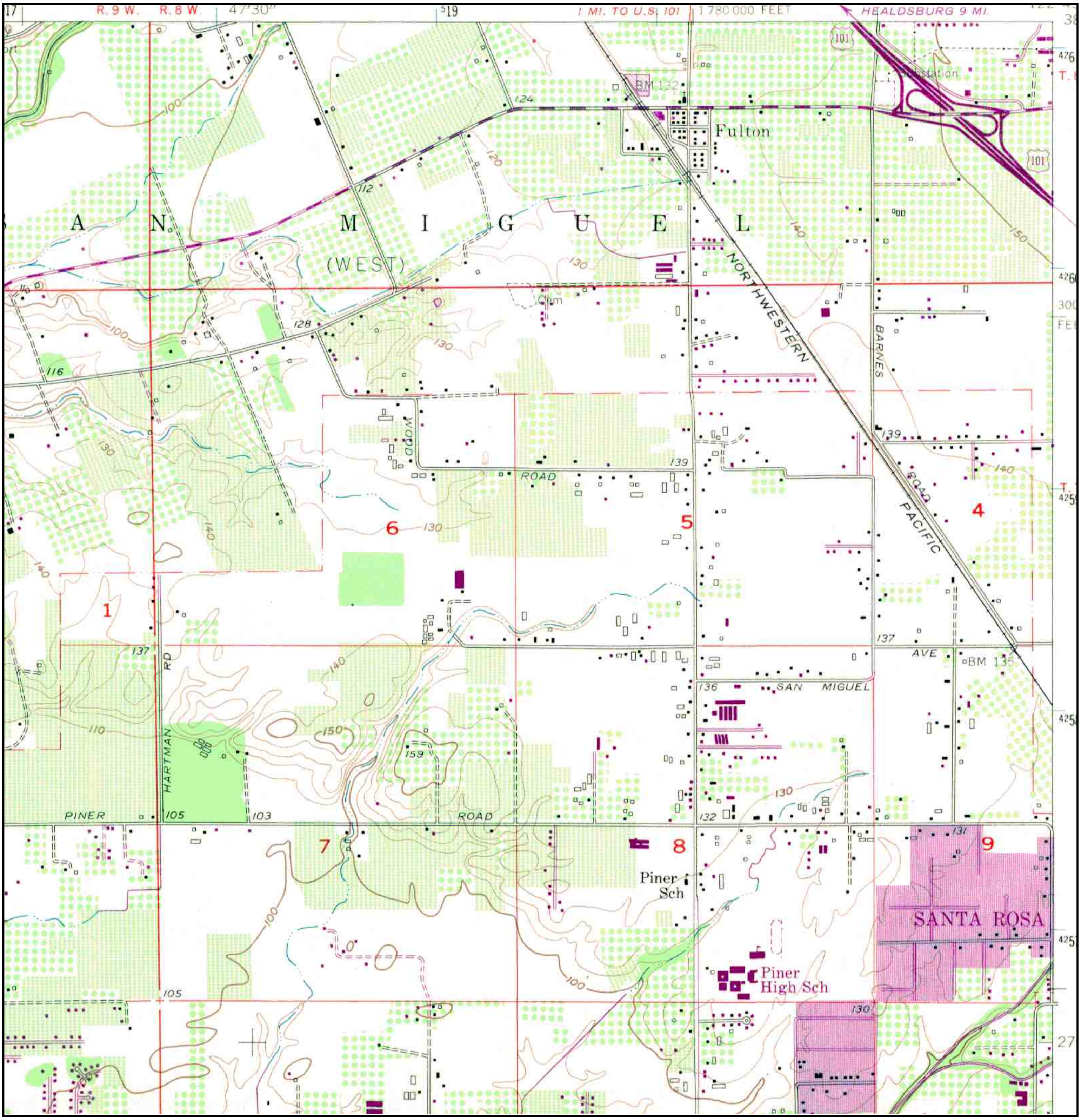
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Historical Topographic Map



N	TARGET QUAD NAME: SEBASTOPOL MAP YEAR: 1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

Historical Topographic Map



N	TARGET QUAD NAME: SEBASTOPOL MAP YEAR: 1968 PHOTOREVISED FROM:1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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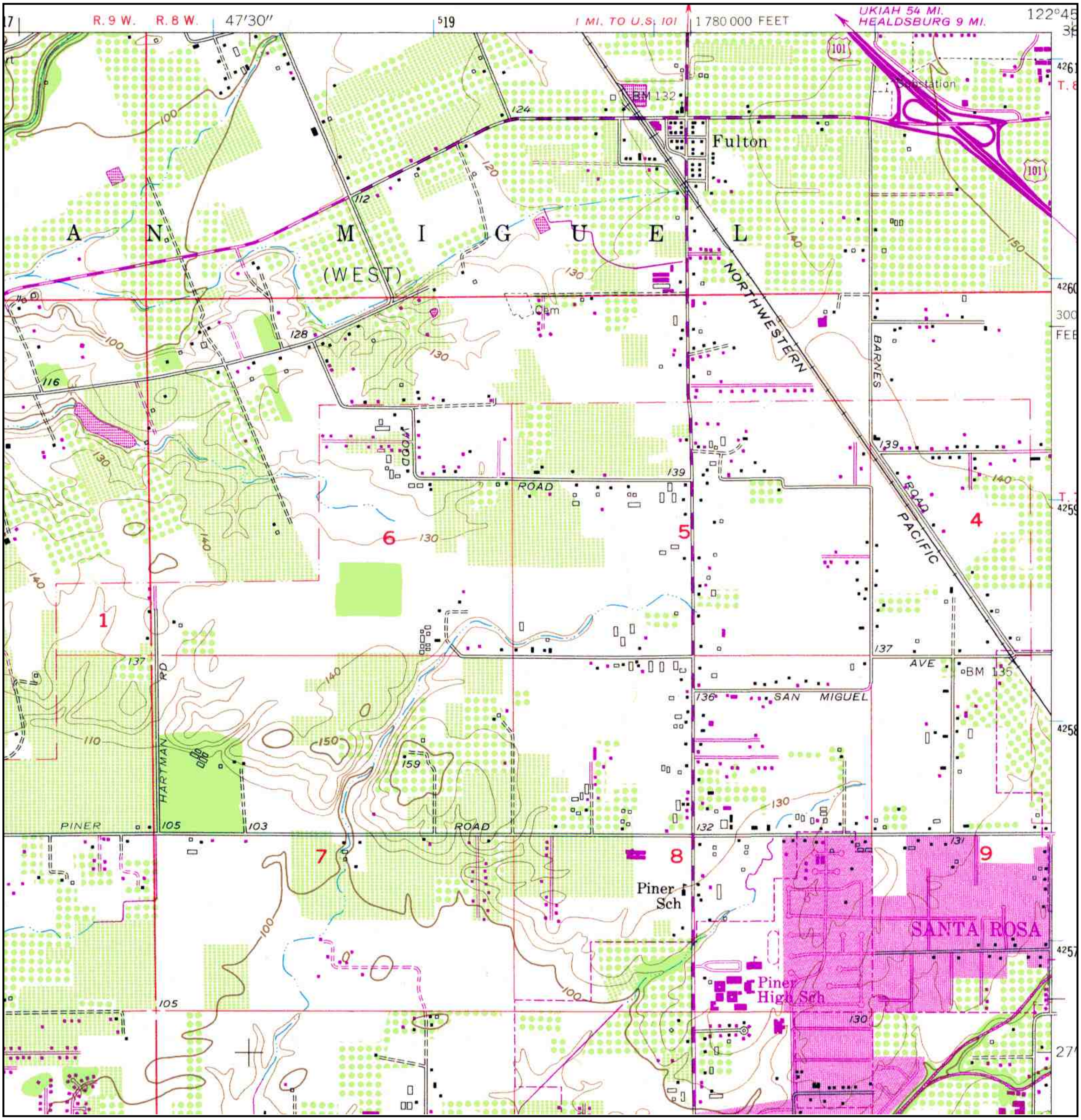

N	TARGET QUAD NAME: SEBASTOPOL MAP YEAR: 1980 PHOTOREVISED FROM:1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

Historical Topographic Map

N	ADJOINING QUAD NAME: HEALDSBURG MAP YEAR: 1940 SERIES: 15 SCALE: 1:62500	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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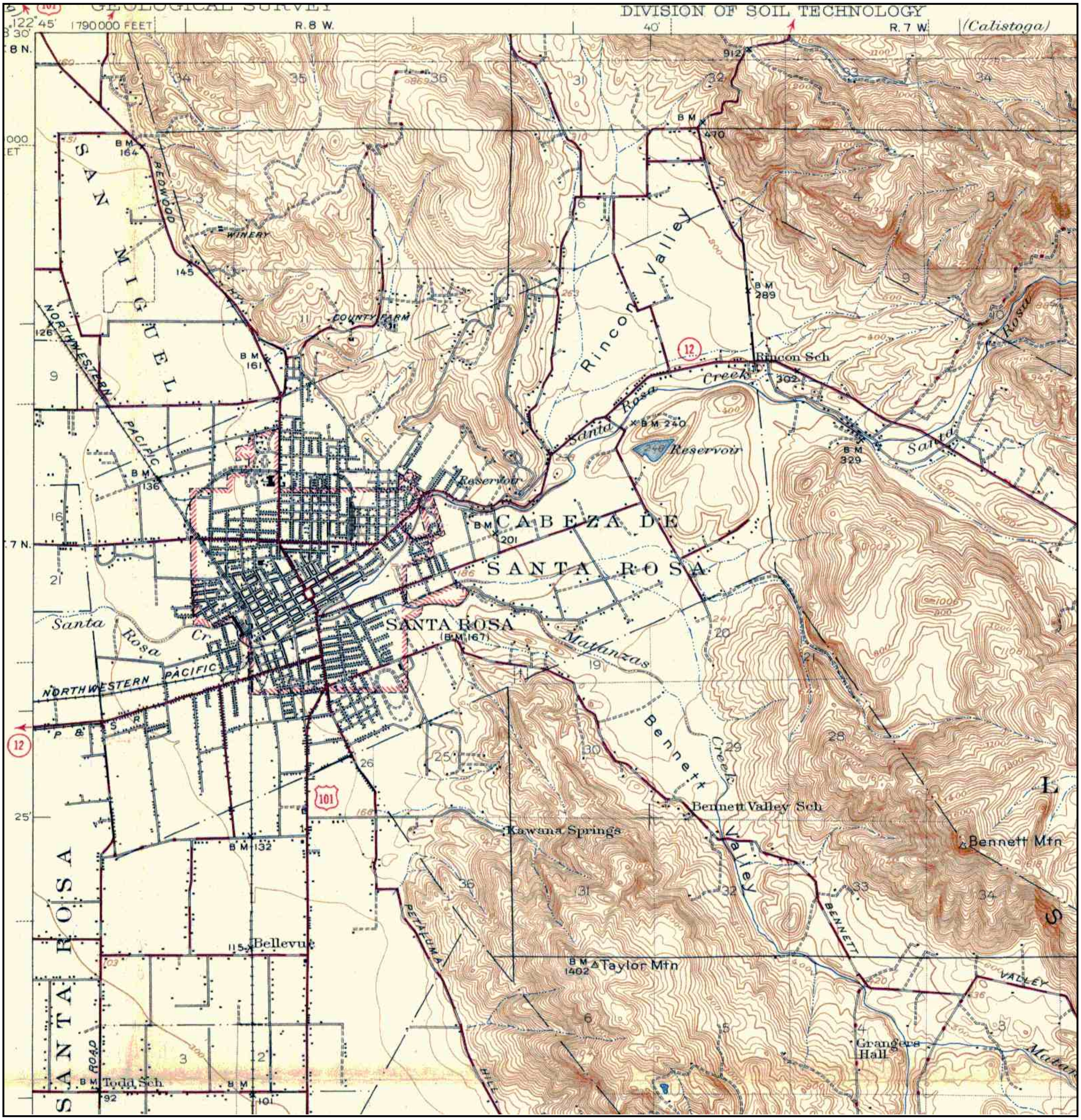

N	ADJOINING QUAD NAME: SANTA ROSA MAP YEAR: 1944 SERIES: 15 SCALE: 1:62500	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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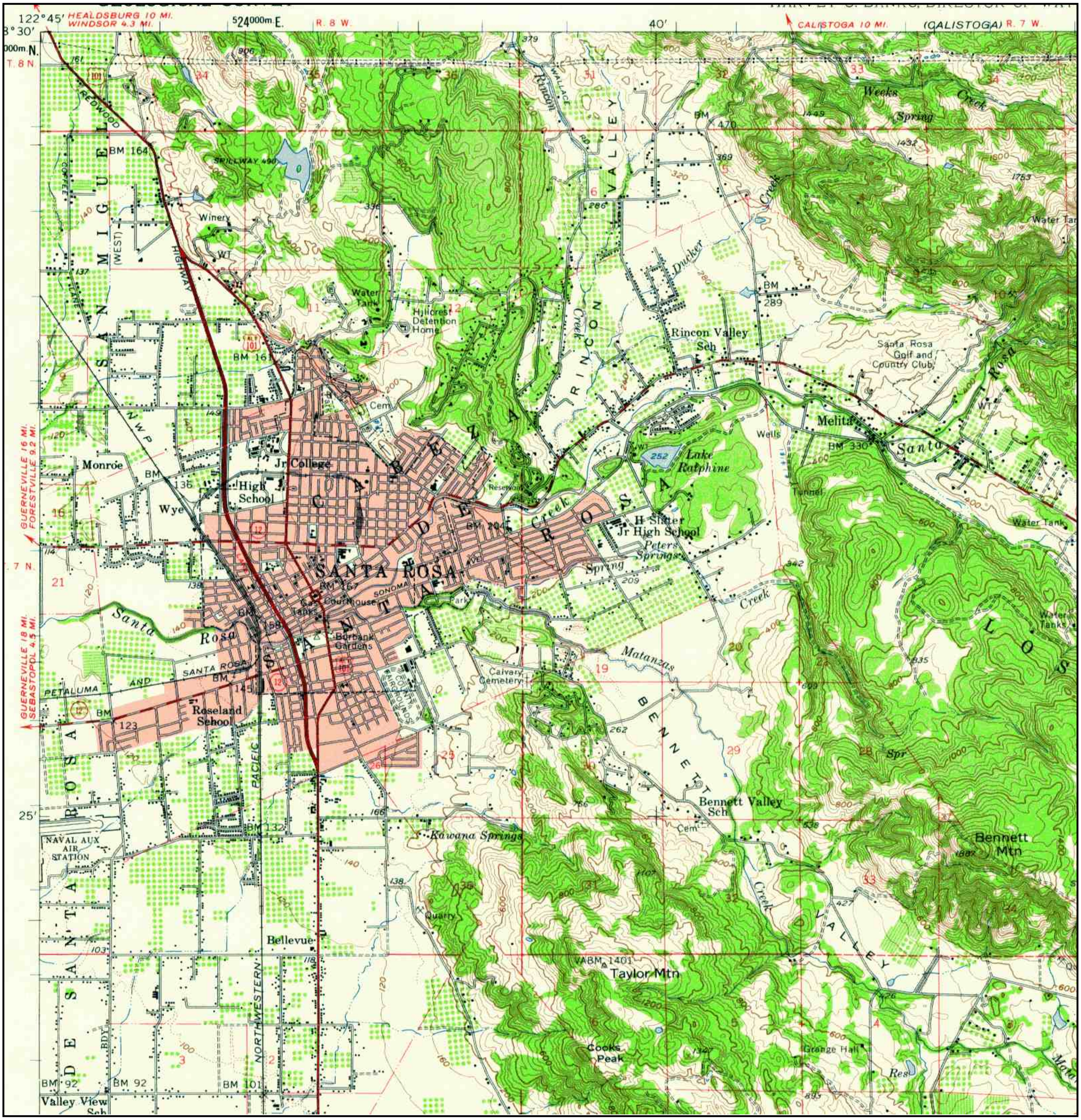

N	ADJOINING QUAD NAME: SANTA ROSA MAP YEAR: 1954 SERIES: 15 SCALE: 1:62500	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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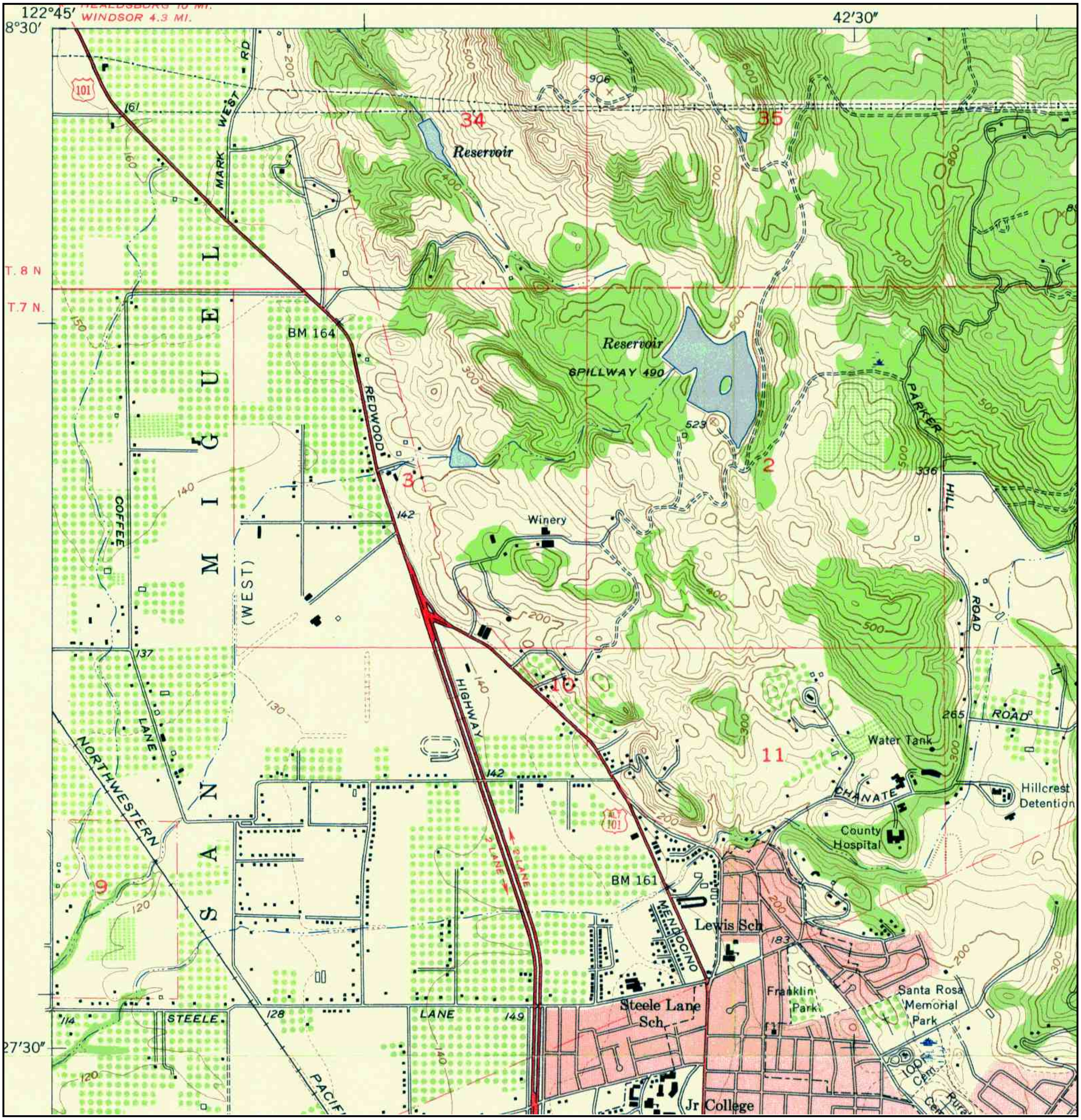

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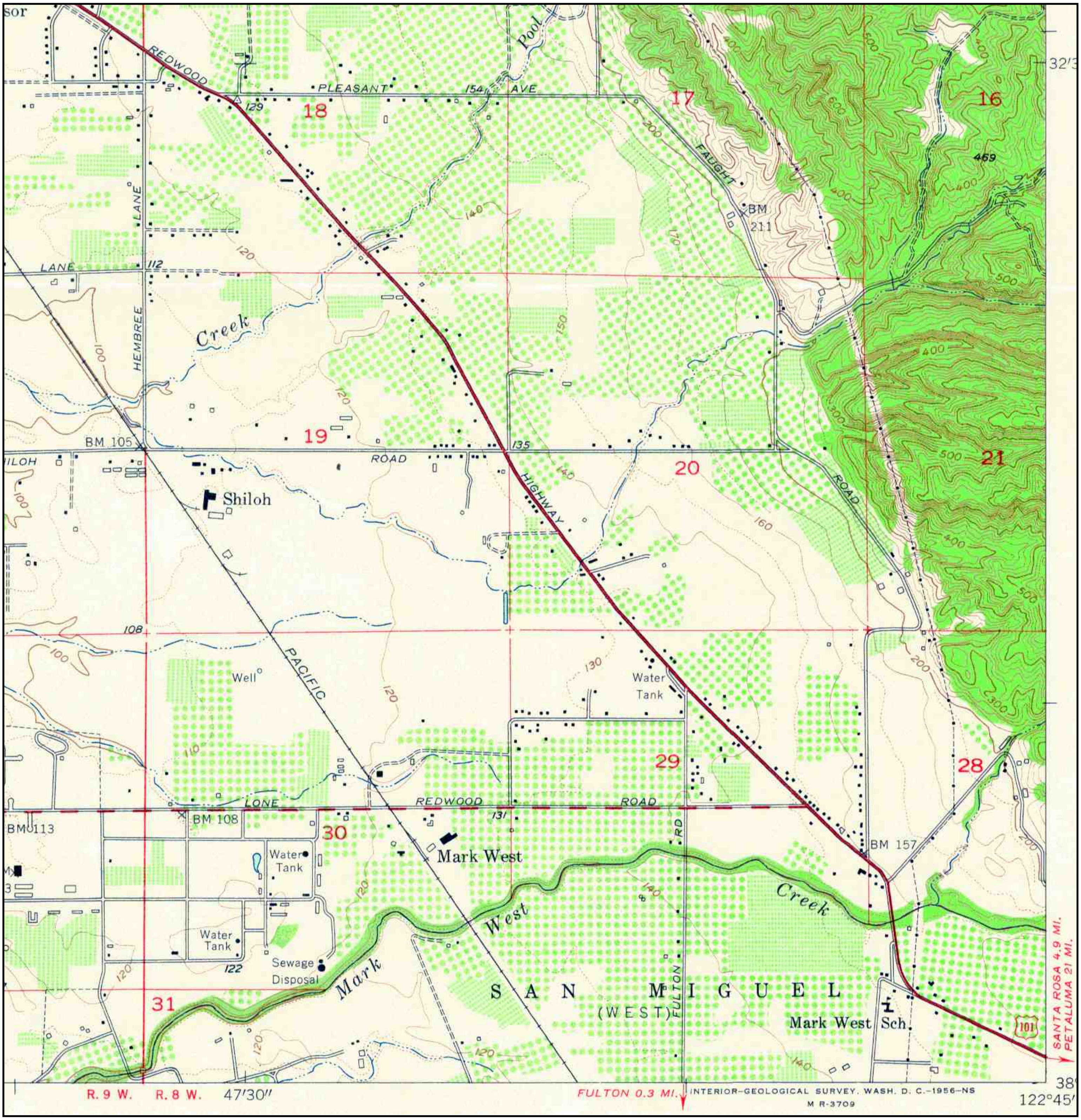

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Historical Topographic Map

N	ADJOINING QUAD NAME: MARK WEST SPRINGS MAP YEAR: 1958 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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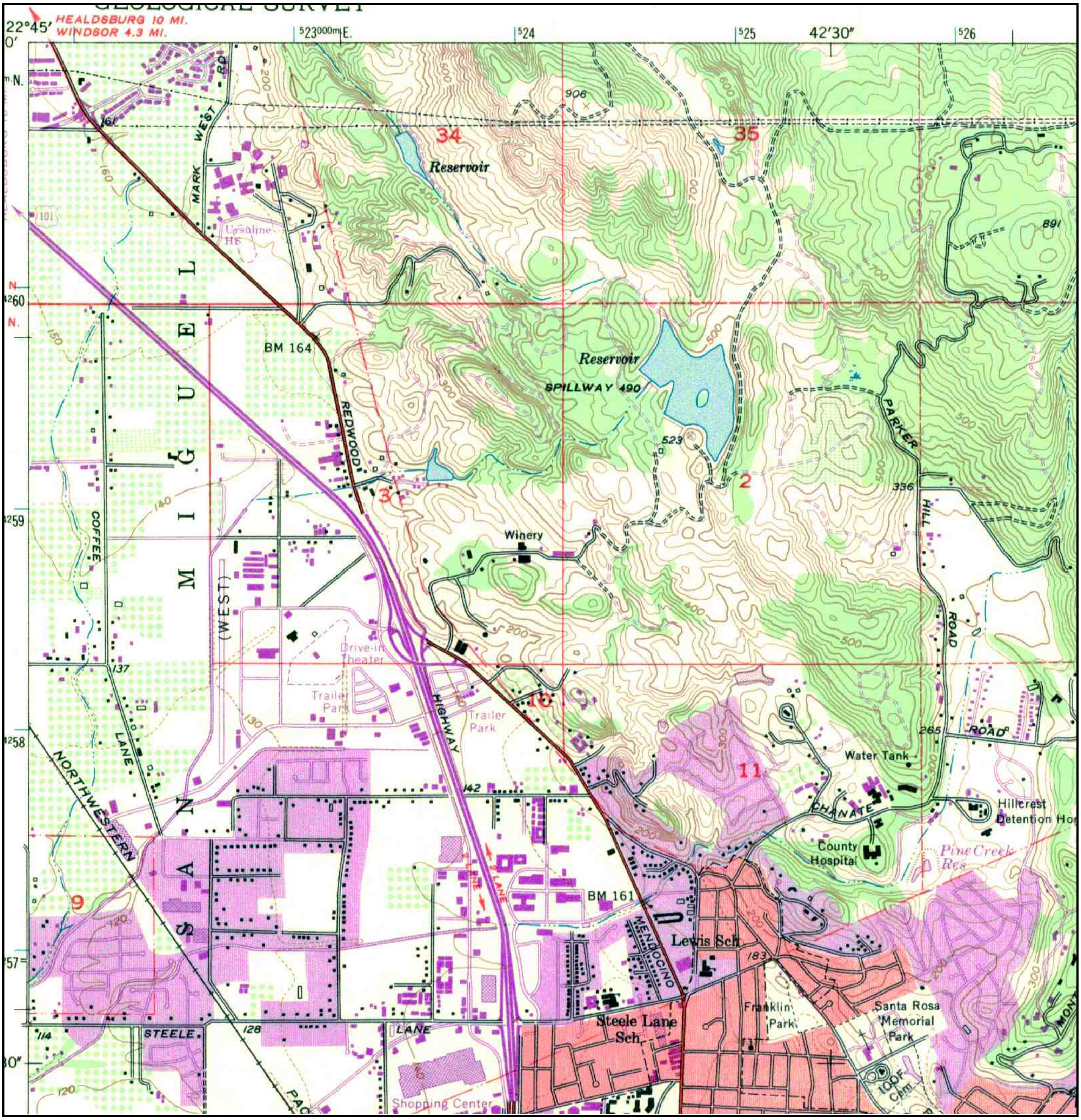

N	ADJOINING QUAD NAME: SANTA ROSA MAP YEAR: 1968 PHOTOREVISED FROM:1954 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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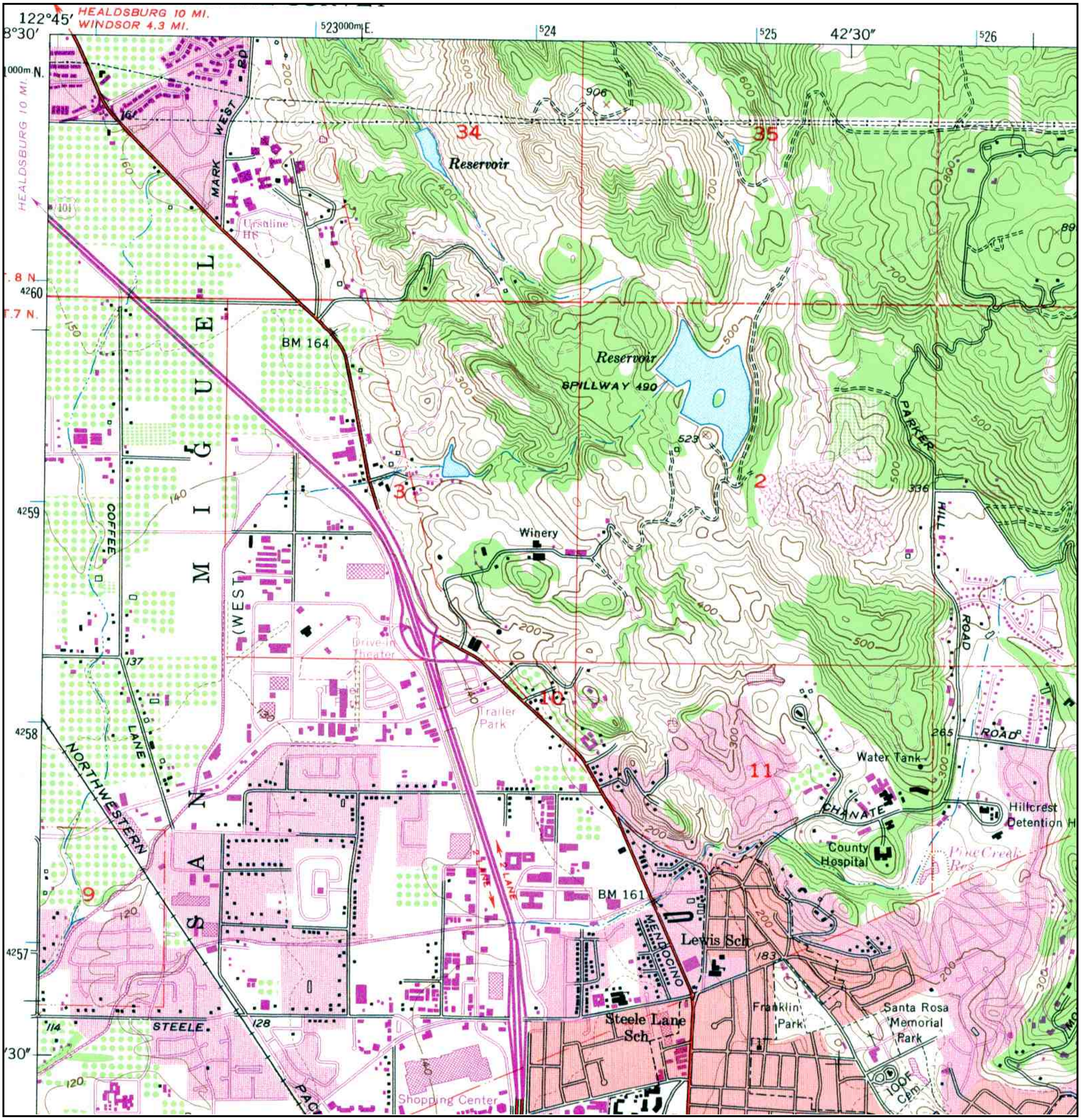

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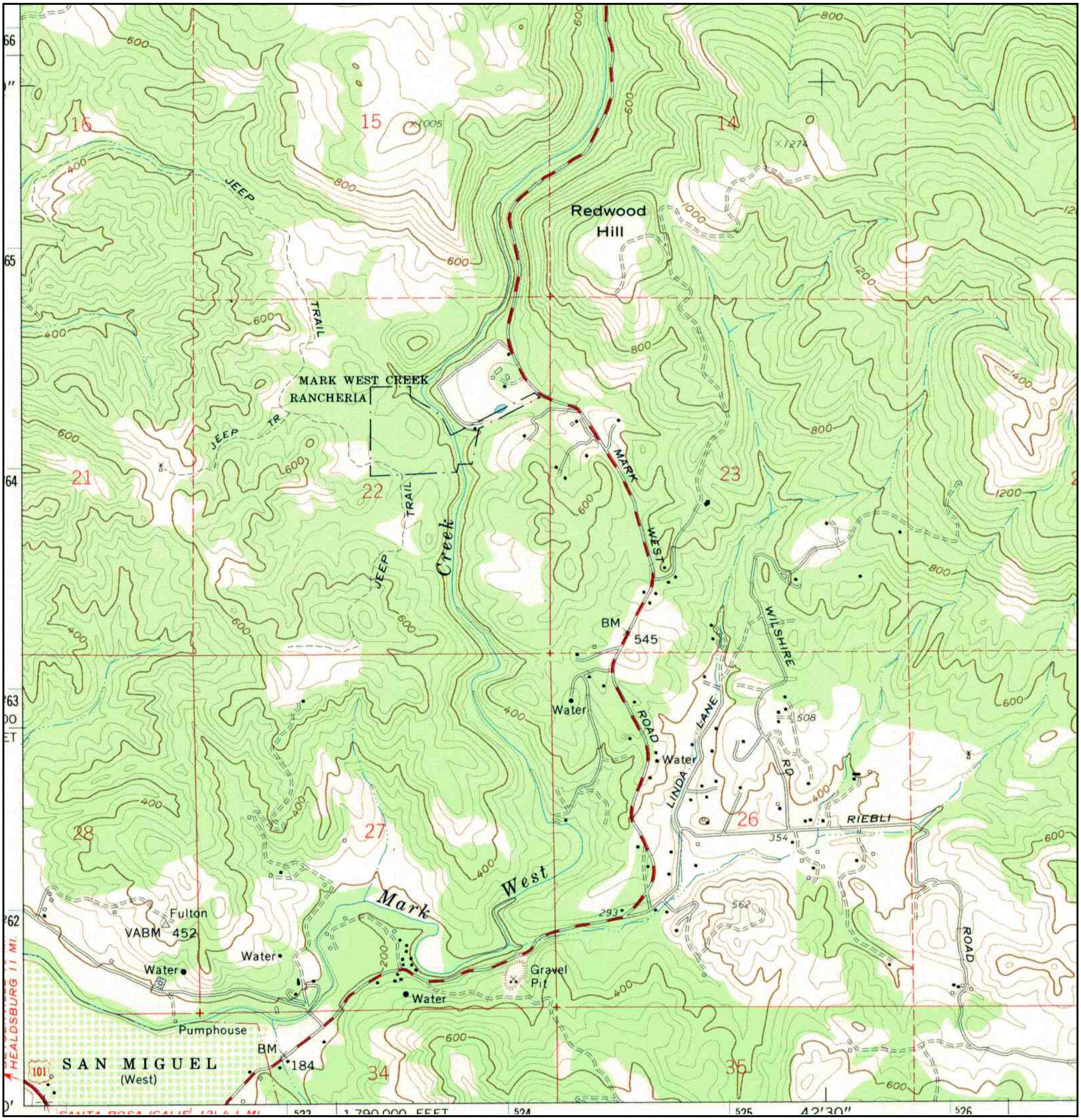

N	ADJOINING QUAD NAME: MARK WEST SPRINGS MAP YEAR: 1978 PHOTOINSPECTED FROM: 1958 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

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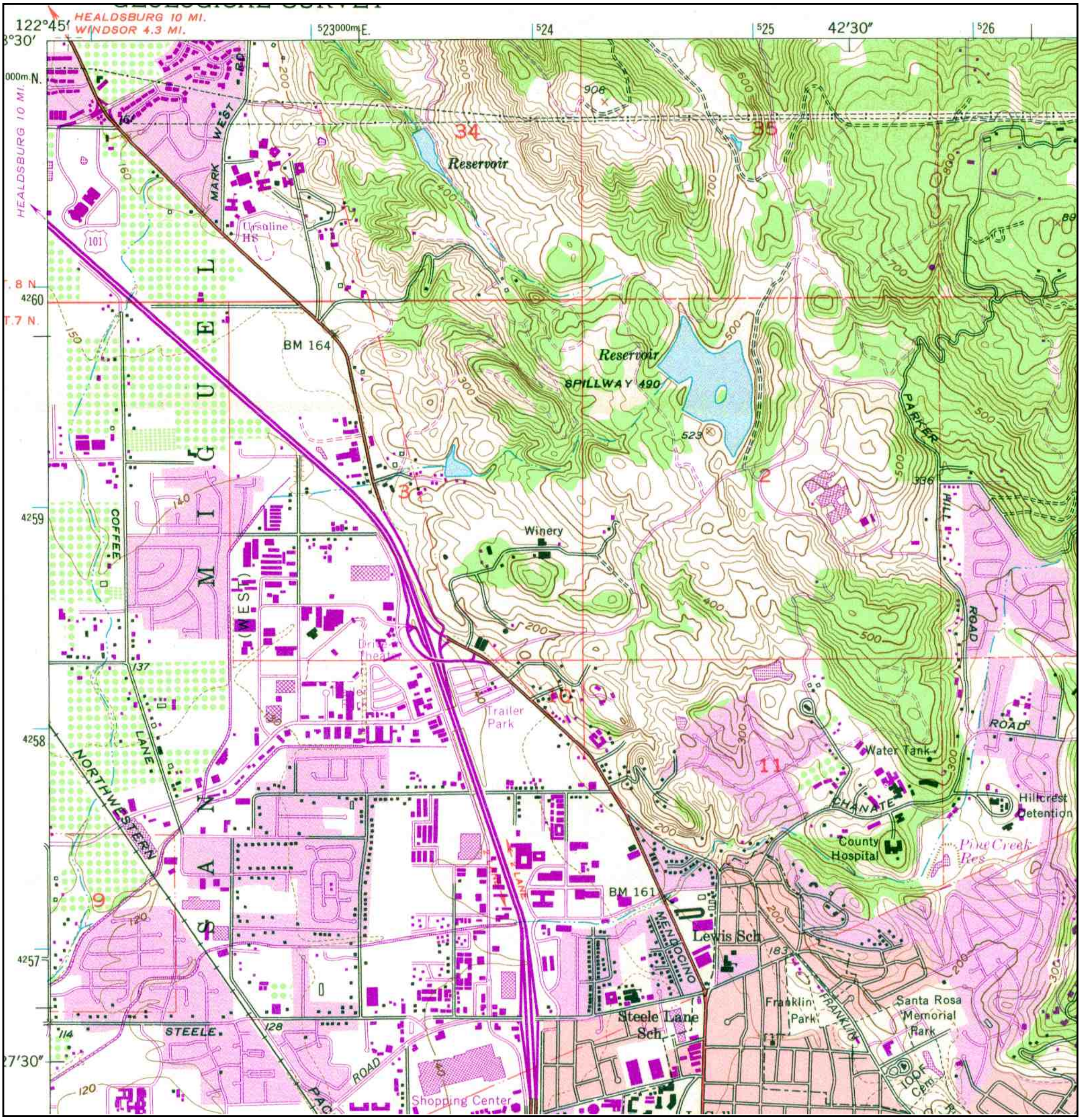

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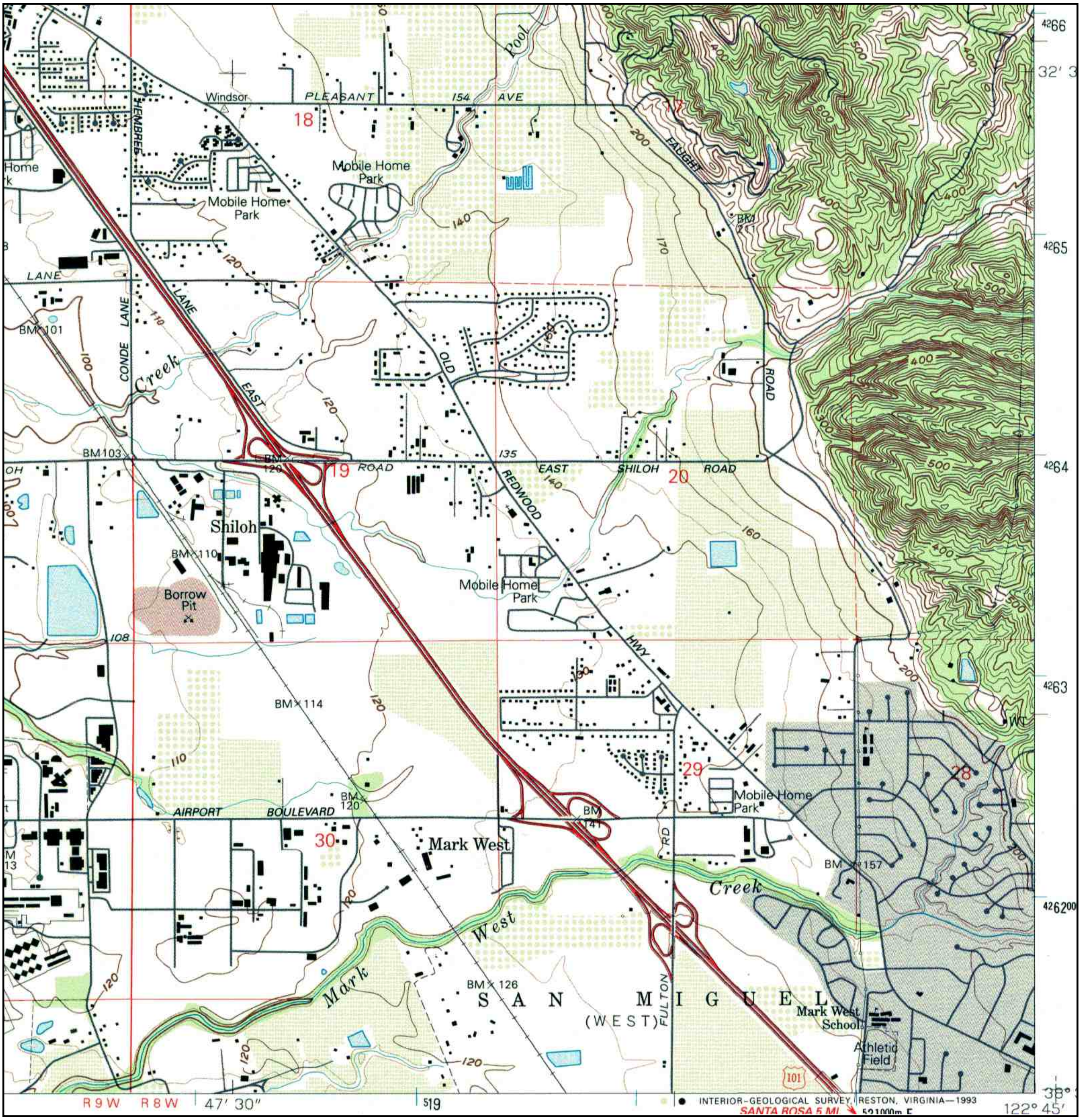

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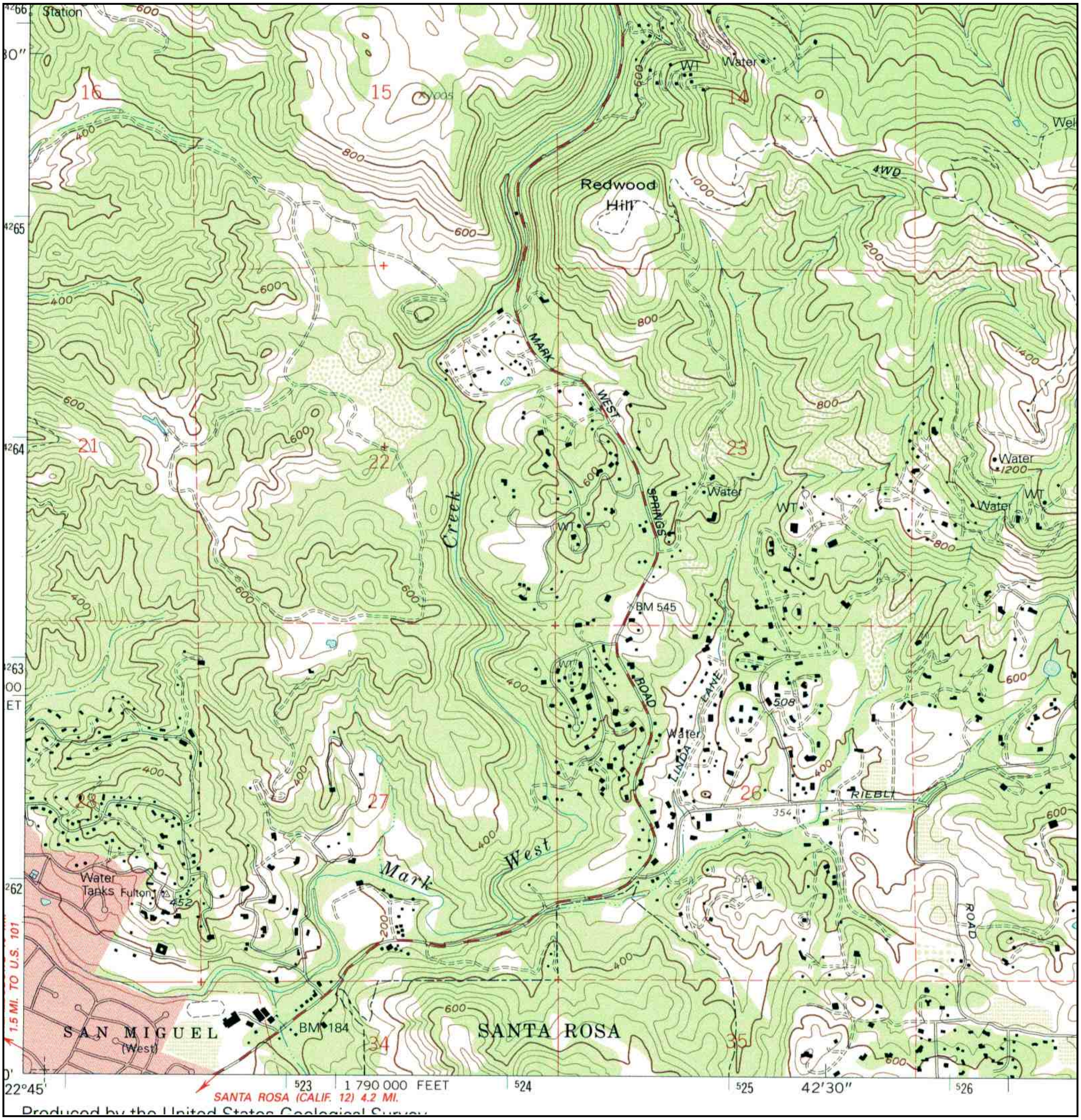
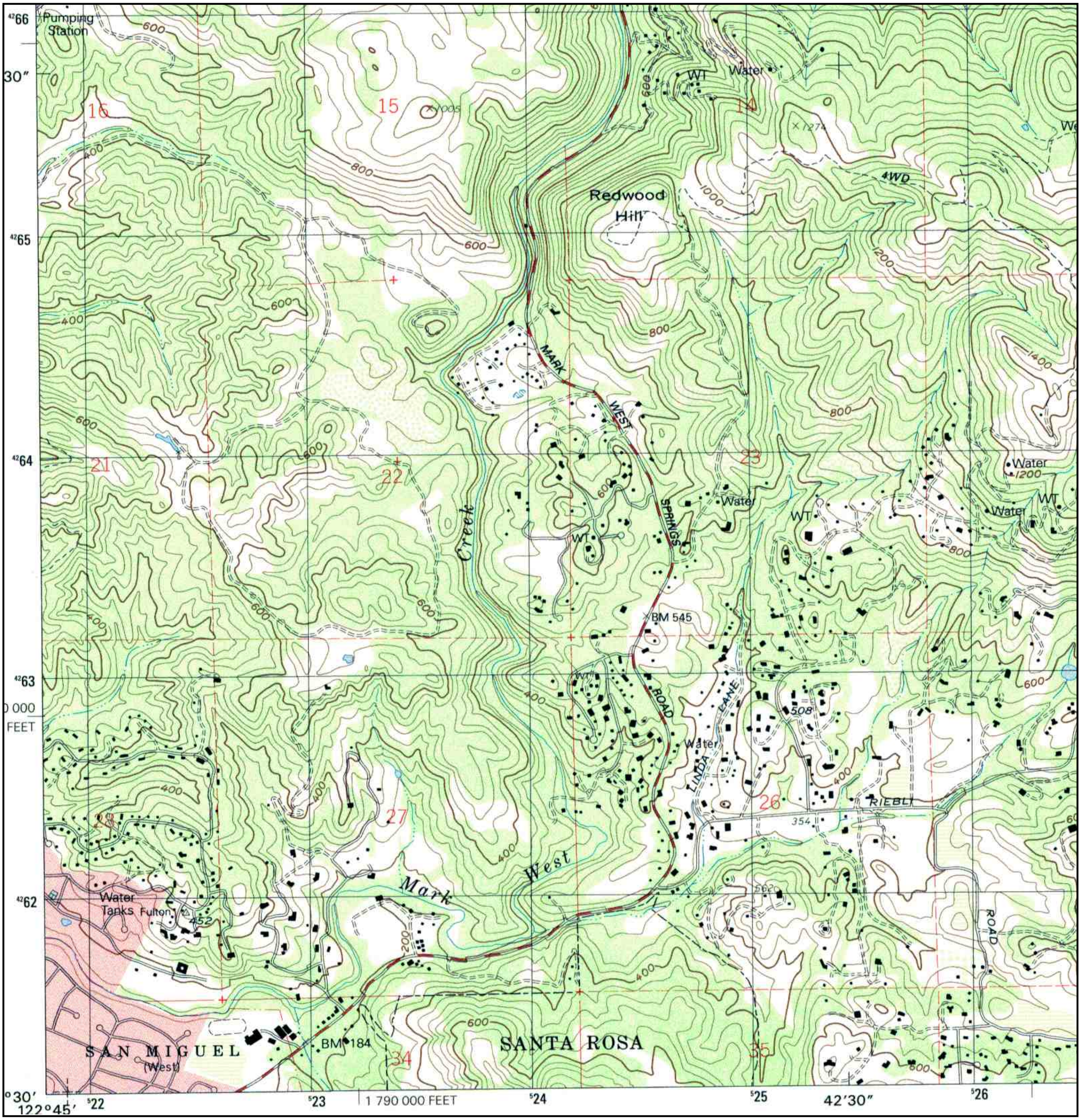


N	ADJOINING QUAD NAME: MARK WEST SPRINGS MAP YEAR: 1993 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

Historical Topographic Map



N ↑	ADJOINING QUAD NAME: MARK WEST SPRINGS MAP YEAR: 1998 SERIES: 7.5 SCALE: 1:24000	SITE NAME: LBC / SMC-SR Properties ADDRESS: 50 Mark West Springs Road Santa Rosa, CA 95403 LAT/LONG: 38.4945 / 122.75	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY#: 2468920.4 RESEARCH DATE: 04/16/2009

APPENDIX D

TITLE COMPANY

Preliminary Title Report

APPENDIX D

LBC / SMC-SR Properties

50 Mark West Springs Road

Santa Rosa, CA 95403

Inquiry Number: 2468920.5

April 17, 2009

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

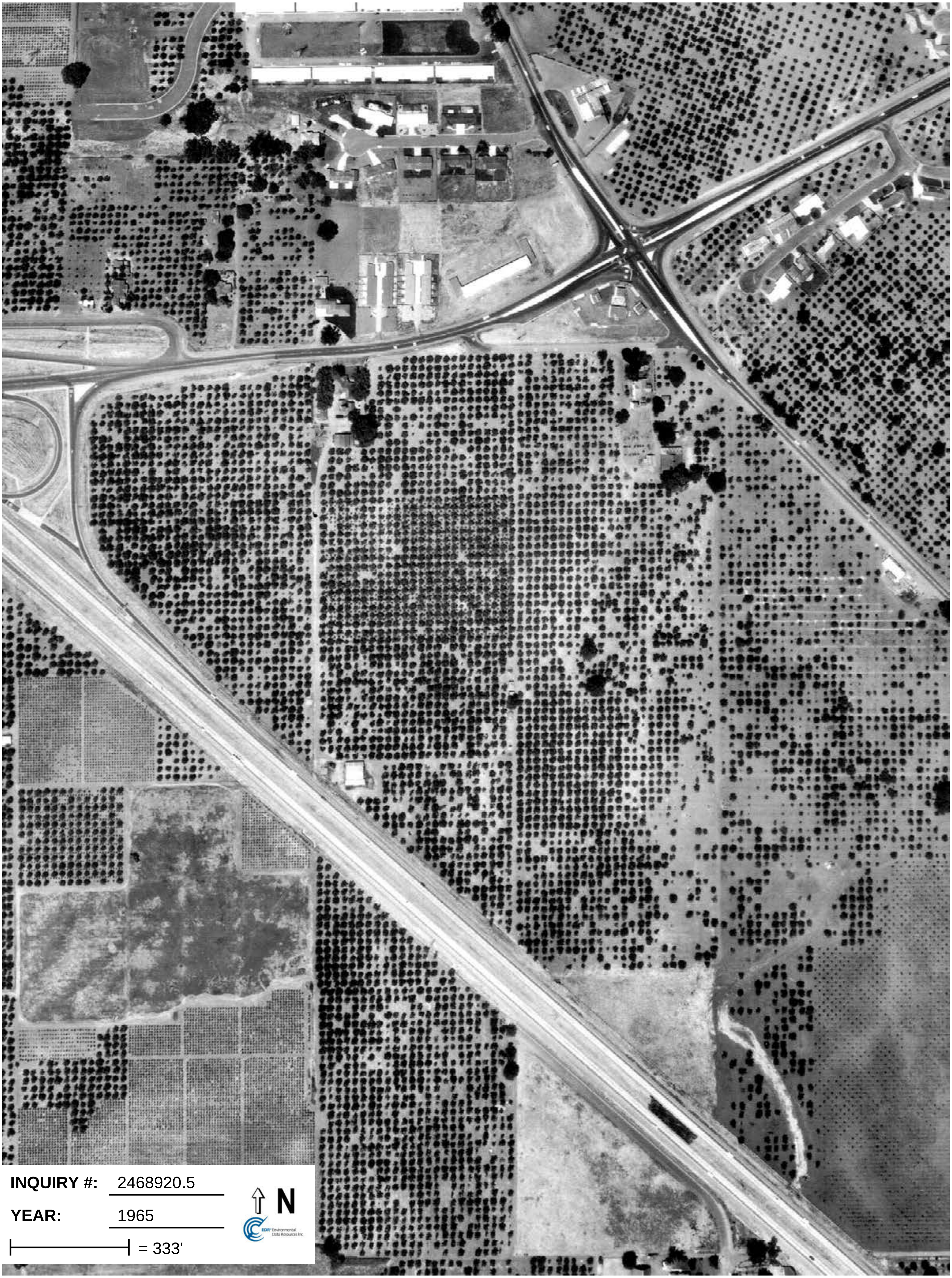
Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography April 17, 2009

Target Property:
50 Mark West Springs Road
Santa Rosa, CA 95403

Year	***Scale***	***Details***	***Source***
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Pacific Air
1965	Aerial Photograph. Scale: 1"=333'	Flight Year: 1965	Cartwright
1974	Aerial Photograph. Scale: 1"=541'	Flight Year: 1974	NASA
1982	Aerial Photograph. Scale: 1"=690'	Flight Year: 1982	USGS
1993	Aerial Photograph. Scale: 1"=666'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=666'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=484'	Flight Year: 2005	EDR


INQUIRY #: 2468920.5
YEAR: 1953
= 555'
N
EDR Environmental Data Resources Inc



INQUIRY #: 2468920.5

YEAR: 1965

= 333'

N

EDR Environmental Data Resources Inc


INQUIRY #: 2468920.5
YEAR: 1974
= 541'
N
EDR Environmental Data Resources Inc


INQUIRY #: 2468920.5
YEAR: 1982
= 690'
N
EDR Environmental Data Resources Inc


INQUIRY #: 2468920.5
YEAR: 1993
= 666'
N
EDR Environmental Data Resources Inc

INQUIRY #: 2468920.5
YEAR: 1998
= 666'
N
EDR Environmental Data Resources Inc


INQUIRY #: 2468920.5
YEAR: 2005
= 484'
N

APPENDIX E

ENVIRONMENTAL DATA RESOURCES, INC.

Aerial Photo Decade Package

A P P E N D I X E

LBC / SMC-SR Properties
Mark West Springs Road
Santa Rosa, CA 95403

Inquiry Number: 2468920.6
April 16, 2009

The EDR-City Directory Abstract

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Executive Summary

Findings

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

2009 Enhancements to EDR City Directory Abstract

New for 2009, the EDR City Directory Abstract has been enhanced with additional information and features. These enhancements will make your city directory research process more efficient, flexible, and insightful than ever before. The enhancements will improve the options for selecting adjoining properties, and will speed up your review of the report.

City Directory Report. Three important enhancements have been made to the EDR City Directory Abstract:

1. *Executive Summary.* The report begins with an Executive Summary that lists the sources consulted in the preparation of the report. Where available, a parcel map is also provided within the report, showing the locations of properties researched.

2. *Page Images.* Where available, the actual page source images will be included in the Appendix, so that you can review them for information that may provide additional insight. EDR has copyright permission to include these images.

3. *Findings Listed by Location.* Another useful enhancement is that findings are now grouped by address. This will significantly reduce the time you need to review your abstracts. Findings are provided under each property address, listed in reverse chronological order and referencing the source for each entry.

Options for Selecting Adjoining Properties. Ensuring that the right adjoining property addresses are searched is one of the biggest challenges that environmental professionals face when conducting city directory historical research. EDR's new enhancements make it easier for you to meet this challenge. Now, when you place an order for the EDR City Directory Abstract, you have the following choices for determining which addresses should be researched.

1. *You Select Addresses and EDR Selects Addresses.* Use the "Add Another Address" feature to specify the addresses you want researched. Your selections will be supplemented by addresses selected by EDR researchers using our established research methods. Where available, a digital map will be shown, indicating property lines overlaid on a color aerial photo and their corresponding addresses. Simply use the address list below the map to check off which properties shown on the map you want to include. You may also select other addresses using the "Add Another Address" feature at the bottom of the list.

2. *EDR Selects Addresses.* Choose this method if you want EDR's researchers to select the addresses to be researched for you, using our established research methods.

3. *You Select Addresses.* Use this method for research based solely on the addresses you select or enter into the system.

4. *Hold City Directory Research Option.* If you choose to select your own adjoining addresses, you may pause production of your EDR City Directory Abstract report until you have had a chance to look at your other EDR reports and sources. Sources for property addresses include: your Certified Sanborn Map Report may show you the location of property addresses; the new EDR Property Tax Map Report may show the location of property addresses; and your field research can supplement these sources with additional address information. To use this capability, simply click "Hold City Directory research" box under "Other Options" at the bottom of the page. Once you have determined what addresses you want researched, go to your EDR Order Status page, select the EDR City Directory Abstract, and enter the addresses and submit for production.

Questions? Contact your EDR representative at 800-352-0050. For more information about all of EDR's 2009 report and service enhancements, visit www.edrnet.com/2009enhancements

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Abstract is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Abstract includes a search and abstract of available city directory data. For each address, the directory lists the name of the corresponding occupant at five year intervals.

Business directories including city, cross reference and telephone directories were reviewed, if available, at approximately five year intervals for the years spanning 1930 through 2006. This report compiles information gathered in this review by geocoding the latitude and longitude of properties identified and gathering information about properties within 1320 feet of the target property.

A summary of the information obtained is provided in the text of this report.

RESEARCH SUMMARY

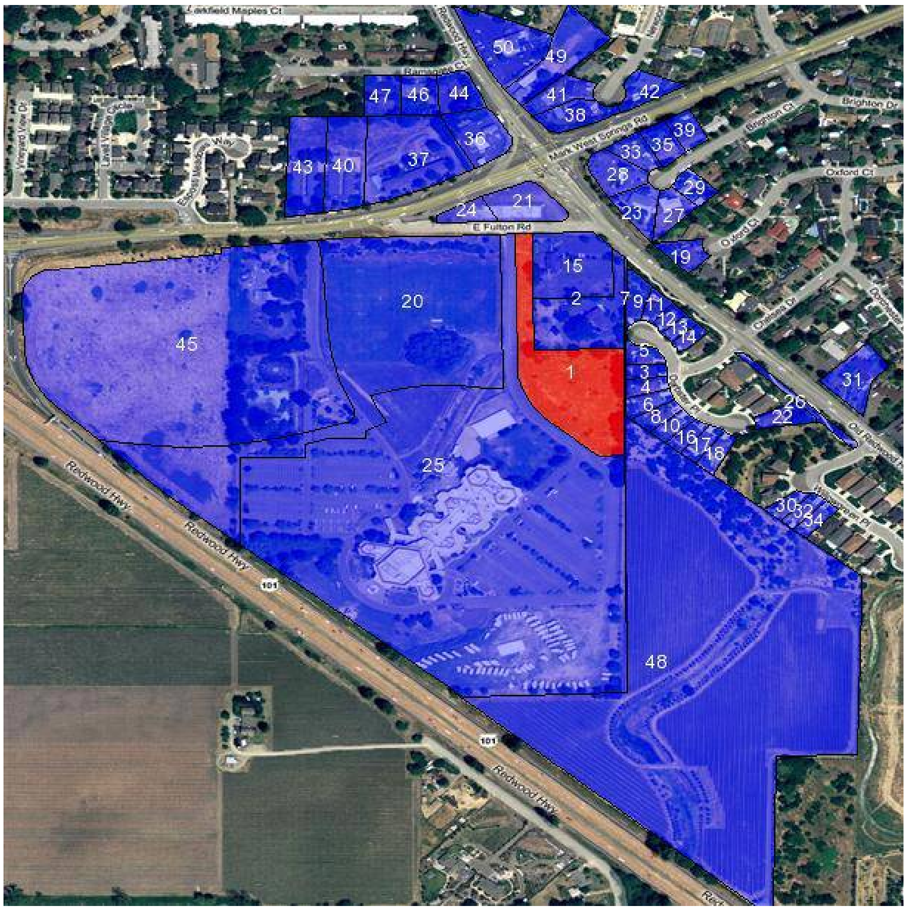
The following research sources were consulted in the preparation of this report. An "X" indicates where information was identified in the source and provided in this report.

Year	***Source***	***TP***	***Adjoining***	***Text Abstract***	***Source Image***
2006	AT T Yellow Pages	-	X	X	-
1994	Pacific Bell	-	X	X	-
1990	R. L. Polk Co. Publishers	-	X	X	-
1987	R. L. Polk Co. Publishers	-	X	X	-
1981	The Pacific Telephone and Telegraph Company	-	X	X	-
1976	R. L. Polk Co. Publishers	-	X	X	-
1970	R. L. Polk Co. Publishers	-	X	X	-
1965	R. L. Polk Co. Publishers	-	X	X	-
1961	R. L. Polk Co., Publishers	-	-	-	-
1958	R. L. Polk Co., Publishers	-	-	-	-
1953	R. L. Polk Co., Publishers	-	-	-	-
1947	R. L. Polk Co., Publishers	-	-	-	-
1935	R. L. Polk Co., Publishers	-	-	-	-
1930	R. L. Polk Co., of California Publishers	-	-	-	-

EXECUTIVE SUMMARY

MAP INFORMATION

The Overview Map provides information on nearby property parcel boundaries. Properties on this map that were selected for research are listed below the map.



SELECTED ADDRESSES

The following addresses were selected by the client. Detailed findings are contained in the findings section. An "X" indicates where information was identified.

Address	***Type***	***Findings***
50 Mark West Springs Road	Map ID: 1	
18 E FULTON RD	Map ID: 15	
4585 OLD REDWOOD HWY	Map ID: 2	
90 W MARK SPRINGS RD	Map ID: 21	
200 DARBSTER PL	Map ID: 22	
14 BRIGHTON CT	Map ID: 23	
50 MARK WEST SPRINGS RD	Map ID: 25	

EXECUTIVE SUMMARY

Address	***Type***	***Findings***
15 BRIGHTON CT	Map ID: 28	
4605 OLD REDWOOD HWY	Map ID: 36	
69 W MARK SPRINGS RD	Map ID: 37	
495 NEWPORT PL	Map ID: 38	
129 W MARK SPRINGS RD	Map ID: 40	
483 NEWPORT PL	Map ID: 41	
145 W MARK SPRINGS RD	Map ID: 43	

FINDINGS

TARGET PROPERTY INFORMATION

ADDRESS

Mark West Springs Road 1
Santa Rosa, CA 95403

FINDINGS DETAIL

Target Property research detail.

No Addresses Found

FINDINGS

ADJOINING PROPERTY DETAIL

The following Adjoining Property addresses were researched for this report. Detailed findings are provided for each address.

BRIGHTON

14 BRIGHTON

Year	Uses	Source
2006	FLATER R	AT T Yellow Pages

24 BRIGHTON

Year	Uses	Source
2006	TAYLOR	AT T Yellow Pages
	TAYLOR	AT T Yellow Pages

27 BRIGHTON

Year	Uses	Source
2006	MASON Acacia	AT T Yellow Pages
	MASON Acacia	AT T Yellow Pages

32 BRIGHTON

Year	Uses	Source
2006	CHEATHAM Deanna	AT T Yellow Pages
	CHEATHAM Deanna	AT T Yellow Pages

BRIGHTON CT

14 BRIGHTON CT

Year	Uses	Source
2006	FLATEBO Richard	AT T Yellow Pages
	Richard L & Jan	AT T Yellow Pages
1987	Blackburn Roofing	R. L. Polk Co. Publishers
	Blackburn Ingolf	R. L. Polk Co. Publishers
1976	Vacant	R. L. Polk Co. Publishers
1970	Barcus Hayward L	R. L. Polk Co. Publishers

15 BRIGHTON CT

Year	Uses	Source
1990	Ramsey Gerald F	R. L. Polk Co. Publishers
1987	Ramsey Gerald F	R. L. Polk Co. Publishers
1976	Larsen Donald W	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1970	Nissen Robt L	R. L. Polk Co. Publishers

19 BRIGHTON CT

Year	Uses	Source
1994	Flinn Bill & Lynn	Pacific Bell
1990	No Return	R. L. Polk Co. Publishers
1987	Perezchica Lupe A	R. L. Polk Co. Publishers
1981	Perezchica Lupe	The Pacific Telephone and Telegraph Company
1976	Perezchica Lupe A	R. L. Polk Co. Publishers
1970	Lovejoy Robt J	R. L. Polk Co. Publishers

20 BRIGHTON CT

Year	Uses	Source
1994	INVESTIGATIONS	Pacific Bell
	GREER J R	Pacific Bell
1990	Greer James R investigator	R. L. Polk Co. Publishers
1987	Greer James R investigator	R. L. Polk Co. Publishers
1976	Greer James R	R. L. Polk Co. Publishers
1970	Greer James	R. L. Polk Co. Publishers

24 BRIGHTON CT

Year	Uses	Source
2006	Darren & Tamara	AT T Yellow Pages
	TAYLOR	AT T Yellow Pages
1994	Baird Cleo L	Pacific Bell
1990	Baird Cleo L Mrs	R. L. Polk Co. Publishers
1987	Baird Cleo L Mrs	R. L. Polk Co. Publishers
1981	Baird Kenneth C & Cleo L	The Pacific Telephone and Telegraph Company
1976	Culley Clinton L	R. L. Polk Co. Publishers
1970	Culley Clinton L	R. L. Polk Co. Publishers
1965	Culey Clinton L	R. L. Polk Co. Publishers

27 BRIGHTON CT

Year	Uses	Source
2006	Steve & Pam	AT T Yellow Pages
	MASON Acacia	AT T Yellow Pages
1990	Mason Wm	R. L. Polk Co. Publishers
1987	Russ Frank G	R. L. Polk Co. Publishers
1976	Russ Frank G	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1970	Russ Frank G	R. L. Polk Co. Publishers

32 BRIGHTON CT

Year	Uses	Source
2006	Richard & Renee Cheal	AT T Yellow Pages
	CHEALR&S	AT T Yellow Pages
	Richard	AT T Yellow Pages
1994	Cheal Richard & Renee	Pacific Bell
1990	Cheal Richard	R. L. Polk Co. Publishers
1987	Cheal Richard	R. L. Polk Co. Publishers
1981	Mount Robt A	The Pacific Telephone and Telegraph Company
	MT STORM FOREST PRODUCTS	The Pacific Telephone and Telegraph Company
1976	Mount Robt A	R. L. Polk Co. Publishers
1970	Bishop Wm R elec contr	R. L. Polk Co. Publishers
1965	Bishop Wm R	R. L. Polk Co. Publishers

35 BRIGHTON CT

Year	Uses	Source
2006	John	AT T Yellow Pages
	CHISM Chas	AT T Yellow Pages
1990	No Return	R. L. Polk Co. Publishers
1987	Vacant	R. L. Polk Co. Publishers
1981	Martin Gina	The Pacific Telephone and Telegraph Company
1976	Martin Wm	R. L. Polk Co. Publishers
1970	Duffield Clarence H	R. L. Polk Co. Publishers
1965	Under Constn	R. L. Polk Co. Publishers

DARBSTER

255 DARBSTER

Year	Uses	Source
2006	PIROLA William N	AT T Yellow Pages

300 DARBSTER

Year	Uses	Source
2006	ERIKSON Brian D	AT T Yellow Pages

FINDINGS

DARBSTER PL

205 DARBSTER PL

Year	Uses	Source
2006	Jeffrey	AT T Yellow Pages
	SCOTTA	AT T Yellow Pages

215 DARBSTER PL

Year	Uses	Source
2006	MICHEL Cammy	AT T Yellow Pages
	Donna	AT T Yellow Pages

220 DARBSTER PL

Year	Uses	Source
2006	WOLLET Richard	AT T Yellow Pages

230 DARBSTER PL

Year	Uses	Source
2006	BERG A	AT T Yellow Pages
	Werner	AT T Yellow Pages
	RUNVIOK	AT T Yellow Pages

255 DARBSTER PL

Year	Uses	Source
2006	PIRO Craig	AT T Yellow Pages
	Johnpaul J	AT T Yellow Pages

260 DARBSTER PL

Year	Uses	Source
2006	SCHECTHER Jeffrey	AT T Yellow Pages

300 DARBSTER PL

Year	Uses	Source
2006	ERIKSON Brian D	AT T Yellow Pages

E FULTON RD

18 E FULTON RD

Year	Uses	Source
2006	Hansen & Miller Law Firm	AT T Yellow Pages
1976	Meredith Jennie L Mrs	R. L. Polk Co. Publishers
1970	Meredith Lawrence M	R. L. Polk Co. Publishers

FINDINGS

FULTON E RD

18 FULTON E RD

Year	Uses	Source
1994	HANSEN & JONES	Pacific Bell
1965	Meredith Lawrence M	R. L. Polk Co. Publishers

LAVELL

201 LAVELL

Year	Uses	Source
2006	LAVENDER D	AT T Yellow Pages
	LAVELL Charles & Elvira	AT T Yellow Pages
	LAVENDER D	AT T Yellow Pages
	LAVELLE Ed & Diane	AT T Yellow Pages

LAVELL RD

175 LAVELL RD

Year	Uses	Source
1987	Dahms	R. L. Polk Co. Publishers
1976	Me Hugh Lucile R	R. L. Polk Co. Publishers
	Houk John D	R. L. Polk Co. Publishers
	Turner Herbert F	R. L. Polk Co. Publishers
1970	Turner Herbert T	R. L. Polk Co. Publishers
	Me Hugh Roy E	R. L. Polk Co. Publishers
	Houk John D	R. L. Polk Co. Publishers

199 LAVELL RD

Year	Uses	Source
1990	Eichar Shirley J Mrs	R. L. Polk Co. Publishers
1987	Eichar Joseph E	R. L. Polk Co. Publishers
1981	Eichar Jos Ed & Shirley	The Pacific Telephone and Telegraph Company

201 LAVELL RD

Year	Uses	Source
2006	John K	AT T Yellow Pages
	LAVELL Charles & Elvira	AT T Yellow Pages
1994	Lavell E E	Pacific Bell
1990	Lavell Elva E Mrs	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1987	Lavell Elva E Mrs	R. L. Polk Co. Publishers
1981	Lavell E E	The Pacific Telephone and Telegraph Company
1976	Lavell Elva E Mrs	R. L. Polk Co. Publishers
1970	Lavell Elva E Mrs	R. L. Polk Co. Publishers

LAVELL VILLAGE

120 LAVELL VILLAGE

Year	Uses	Source
2006	Sara N	AT T Yellow Pages

124 LAVELL VILLAGE

Year	Uses	Source
2006	BEACH d &	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages
	HENDERSON A & C	AT T Yellow Pages
	HENDERSON A & C	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages

128 LAVELL VILLAGE

Year	Uses	Source
2006	ODONNELL Gerald	AT T Yellow Pages
	ODONNELL Gerald	AT T Yellow Pages
	MURAKAMI A K	AT T Yellow Pages
	MURAKAMI A K	AT T Yellow Pages

132 LAVELL VILLAGE

Year	Uses	Source
2006	SMART Alvin C	AT T Yellow Pages

140 LAVELL VILLAGE

Year	Uses	Source
2006	SLATE Heather	AT T Yellow Pages
	SLATE Heather	AT T Yellow Pages
	SLATE Heather	AT T Yellow Pages

FINDINGS

156 LAVELL VILLAGE

Year	Uses	Source
2006	CUEVAS Alejandro	AT T Yellow Pages

LAVELL VILLAGE CIR

120 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Sara N	AT T Yellow Pages

124 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Jorge	AT T Yellow Pages
	BEACH d &	AT T Yellow Pages
	K	AT T Yellow Pages
	HENDERSON A & C	AT T Yellow Pages
	Brian Lewis	AT T Yellow Pages
	AVALOS Eliseo	AT T Yellow Pages

128 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Rosa	AT T Yellow Pages
	MUNYUA Rosebell	AT T Yellow Pages
	Rafael	AT T Yellow Pages
	Heather	AT T Yellow Pages
	ODONNELL Gerald	AT T Yellow Pages
	Debbie	AT T Yellow Pages
	BRITTON Brian & Denise	AT T Yellow Pages

132 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Amber	AT T Yellow Pages
	SMART Alvin C	AT T Yellow Pages
	MENDOZA Moe	AT T Yellow Pages
	Nora	AT T Yellow Pages

136 LAVELL VILLAGE CIR

Year	Uses	Source
2006	DONCHU Eugene	AT T Yellow Pages

FINDINGS

140 LAVELL VILLAGE CIR

Year	Uses	Source
2006	SLANINA Natalie	AT T Yellow Pages

148 LAVELL VILLAGE CIR

Year	Uses	Source
2006	HIBDON Cory	AT T Yellow Pages
	SENDNER Kathy L	AT T Yellow Pages

152 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Joyce	AT T Yellow Pages
	PATTERSON Adele	AT T Yellow Pages
	MARTINEZ Michael	AT T Yellow Pages
	Miguel	AT T Yellow Pages

156 LAVELL VILLAGE CIR

Year	Uses	Source
2006	CUEVAS Alejandro	AT T Yellow Pages
	Luz Maria	AT T Yellow Pages
	LOPEZ A Juan	AT T Yellow Pages
	Candida	AT T Yellow Pages

165 LAVELL VILLAGE CIR

Year	Uses	Source
2006	Lavell Village	AT T Yellow Pages

MARK WEST SPRINGS

100 MARK WEST SPRINGS

Year	Uses	Source
2006	SIGRIST Chris & Tracy	AT T Yellow Pages

131 MARK WEST SPRINGS

Year	Uses	Source
2006	PALADINO Audry	AT T Yellow Pages

161 MARK WEST SPRINGS

Year	Uses	Source
2006	ROGERS Doris M	AT T Yellow Pages

MARK WEST SPRINGS RD

100 MARK WEST SPRINGS RD

Year	Uses	Source
2006	SIGNORELLI C	AT T Yellow Pages
1994	ITF CONSTRUCTION CO	Pacific Bell
1990	Eilken Wm E	R. L. Polk Co. Publishers
1987	Luther Burbank Memorial banks	R. L. Polk Co. Publishers
1981	Chilson Jerry D	The Pacific Telephone and Telegraph Company
1976	Harvest House The	R. L. Polk Co. Publishers
1970	Buttitta Pietro	R. L. Polk Co. Publishers

129 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Northum Karen	R. L. Polk Co. Publishers
1987	Northum Karen	R. L. Polk Co. Publishers
1976	Severns Pietrina Mrs	R. L. Polk Co. Publishers
1970	Bennett Evan D	R. L. Polk Co. Publishers

131 MARK WEST SPRINGS RD

Year	Uses	Source
2006	Camille E	AT T Yellow Pages
	PALADINO Audry	AT T Yellow Pages
1990	No Return	R. L. Polk Co. Publishers
1987	No Return	R. L. Polk Co. Publishers
1976	Huston Harold	R. L. Polk Co. Publishers
1970	No Return	R. L. Polk Co. Publishers

133 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Sevener Thomas	R. L. Polk Co. Publishers
1987	Sevener Thomas	R. L. Polk Co. Publishers
1976	Me Grew Michl	R. L. Polk Co. Publishers
1970	No Return	R. L. Polk Co. Publishers

135 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Sawya Sheri	R. L. Polk Co. Publishers
1987	Sawya Sheri	R. L. Polk Co. Publishers
1976	Faught Lorena Mrs	R. L. Polk Co. Publishers

Year	Uses	Source
1970	No Return	R. L. Polk Co. Publishers

137 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Pierce Wm F	R. L. Polk Co. Publishers
1987	Pierce Wm F	R. L. Polk Co. Publishers
1981	Fay Cecil A	The Pacific Telephone and Telegraph Company
1976	Hagoes Marilyn Mrs	R. L. Polk Co. Publishers
1970	Jameson Sally	R. L. Polk Co. Publishers

139 MARK WEST SPRINGS RD

Year	Uses	Source
1990	No Return	R. L. Polk Co. Publishers
1987	Vacant	R. L. Polk Co. Publishers
1976	Rainforth Jerry S	R. L. Polk Co. Publishers
1970	No Return	R. L. Polk Co. Publishers

140 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Roses Amilio	R. L. Polk Co. Publishers
1987	Roses Amilio	R. L. Polk Co. Publishers

141 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Stevens Ernestine Mrs	R. L. Polk Co. Publishers
1987	Stevens Ernestine Mrs	R. L. Polk Co. Publishers
1981	Stevens F A	The Pacific Telephone and Telegraph Company
	Stevens Ernestine A	The Pacific Telephone and Telegraph Company
1976	Davies Kelly	R. L. Polk Co. Publishers
1970	Vacant	R. L. Polk Co. Publishers

143 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Nicholas Stacey G	R. L. Polk Co. Publishers
1987	Nicholas Stacey G	R. L. Polk Co. Publishers
1981	Ellis Dave G	The Pacific Telephone and Telegraph Company
1976	Wright Deborah K	R. L. Polk Co. Publishers
1970	No Return	R. L. Polk Co. Publishers

FINDINGS

145 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Storie Lois	R. L. Polk Co. Publishers
	Sunnyside Apartments	R. L. Polk Co. Publishers
1987	Sunnyside Apartments	R. L. Polk Co. Publishers
	Storie Lois	R. L. Polk Co. Publishers
1976	Biados Lucille A	R. L. Polk Co. Publishers
1970	Mallory Mike	R. L. Polk Co. Publishers

147 MARK WEST SPRINGS RD

Year	Uses	Source
2006	Teresa	AT T Yellow Pages
	GARCIA Saul	AT T Yellow Pages
1990	No Return	R. L. Polk Co. Publishers
1987	No Return	R. L. Polk Co. Publishers
1976	No Return	R. L. Polk Co. Publishers
1970	Finkle David	R. L. Polk Co. Publishers

149 MARK WEST SPRINGS RD

Year	Uses	Source
1981	Love G	The Pacific Telephone and Telegraph Company
1976	Vacant	R. L. Polk Co. Publishers
1970	Leighty Sandra J Mrs	R. L. Polk Co. Publishers

151 MARK WEST SPRINGS RD

Year	Uses	Source
1976	Vacant	R. L. Polk Co. Publishers
1970	Imperatrice Ron	R. L. Polk Co. Publishers

153 MARK WEST SPRINGS RD

Year	Uses	Source
1990	Rowtin Max	R. L. Polk Co. Publishers
1987	Rowtin Max	R. L. Polk Co. Publishers
1976	Vacant	R. L. Polk Co. Publishers
1970	Harms Alice	R. L. Polk Co. Publishers

155 MARK WEST SPRINGS RD

Year	Uses	Source
1987	Clark John B	R. L. Polk Co. Publishers
1976	Ledou Stacy E	R. L. Polk Co. Publishers

FINDINGS

Year	*Uses*	*Source*
1970	No Return	R. L. Polk Co. Publishers

157 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
1990	No Return	R. L. Polk Co. Publishers
1987	No Return	R. L. Polk Co. Publishers
1976	Cornett Roy	R. L. Polk Co. Publishers
1970	Collard Carl Jr	R. L. Polk Co. Publishers

159 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
1990	Dunn Norbert A	R. L. Polk Co. Publishers
1987	Dunn Norbert A	R. L. Polk Co. Publishers
1981	Baxter Carl	The Pacific Telephone and Telegraph Company
1976	Freites Chris L	R. L. Polk Co. Publishers
1970	Bostrom Judith	R. L. Polk Co. Publishers

161 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
2006	ROGERS Doris M	AT T Yellow Pages
	Lloyd G	AT T Yellow Pages
	BIER Laura	AT T Yellow Pages
	Mary	AT T Yellow Pages

184 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
1981	Wood Chas D	The Pacific Telephone and Telegraph Company
	Wood Christopher...................	The Pacific Telephone and Telegraph Company

186 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
1981	Chirco Michael Jr	The Pacific Telephone and Telegraph Company

50 MARK WEST SPRINGS RD

Year	*Uses*	*Source*
2006	WELLS FARGO CENTER FOR THE ARTS	AT T Yellow Pages
	Art Reach Assistance & Outreach Programs	AT T Yellow Pages
	WELLS FARGO CENTER FOR THE ARTS	AT T Yellow Pages

FINDINGS

Year	*Uses*	*Source*
2006	Art Reach Assistance & Outreach Programs	AT T Yellow Pages
1994	SONOMA COUNTRY DAY	Pacific Bell
	SCHOOL	Pacific Bell
	CALIFORNIA MUSEUM OF	Pacific Bell
	ART LUTHER BURBANK	Pacific Bell
	LUTHER BURBANK CENTER	Pacific Bell
	FOR THE ARTS	Pacific Bell
	Building	Pacific Bell
	SONOMA COUNTY	Pacific Bell
	201 CALVARY CHAPEL OF	Pacific Bell
	SANTA ROSA	Pacific Bell
	SYMPHONY	Pacific Bell
	400 CHURCH OF RELIGIOUS	Pacific Bell
	SCIENCE	Pacific Bell
	102 ACTORS THEATRE OF	Pacific Bell
	304 SANTA ROSA	Pacific Bell
	SONOMA COUNTRY DAY	Pacific Bell
	SCHOOL	Pacific Bell
	CALIFORNIA MUSEUM OF	Pacific Bell
	ART LUTHER BURBANK	Pacific Bell
	LUTHER BURBANK CENTER	Pacific Bell
	FOR THE ARTS	Pacific Bell
	Building	Pacific Bell
	SONOMA COUNTY	Pacific Bell
	201 CALVARY CHAPEL OF	Pacific Bell
	SANTA ROSA	Pacific Bell
	SYMPHONY	Pacific Bell
	400 CHURCH OF RELIGIOUS	Pacific Bell
	SCIENCE	Pacific Bell
	102 ACTORS THEATRE OF	Pacific Bell
	304 SANTA ROSA	Pacific Bell
1990	Luther Burbank Cntr For The Arts	R. L. Polk Co. Publishers
	Sonoma County Wine Growers Assn	R. L. Polk Co. Publishers
	Sonoma County Day School	R. L. Polk Co. Publishers
	Sonoma County Wine Showcase & Auction	R. L. Polk Co. Publishers
	A Childs World	R. L. Polk Co. Publishers
	Luther Burbank Center For Performing Arts	R. L. Polk Co. Publishers
	Santa Rosa Symphony Assn	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1990	Actors Theatre Of Sonoma Cnty	R. L. Polk Co. Publishers
	Resurrection Life Center church	R. L. Polk Co. Publishers
	Luther Burbank Cntr For The Arts Addl Sp	R. L. Polk Co. Publishers
	Luther Burbank Cntr For The Arts	R. L. Polk Co. Publishers
	Sonoma County Wine Growers Assn	R. L. Polk Co. Publishers
	Sonoma County Day School	R. L. Polk Co. Publishers
	Sonoma County Wine Showcase & Auction	R. L. Polk Co. Publishers
	A Childs World	R. L. Polk Co. Publishers
	Luther Burbank Center For Performing Arts	R. L. Polk Co. Publishers
	Santa Rosa Symphony Assn	R. L. Polk Co. Publishers
	Actors Theatre Of Sonoma Cnty	R. L. Polk Co. Publishers
	Resurrection Life Center church	R. L. Polk Co. Publishers
	Luther Burbank Cntr For The Arts Addl Sp	R. L. Polk Co. Publishers
1987	Luther Burbank Center For Performing	R. L. Polk Co. Publishers
	Resurrection Life Center church	R. L. Polk Co. Publishers
	K C L B 92 F M Radio Sta	R. L. Polk Co. Publishers
	Center For Positive Uving	R. L. Polk Co. Publishers
	Carters West College	R. L. Polk Co. Publishers
	Sonoma County Day School	R. L. Polk Co. Publishers
	Childrens World Day Care Center	R. L. Polk Co. Publishers
	Luther Burbank Center For Performing	R. L. Polk Co. Publishers
	Resurrection Life Center church	R. L. Polk Co. Publishers
	K C L B 92 F M Radio Sta	R. L. Polk Co. Publishers
	Center For Positive Uving	R. L. Polk Co. Publishers
	Carters West College	R. L. Polk Co. Publishers
	Sonoma County Day School	R. L. Polk Co. Publishers
	Childrens World Day Care Center	R. L. Polk Co. Publishers
1981	Christian Life Bookstore	The Pacific Telephone and Telegraph Company
	Christian Life Center	The Pacific Telephone and Telegraph Company
	Christian Life Elementary Jr High School	The Pacific Telephone and Telegraph Company
	Storyland Pre School	The Pacific Telephone and Telegraph Company
	Muster Fred A Rev	The Pacific Telephone and Telegraph Company
	Christian Life Bookstore	The Pacific Telephone and Telegraph Company
	Christian Life Center	The Pacific Telephone and Telegraph Company

FINDINGS

Year	Uses	Source
1981	Christian Life Elementary Jr High School	The Pacific Telephone and Telegraph Company
	Storyland Pre School	The Pacific Telephone and Telegraph Company
	Muster Fred A Rev	The Pacific Telephone and Telegraph Company
1976	Christian Life Center	R. L. Polk Co. Publishers
	Christian Life Elementary School	R. L. Polk Co. Publishers
	Christian Life Center	R. L. Polk Co. Publishers
	Christian Life Elementary School	R. L. Polk Co. Publishers

65 MARK WEST SPRINGS RD

Year	Uses	Source
2006	John	AT T Yellow Pages
	MILLERG Steve	AT T Yellow Pages
1994	Esposti John	Pacific Bell
1990	bWatson Francis	R. L. Polk Co. Publishers
	Esposti Dina	R. L. Polk Co. Publishers
1987	b Mooney M	R. L. Polk Co. Publishers
	Esposti John	R. L. Polk Co. Publishers
1981	I Esposti John	The Pacific Telephone and Telegraph Company
	Esposti Fred Hart Ln Ft	The Pacific Telephone and Telegraph Company
1976	b Schneitman Roy	R. L. Polk Co. Publishers
	Esposti John	R. L. Polk Co. Publishers
1970	Esposti John A	R. L. Polk Co. Publishers

69 MARK WEST SPRINGS RD

Year	Uses	Source
2006	ADAMSON Barry	AT T Yellow Pages
	Nathan	AT T Yellow Pages
1994	Building	Pacific Bell
	8 Ochoa Jose Luis	Pacific Bell
1990	Mark West Villas apts	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Silva Craig M	R. L. Polk Co. Publishers
	Phi Uips Kathleen	R. L. Polk Co. Publishers
	Vadon Susan	R. L. Polk Co. Publishers
	Keyes Sandra D Mrs	R. L. Polk Co. Publishers
	Laughlin Earl W	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1990	Mahurin Eleanor Mrs	R. L. Polk Co. Publishers
	Jacquez Eliseo	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
1987	Mark West Villas apts	R. L. Polk Co. Publishers
	Hildebrand Cheri	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Silva Craig M	R. L. Polk Co. Publishers
	Phillips Kathleen	R. L. Polk Co. Publishers
	Vadon Susan	R. L. Polk Co. Publishers
	Keyes Sandra D Mrs	R. L. Polk Co. Publishers
	Laughlin Earl W	R. L. Polk Co. Publishers
	Mahurin Eleanor Mrs	R. L. Polk Co. Publishers
	Jacquez Eliseo	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
1981	Taylor Robt C	The Pacific Telephone and Telegraph Company
	Townsend Andrew	The Pacific Telephone and Telegraph Company
	Higgins Rocky	The Pacific Telephone and Telegraph Company
	Ransom H	The Pacific Telephone and Telegraph Company
	Briggs Thos G	The Pacific Telephone and Telegraph Company
	Ransom Helen	The Pacific Telephone and Telegraph Company
	Ransom L R	The Pacific Telephone and Telegraph Company
	Rogers Isabel	The Pacific Telephone and Telegraph Company
	Sale R	The Pacific Telephone and Telegraph Company
1976	Genesis House Christian Life Center	R. L. Polk Co. Publishers
	Martin Greg	R. L. Polk Co. Publishers
	Sullivan Joy	R. L. Polk Co. Publishers
	Chadwick Bonita	R. L. Polk Co. Publishers
1970	Howse Neville	R. L. Polk Co. Publishers
	Swain Terry	R. L. Polk Co. Publishers

Year	Uses	Source
1970	Larkfield Elms Apartments	R. L. Polk Co. Publishers
	Guildford Edw J	R. L. Polk Co. Publishers
	Berry Douglas	R. L. Polk Co. Publishers
	Schaefer Linda	R. L. Polk Co. Publishers
	Poole Norma	R. L. Polk Co. Publishers
	Moratto Lawrence A	R. L. Polk Co. Publishers
	Bronsert Ronald	R. L. Polk Co. Publishers
	Erwin Gordon	R. L. Polk Co. Publishers
	Di Stefano Paula	R. L. Polk Co. Publishers
	Salkin Howard	R. L. Polk Co. Publishers
	Duport Kenneth M	R. L. Polk Co. Publishers

NEWPORT

450 NEWPORT

Year	Uses	Source
2006	SEITZ Anja	AT T Yellow Pages

NEWPORT PL

400 NEWPORT PL

Year	Uses	Source
1990	No Return	R. L. Polk Co. Publishers

412 NEWPORT PL

Year	Uses	Source
2006	Suzette	AT T Yellow Pages
	MORSHEAD Stuart W	AT T Yellow Pages
1990	Dada Ralph	R. L. Polk Co. Publishers

424 NEWPORT PL

Year	Uses	Source
2006	BUZANSKI Paul W	AT T Yellow Pages
1994	Buzanski Paul	Pacific Bell
1990	Buzanski Paul	R. L. Polk Co. Publishers

436 NEWPORT PL

Year	Uses	Source
1990	Scheffel Lee D	R. L. Polk Co. Publishers

FINDINGS

450 NEWPORT PL

Year	Uses	Source
2006	SEITZ Anja	AT T Yellow Pages
	Paula	AT T Yellow Pages
1990	Fess Mike R	R. L. Polk Co. Publishers

459 NEWPORT PL

Year	Uses	Source
1990	Landeros Moises	R. L. Polk Co. Publishers

460 NEWPORT PL

Year	Uses	Source
1990	Vacant	R. L. Polk Co. Publishers

470 NEWPORT PL

Year	Uses	Source
2006	Stan	AT T Yellow Pages
	COMMERFORDGary A	AT T Yellow Pages
1994	Commerford Stan	Pacific Bell
1990	No Return	R. L. Polk Co. Publishers

483 NEWPORT PL

Year	Uses	Source
1990	Vaillentte Robt J	R. L. Polk Co. Publishers

OLD REDWOOD HWY

4404 OLD REDWOOD HWY

Year	Uses	Source
2006	Willis Wine Bar	AT T Yellow Pages
1994	ORCHARD INN	Pacific Bell
1990	Orchard Inn	R. L. Polk Co. Publishers
1987	Orchard Inn	R. L. Polk Co. Publishers
1981	Reed Walter H	The Pacific Telephone and Telegraph Company
	I Orchard Inn	The Pacific Telephone and Telegraph Company
	Orchard Ellis D Lt Col Ret	The Pacific Telephone and Telegraph Company

FINDINGS

4420 OLD REDWOOD HWY

Year	***Uses***	***Source***
1994	Building	Pacific Bell
	56 Courtney Chris	Pacific Bell
	60 Becker Bruce H	Pacific Bell
1990	Apartments	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Becker Bruce H	R. L. Polk Co. Publishers
	Cain M	R. L. Polk Co. Publishers
	Trimingham S	R. L. Polk Co. Publishers
	Button C	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Berman Robt	R. L. Polk Co. Publishers
	No Return	R. L. Polk Co. Publishers
	Adams E	R. L. Polk Co. Publishers
1987	Vacant	R. L. Polk Co. Publishers
	Cain M	R. L. Polk Co. Publishers
	Trimingham S	R. L. Polk Co. Publishers
	Button C	R. L. Polk Co. Publishers
	Traylor V	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
	Berman Robt	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
	Apartments	R. L. Polk Co. Publishers
	Vacant	R. L. Polk Co. Publishers
	Adams E	R. L. Polk Co. Publishers
	Bosco M	R. L. Polk Co. Publishers
1981	Danielson Norman J	The Pacific Telephone and Telegraph Company
	Wax Jos M	The Pacific Telephone and Telegraph Company
	Danis Geo H	The Pacific Telephone and Telegraph Company
	Marmorsteinova Anna	The Pacific Telephone and Telegraph Company
	Berman Robert	The Pacific Telephone and Telegraph Company

Year	Uses	Source
1981	Shook Edith	The Pacific Telephone and Telegraph Company

4440 OLD REDWOOD HWY

Year	Uses	Source
2006	La Mancha Apartments	AT T Yellow Pages
	CLACK Judith	AT T Yellow Pages
	S	AT T Yellow Pages
	MCLAUGHLIN Curt & Samantha	AT T Yellow Pages
	Jamie	AT T Yellow Pages
	PFEIFFER Greg	AT T Yellow Pages
	Katrina L	AT T Yellow Pages
	SCISLOWSKI Piotr	AT T Yellow Pages
	THOMAS Robert	AT T Yellow Pages
	Shelia	AT T Yellow Pages
	WASHBURN Aubin	AT T Yellow Pages
	Heidi	AT T Yellow Pages
1994	2 Prado Mark & Kimberly	Pacific Bell
	3 Brown Charles E	Pacific Bell
	5 Jernander Vern	Pacific Bell
	26 Perkins Martin	Pacific Bell
	Building	Pacific Bell
1990	Henderson H W	R. L. Polk Co. Publishers
	Jernander Vem	R. L. Polk Co. Publishers
	Bell Carl	R. L. Polk Co. Publishers
	Bell Carl	R. L. Polk Co. Publishers
	Pringle Pame	R. L. Polk Co. Publishers
	Under Constn	R. L. Polk Co. Publishers
	La Mancha Apartments	R. L. Polk Co. Publishers
1987	La Mancha Apartments	R. L. Polk Co. Publishers
1981	Crotser Thos A	The Pacific Telephone and Telegraph Company
	I Crotteau A D	The Pacific Telephone and Telegraph Company
	Farley Howard E	The Pacific Telephone and Telegraph Company
	Enedy Steven	The Pacific Telephone and Telegraph Company
	Wildnauer Kenn	The Pacific Telephone and Telegraph Company
	Gonsaives J	The Pacific Telephone and Telegraph Company

Year	Uses	Source
1981	Leiter Paul	The Pacific Telephone and Telegraph Company
	Nation Norma	The Pacific Telephone and Telegraph Company
	Dell Oro Walter	The Pacific Telephone and Telegraph Company
	I Farley Jas M	The Pacific Telephone and Telegraph Company
	Robertson Carla J	The Pacific Telephone and Telegraph Company
	Brown Elmer J & Glenys	The Pacific Telephone and Telegraph Company
	Jernander Vern	The Pacific Telephone and Telegraph Company
	La Mancha Apartments	The Pacific Telephone and Telegraph Company
	Mc Donald Wm & Sybil	The Pacific Telephone and Telegraph Company
	Alford John A	The Pacific Telephone and Telegraph Company
	Alford Ray	The Pacific Telephone and Telegraph Company
	Packwood Gene C	The Pacific Telephone and Telegraph Company
	Almon Richard G	The Pacific Telephone and Telegraph Company
	Brooks John V	The Pacific Telephone and Telegraph Company
	Bergh H	The Pacific Telephone and Telegraph Company
	Bertuccelli Wm F	The Pacific Telephone and Telegraph Company
	Bonfigli Tom & Pam	The Pacific Telephone and Telegraph Company
	Powell S S	The Pacific Telephone and Telegraph Company
	Savage Robt	The Pacific Telephone and Telegraph Company
	Savage Sue Highland Ter MRo........	The Pacific Telephone and Telegraph Company
	Robertson Albert	The Pacific Telephone and Telegraph Company

4605 OLD REDWOOD HWY

Year	Uses	Source
1994	LARKFIELD UNION	Pacific Bell
	SERVICE	Pacific Bell

Year	Uses	Source
1990	Larkfield Union Service	R. L. Polk Co. Publishers
1987	Larkfield Union Service	R. L. Polk Co. Publishers
1981	Larkfield Union Service	The Pacific Telephone and Telegraph Company
	LARKFIELD WATER CO	The Pacific Telephone and Telegraph Company

PAULETTE

4696 PAULETTE

Year	Uses	Source
2006	BOIVIN Amanda A	AT T Yellow Pages

PAULETTE PL

4653 PAULETTE PL

Year	Uses	Source
2006	SANCHEZ Jose	AT T Yellow Pages
	Jose	AT T Yellow Pages
1994	Tescher Patricia & Tom	Pacific Bell

4661 PAULETTE PL

Year	Uses	Source
1994	Brown Maurice & Ruth	Pacific Bell

4669 PAULETTE PL

Year	Uses	Source
2006	OLCESE Richard	AT T Yellow Pages
1994	Olcese Richard	Pacific Bell

4674 PAULETTE PL

Year	Uses	Source
1994	Humphrey Joseph W	Pacific Bell

4682 PAULETTE PL

Year	Uses	Source
2006	DRESCHERJ	AT T Yellow Pages
	Roy M	AT T Yellow Pages
1994	Drescher Roy M	Pacific Bell

FINDINGS

4696 PAULETTE PL

Year	Uses	Source
2006	Donald & Paula	AT T Yellow Pages
	BOIVIN Amanda A	AT T Yellow Pages

4697 PAULETTE PL

Year	Uses	Source
2006	Jashmer Rajinder	AT T Yellow Pages
	SIHOTA Jasdeeo.S	AT T Yellow Pages
1994	Slhota Jashmer	Pacific Bell
	Rajinder	Pacific Bell

4710 PAULETTE PL

Year	Uses	Source
2006	PRATTB	AT T Yellow Pages
	Christopher & Jackie	AT T Yellow Pages
1994	Pratt Christopher	Pacific Bell
	Jackie	Pacific Bell
	4712 Lorange Dave & Slony	Pacific Bell

4712 PAULETTE PL

Year	Uses	Source
2006	LORANGE Dave	AT T Yellow Pages

RAMSGATE

33 RAMSGATE

Year	Uses	Source
2006	WILGISD&T	AT T Yellow Pages
	WILHELM Billy	AT T Yellow Pages
	WILHELM Billy	AT T Yellow Pages
	WILFORD A W	AT T Yellow Pages
	WILHELM Billy	AT T Yellow Pages

35 RAMSGATE

Year	Uses	Source
2006	ADAMSC	AT T Yellow Pages

98 RAMSGATE

Year	Uses	Source
2006	JENSEN Alan D	AT T Yellow Pages

FINDINGS

RAMSGATE CT

33 RAMSGATE CT

Year	Uses	Source
2006	WILFORD A W	AT T Yellow Pages
1994	Wilford A W	Pacific Bell
1990	Wilford Albert W	R. L. Polk Co. Publishers
1987	Wilford Albert W	R. L. Polk Co. Publishers
1981	Wilford AW	The Pacific Telephone and Telegraph Company
1976	Wilford Albert W	R. L. Polk Co. Publishers
1970	Fracchia Allen V	R. L. Polk Co. Publishers

35 RAMSGATE CT

Year	Uses	Source
2006	ADAMSC	AT T Yellow Pages
	Dennis	AT T Yellow Pages
1990	Wilford Francis W	R. L. Polk Co. Publishers
1987	Wilford Francis W	R. L. Polk Co. Publishers
1976	Hyman Harold B	R. L. Polk Co. Publishers
1970	Saner Fredk	R. L. Polk Co. Publishers
1965	Vacant	R. L. Polk Co. Publishers

40 RAMSGATE CT

Year	Uses	Source
1994	Proctor N	Pacific Bell
1990	Brophy Robt W	R. L. Polk Co. Publishers
1987	Brophy Robt W	R. L. Polk Co. Publishers
1981	Erickson Eugene	The Pacific Telephone and Telegraph Company
1976	Browning Jo Ann	R. L. Polk Co. Publishers
1970	Vaughn Ron G	R. L. Polk Co. Publishers
1965	Vacant	R. L. Polk Co. Publishers

42 RAMSGATE CT

Year	Uses	Source
1987	Kulka Charmian Mrs	R. L. Polk Co. Publishers
1981	Cole M	The Pacific Telephone and Telegraph Company
1976	Lizza Barbara Mrs	R. L. Polk Co. Publishers
1970	Stone Bud	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1965	Humphrey Donald M	R. L. Polk Co. Publishers

53 RAMSGATE CT

Year	Uses	Source
1987	Flatebo Richd	R. L. Polk Co. Publishers
1981	Flatebo Richard	The Pacific Telephone and Telegraph Company
1976	Flatebo Richd	R. L. Polk Co. Publishers
1970	Bjorkman Eric R	R. L. Polk Co. Publishers
1965	Johnson Sumner F	R. L. Polk Co. Publishers

55 RAMSGATE CT

Year	Uses	Source
1990	Pickett Geo	R. L. Polk Co. Publishers
1987	Vacant	R. L. Polk Co. Publishers
1976	Howard Arlene Mrs	R. L. Polk Co. Publishers
1970	Traxler Doris T Mrs	R. L. Polk Co. Publishers
1965	Ramkey Richd N	R. L. Polk Co. Publishers

60 RAMSGATE CT

Year	Uses	Source
1994	Townsend Wilmer	Pacific Bell
1990	Townsend Wilmer	R. L. Polk Co. Publishers
1987	Townsend Wilmer A	R. L. Polk Co. Publishers
1976	Vacant	R. L. Polk Co. Publishers
1970	Todd Corrine M Mrs	R. L. Polk Co. Publishers
1965	Todd Corrine M Mrs	R. L. Polk Co. Publishers

62 RAMSGATE CT

Year	Uses	Source
1990	Fulgham Mary Mrs	R. L. Polk Co. Publishers
1987	Fulgham Mary Mrs	R. L. Polk Co. Publishers
1981	Fulgham R C	The Pacific Telephone and Telegraph Company
1976	Fulgham Ray C	R. L. Polk Co. Publishers
1970	Fulgham Ray C	R. L. Polk Co. Publishers
1965	Fulgham Ray C	R. L. Polk Co. Publishers

73 RAMSGATE CT

Year	Uses	Source
2006	ATKERSON J	AT T Yellow Pages

Year	Uses	Source
1990	Revard Betty Mrs	R. L. Polk Co. Publishers
1987	Revard Betty Mrs	R. L. Polk Co. Publishers
1976	Vacant	R. L. Polk Co. Publishers
1970	Jensen Ronald	R. L. Polk Co. Publishers

75 RAMSGATE CT

Year	Uses	Source
1990	Lorenzo Frank	R. L. Polk Co. Publishers
	Lorenzo Construction & Design Service	R. L. Polk Co. Publishers
1987	Lorenzo Frank	R. L. Polk Co. Publishers
	Lorenzo Construction & Design Service	R. L. Polk Co. Publishers
1981	Lorenzo Construction & Design Service	The Pacific Telephone and Telegraph Company
1976	Erickson Alfonso A	R. L. Polk Co. Publishers
1970	Erickson Alfonso A	R. L. Polk Co. Publishers

80 RAMSGATE CT

Year	Uses	Source
2006	BEDFORD Andrew	AT T Yellow Pages
	Mary J	AT T Yellow Pages
1990	Cortes George L	R. L. Polk Co. Publishers
1987	Cortes George L	R. L. Polk Co. Publishers
1981	Elrod Mark R	The Pacific Telephone and Telegraph Company
1976	Hayes Dorothy	R. L. Polk Co. Publishers
1970	Miller James	R. L. Polk Co. Publishers
1965	Bailie Cecil L	R. L. Polk Co. Publishers

82 RAMSGATE CT

Year	Uses	Source
1990	Smallridge Jay	R. L. Polk Co. Publishers
1987	Smallridge Jay	R. L. Polk Co. Publishers
1976	Castell Sue Y	R. L. Polk Co. Publishers
1970	Reed James P	R. L. Polk Co. Publishers

95 RAMSGATE CT

Year	Uses	Source
1994	Guildford Edward J	Pacific Bell
1990	Guildford Edward J	R. L. Polk Co. Publishers
1987	Guildford Edward J	R. L. Polk Co. Publishers

FINDINGS

Year	Uses	Source
1981	Guildford Edward J	The Pacific Telephone and Telegraph Company
1976	Guildford Edward J	R. L. Polk Co. Publishers
1970	Me Arthur Jared	R. L. Polk Co. Publishers
1965	Mc Auley Jas D	R. L. Polk Co. Publishers

96 RAMSGATE CT

Year	Uses	Source
1990	Martin Carolyn	R. L. Polk Co. Publishers
1987	Martin Carolyn	R. L. Polk Co. Publishers
1976	Hart Gary	R. L. Polk Co. Publishers
1970	Lintner Gary	R. L. Polk Co. Publishers

97 RAMSGATE CT

Year	Uses	Source
2006	Timothy	AT T Yellow Pages
	FAUTLEY Gilbert	AT T Yellow Pages
1990	Juvinall Florence J Mrs	R. L. Polk Co. Publishers
1987	Juvinall Florence J Mrs	R. L. Polk Co. Publishers
1981	Juvinall Andrew V Rev	The Pacific Telephone and Telegraph Company
1976	Juvina H Andrew V	R. L. Polk Co. Publishers
1970	Black Ivan D	R. L. Polk Co. Publishers
1965	Vot Oettingen Walter G	R. L. Polk Co. Publishers

98 RAMSGATE CT

Year	Uses	Source
2006	JENSEN Alan D	AT T Yellow Pages
	Christiane	AT T Yellow Pages
1994	Jensen Christiane	Pacific Bell
1990	Jenson Christine Mrs	R. L. Polk Co. Publishers
1987	Jenson Christine Mrs	R. L. Polk Co. Publishers
1981	Jensen Christiane	The Pacific Telephone and Telegraph Company
1976	Jenson Ronald	R. L. Polk Co. Publishers
1970	Miller James A	R. L. Polk Co. Publishers
1965	Smith R Curtis	R. L. Polk Co. Publishers

FINDINGS

S MARK WEST SPRINGS RD

50 S MARK WEST SPRINGS RD

Year	*Uses*	*Source*
2006	Sonoma Academy	AT T Yellow Pages
	Sonoma Academy	AT T Yellow Pages

FINDINGS

TARGET PROPERTY: ADDRESS NOT LISTED IN RESEARCH SOURCE

The following Target Property addresses were researched for this report, and the addresses were not listed in the research source.

Address Researched	Address Not Listed in Research Source
Mark West Springs Road	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930

ADJOINING PROPERTY: ADDRESSES NOT LISTED IN RESEARCH SOURCE

The following Adjoining Property addresses were researched for this report, and the addresses were not listed in research source.

Address Researched	Address Not Listed in Research Source
100 MARK WEST SPRINGS	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
100 MARK WEST SPRINGS RD	1965, 1961, 1958, 1953, 1947, 1935, 1930
120 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
120 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
124 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
124 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
128 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
128 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
129 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
129 W MARK SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
131 MARK WEST SPRINGS	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
131 MARK WEST SPRINGS RD	1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
132 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
132 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
133 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
135 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
136 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
137 MARK WEST SPRINGS RD	2006, 1994, 1965, 1961, 1958, 1953, 1947, 1935, 1930
139 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
14 BRIGHTON	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930

FINDINGS

Address Researched	Address Not Listed in Research Source
14 BRIGHTON CT	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
14 BRIGHTON CT	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
14 BRIGHTON CT	2006, 1994, 1990, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
140 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
140 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
140 MARK WEST SPRINGS RD	2006, 1994, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
141 MARK WEST SPRINGS RD	2006, 1994, 1965, 1961, 1958, 1953, 1947, 1935, 1930
143 MARK WEST SPRINGS RD	2006, 1994, 1965, 1961, 1958, 1953, 1947, 1935, 1930
145 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
145 W MARK SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
147 MARK WEST SPRINGS RD	1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
148 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
149 MARK WEST SPRINGS RD	2006, 1994, 1990, 1987, 1965, 1961, 1958, 1953, 1947, 1935, 1930
15 BRIGHTON CT	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
15 BRIGHTON CT	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
151 MARK WEST SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
152 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
153 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
155 MARK WEST SPRINGS RD	2006, 1994, 1990, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
156 LAVELL VILLAGE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
156 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
157 MARK WEST SPRINGS RD	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
159 MARK WEST SPRINGS RD	2006, 1994, 1965, 1961, 1958, 1953, 1947, 1935, 1930
161 MARK WEST SPRINGS	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
161 MARK WEST SPRINGS RD	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
165 LAVELL VILLAGE CIR	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
175 LAVELL RD	2006, 1994, 1990, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
18 E FULTON RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930

FINDINGS

Address Researched	Address Not Listed in Research Source
18 E FULTON RD	2006, 1994, 1990, 1987, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
18 E FULTON RD	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
18 FULTON E RD	2006, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
18 FULTON E RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1961, 1958, 1953, 1947, 1935, 1930
184 MARK WEST SPRINGS RD	2006, 1994, 1990, 1987, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
186 MARK WEST SPRINGS RD	2006, 1994, 1990, 1987, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
19 BRIGHTON CT	2006, 1965, 1961, 1958, 1953, 1947, 1935, 1930
199 LAVELL RD	2006, 1994, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
20 BRIGHTON CT	2006, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
200 DARBSTER PL	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
201 LAVELL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
201 LAVELL RD	1965, 1961, 1958, 1953, 1947, 1935, 1930
205 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
215 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
220 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
230 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
24 BRIGHTON	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
24 BRIGHTON CT	1961, 1958, 1953, 1947, 1935, 1930
255 DARBSTER	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
255 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
260 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
27 BRIGHTON	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
27 BRIGHTON CT	1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
300 DARBSTER	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
300 DARBSTER PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
32 BRIGHTON	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
32 BRIGHTON CT	1961, 1958, 1953, 1947, 1935, 1930
33 RAMSGATE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
33 RAMSGATE CT	1965, 1961, 1958, 1953, 1947, 1935, 1930
35 BRIGHTON CT	1994, 1961, 1958, 1953, 1947, 1935, 1930
35 RAMSGATE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930

FINDINGS

Address Researched	Address Not Listed in Research Source
35 RAMSGATE CT	1994, 1981, 1961, 1958, 1953, 1947, 1935, 1930
40 RAMSGATE CT	2006, 1961, 1958, 1953, 1947, 1935, 1930
400 NEWPORT PL	2006, 1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
412 NEWPORT PL	1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
42 RAMSGATE CT	2006, 1994, 1990, 1961, 1958, 1953, 1947, 1935, 1930
424 NEWPORT PL	1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
436 NEWPORT PL	2006, 1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4404 OLD REDWOOD HWY	1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4420 OLD REDWOOD HWY	2006, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4440 OLD REDWOOD HWY	1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
450 NEWPORT	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
450 NEWPORT PL	1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4585 OLD REDWOOD HWY	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
459 NEWPORT PL	2006, 1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
460 NEWPORT PL	2006, 1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4605 OLD REDWOOD HWY	2006, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4605 OLD REDWOOD HWY	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4653 PAULETTE PL	1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4661 PAULETTE PL	2006, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4669 PAULETTE PL	1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4674 PAULETTE PL	2006, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4682 PAULETTE PL	1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4696 PAULETTE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4696 PAULETTE PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4697 PAULETTE PL	1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
470 NEWPORT PL	1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4710 PAULETTE PL	1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
4712 PAULETTE PL	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
483 NEWPORT PL	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
483 NEWPORT PL	2006, 1994, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
495 NEWPORT PL	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930

FINDINGS

Address Researched	Address Not Listed in Research Source
50 MARK WEST SPRINGS RD	1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
50 MARK WEST SPRINGS RD	1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
50 MARK WEST SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
50 S MARK WEST SPRINGS RD	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
50 S MARK WEST SPRINGS RD	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
53 RAMSGATE CT	2006, 1994, 1990, 1961, 1958, 1953, 1947, 1935, 1930
55 RAMSGATE CT	2006, 1994, 1981, 1961, 1958, 1953, 1947, 1935, 1930
60 RAMSGATE CT	2006, 1981, 1961, 1958, 1953, 1947, 1935, 1930
62 RAMSGATE CT	2006, 1994, 1961, 1958, 1953, 1947, 1935, 1930
65 MARK WEST SPRINGS RD	1965, 1961, 1958, 1953, 1947, 1935, 1930
69 MARK WEST SPRINGS RD	1965, 1961, 1958, 1953, 1947, 1935, 1930
69 W MARK SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
73 RAMSGATE CT	1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
75 RAMSGATE CT	2006, 1994, 1965, 1961, 1958, 1953, 1947, 1935, 1930
80 RAMSGATE CT	1994, 1961, 1958, 1953, 1947, 1935, 1930
82 RAMSGATE CT	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
90 W MARK SPRINGS RD	2006, 1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
95 RAMSGATE CT	2006, 1961, 1958, 1953, 1947, 1935, 1930
96 RAMSGATE CT	2006, 1994, 1981, 1965, 1961, 1958, 1953, 1947, 1935, 1930
97 RAMSGATE CT	1994, 1961, 1958, 1953, 1947, 1935, 1930
98 RAMSGATE	1994, 1990, 1987, 1981, 1976, 1970, 1965, 1961, 1958, 1953, 1947, 1935, 1930
98 RAMSGATE CT	1961, 1958, 1953, 1947, 1935, 1930

APPENDIX F

ENVIRONMENTAL DATA RESOURCES, INC.

City Directory

APPENDIX F

ENGEO
INCORPORATED

☐ 2010 Crow Canyon Place ▪ Suite 250 ▪ San Ramon, CA 94583 — (925) 866-9000 ▪ Fax (888) 279-2698
☐ 2213 Plaza Drive ▪ Rocklin, CA 95765 — (916) 786-8883 ▪ Fax (888) 279-2698
☐ 116 New Montgomery Street ▪ Suite 224 ▪ San Francisco, CA 94105 — (415) 284-9900 ▪ Fax (888) 279-2698
☐ 6399 San Ignacio Avenue ▪ Suite 150 ▪ San Jose, CA 95119 — (408) 574-4900 ▪ Fax (888) 279-2698
☐ 580 N. Wilma Avenue ▪ Suite A ▪ Ripon, CA 95366 — (209) 835-0610 ▪ Fax (888) 279-2698
☐ 425 Merchant Street ▪ Suite 101 ▪ Vacaville, CA 95688 — (707) 455-7833 ▪ Fax (888) 279-2698
☐ 690 Walnut Avenue ▪ Suite 220 ▪ Mare Island, Vallejo, CA 94592 — (707) 562-0030 ▪ Fax (888) 279-2698
☐ 3545 Airway Drive ▪ Suite 114 ▪ Reno, NV 89511 — (775) 852-2121 ▪ Fax (888) 279-2698

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE FOR CLIENT

To evaluate the potential for possible environmentally related impacts and site contamination the following information is requested. This questionnaire is to be completed by the user of the phase one environmental site assessment, or their authorized representative.

PART I

1. Property address and Assessor's Parcel Number (APN):

50 Mark West Springs Rd.
Santa Rosa, CA 95403

APN 058-040-060
APN 058-040-061

2. Current property owner (name, address, voice/fax number):

Luther Burbank Memorial Foundation
Contact: Marc Hagenlocher
Same address as above.
707.527.7006 #118

3. Date current property owner assumed title of property:

12/21/1982

4. Current property development/improvements:

No changes to outside physical building structure or grounds. Maintenance only.

5. Past property use, development/improvements:

Built as a church (in phases) between 1973- 1977. See PRMD for detailed record of development.

ENGEO
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6. Neighboring property uses:

Strip Mall, LC property, residences.

PART II

1. Are you aware of any environmental cleanup liens against the *property* that are filed under federal, tribal, local or state law? ☐ Yes X No

2. Are you aware of any activity and land use limitations, such as engineering controls, land use restrictions, or institutional controls that are in place at the property and/or have been filed or recorded in a registry under federal, tribal, state or local law? Outlined in our use permit issued by the County circa 1985. X Yes ☐ No

3. Do you have any specialized knowledge or experience related to the *property* or nearby properties? For example are you involved in the same line of business as the current or former occupants of the *property* or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business? For purpose of this exercise, yes X Yes ☐ No

4. If a property transaction is occurring in conjunction with this environmental assessment, does the purchase price of this *property* reasonably reflect the fair market value of the *property*? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the *property?* X Yes ☐ No

5. Are you aware of any commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, X Yes ☐ No

   (a) do you know of specific chemicals that are present or once were present at the *property*? Liquid chlorine used for waste water treatment plant.
   (b) do you know of spills or other chemical releases that have taken place at the *property*? No
   (c) do you know of any environmental cleanups that have taken place at the *property*? No

6. Based on your knowledge and experience related to the *property* are there any obvious indicators that point to the presence or likely presence of contamination at the *property*? ☐ Yes x No

If a "Yes" response was provided to any of the above questions, please provide details below:

See Above

I certify that the information herein is true and correct to the best of my knowledge as of the date signed below.

Name (Printed/Typed): Marc Hagenlocher

Signature:

Date: 5/20/09

ENGEO
INCORPORATED

☐ 2010 Crow Canyon Place ▪ Suite 250 ▪ San Ramon, CA 94583 (925) 866-9000 ▪ Fax (888) 279-2698
☐ 2213 Plaza Drive ▪ Rocklin, CA 95765 (916) 786-8883 ▪ Fax (888) 279-2698
☐ 116 New Montgomery Street ▪ Suite 224 ▪ San Francisco, CA 94105 (415) 284-9900 ▪ Fax (888) 279-2698
☐ 6399 San Ignacio Avenue ▪ Suite 150 ▪ San Jose, CA 95119 (408) 574-4900 ▪ Fax (888) 279-2698
☐ 580 N. Wilma Avenue ▪ Suite A ▪ Ripon, CA 95366 (209) 835-0610 ▪ Fax (888) 279-2698
☐ 425 Merchant Street ▪ Suite 101 ▪ Vacaville, CA 95688 (707) 455-7833 ▪ Fax (888) 279-2698
☐ 690 Walnut Avenue ▪ Suite 220 ▪ Mare Island, Vallejo, CA 94592 (707) 562-0030 ▪ Fax (888) 279-2698
☐ 3545 Airway Drive ▪ Suite 114 ▪ Reno, NV 89511 (775) 852-2121 ▪ Fax (888) 279-2698

ENVIRONMENTAL SITE ASSESSMENT QUESTIONNAIRE FOR "KEY SITE MANAGER"

To evaluate the potential for possible environmentally related impacts and site contamination the following information is requested. This questionnaire is to be preferably completed by the current property owner, or owner representative, leasing agent, or other person having good knowledge of the uses and physical characteristics of the property (Key Site Manager).

PART I

1. Property Address/Location and Assessor's Parcel Number (APN):

50 Mark West Springs Rd.
Santa Rosa, CA 95403

APN 058-040-060
APN 058-040-061

2. Current property owner (name, address, voice/fax number):

Luther Burbank Memorial Foundation
Contact: Marc Hagenlocher
Same address as above.
707.527.7006 #118

3. Date current property owner assumed title of property:

12/21/1982

4. Current property development/improvements:

No changes to outside physical building structure or grounds. Maintenance only.

5. Past property use, development/improvements:

Built as a church (in phases) between 1973- 1977. See PRMD for detailed record of development.

6. Neighboring property uses:
Strip Mall, LC property, residences, and open space.

PART II - The following questions should be answered to the best of your knowledge.

	Question	Yes	No
1.	Is/has the *property* or any adjoining property used/been used for industrial purposes?	☐	X
2.	Has the *property* or any adjoining property been used as a gasoline station, motor repair facility, commercial printing facility, dry cleaners, photo developing laboratory, junkyard or landfill, or as a waste treatment, storage, disposal, processing, or recycling facility?	X	☐
3.	Are there currently, or have there been previously, any damaged or discarded automotive or industrial batteries, or pesticides, paints, or other chemicals in individual containers of greater than 5 gal in volume or 50 gal in the aggregate, stored on or used at the *property* or at the facility?	X	☐
4.	Has undocumented soil been brought onto the property at any time? If yes, estimated quantity is ____________ cubic yards.	☐	X
5.	Has soil been brought onto the property that originated from a contaminated site or that is of an unknown origin?	☐	X
6.	Are there currently, or have there been previously, any pits, ponds, or lagoons located on the *property* in connection with waste treatment or waste disposal?	X	☐
7.	Is there currently, or has there been previously, any stained soil on the *property*?	☐	X
8.	Are there currently, or have there been previously, any registered or unregistered storage tanks (above or underground) located on the *property*?	☐	X
9.	Are there currently, or have there been previously, any vent pipes, fill pipes, or access ways indicating a fill pipe protruding from the ground on the *property* or adjacent to any structure located on the *property*?	☐	X
10.	Are there currently, or have there been previously, any flooring, drains, or walls located within the facility that are stained by substances other than water or are emitting foul odors?	☐	X
11.	Are there any domestic, irrigation or monitoring wells on the property?	X	☐
12.	If the *property* is served by a private well or non-public water system, have contaminants been identified in the well or system that exceed guidelines applicable to the water system or has the well been designated as contaminated by any government environmental/health agency?	☐	X
13.	Have you been informed of the past or current existence of *hazardous substances* or *petroleum products* or environmental violations with respect to the *property* or any facility located on the *property*?	☐	X
14.	Have there been any *environmental site assessments* of the *property* or facility that indicated the presence of *hazardous substances* or *petroleum products* on, or contamination of, the *property* or recommended further assessment of the *property*? See 2004 report	X	☐

15. Have there been any past, threatened, or pending lawsuits or administrative proceedings concerning a release or threatened release of any *hazardous substance* or *petroleum products* involving the *property*? ☐ Yes X No

16. Has there been any past agricultural use of the *property*, such as orchards or seed crop cultivation? X Yes ☐ No

17. Have any *hazardous substances* or *petroleum products*, unidentified waste materials, tires, automotive or industrial batteries or any other waste materials been dumped above grade, buried and/or burned on the *property*? ☐ Yes X No

18. Is there a transformer, capacitor, or any hydraulic equipment for which there are any records indicating the presence of PCBs? ☐ Yes X No

If a "Yes" response was provided to any of the above questions, please provide details below:

See 2004 Phase 1 report.

ENGEO
Expect Excellence

I certify that the information herein is true and correct to the best of my knowledge as of the date signed below.

Name (Printed/Typed): Marc Hagenlocher

Signature: [signature] Date: 5/20/09

APPENDIX G

CAL-EPA PCB Manifest Information

APPENDIX G

*** INBOUND NOTIFICATION : FAX RECEIVED SUCCESSFULLY ***

TIME RECEIVED	REMOTE CSID	DURATION	PAGES	STATUS
May 12, 2009 1:34:29 PM PDT	916 255 3654	76	2	Received

State of California—Environmental Protection Agency
Form Approved OMB No. 2050—0039 (Expires 9-30-96)
Please print or type. Form designed for use on elite (12-pitch) typewriter

See Instructions on back of page 6.

Department of Toxic Substances Control
Sacramento, California

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: CAG002100480
Manifest Document No.: 5013
2. Page 1 of
Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address: LUTHER BURBANK CR. 85
50 MARK W. SPRINGS RD SANTA ROSA CA 95403
4. Generator's Phone (707) 5277006

A. State Manifest Document Number: 96585503
B. State Generator's ID

5. Transporter 1 Company Name: C O TRANSPORTATION
6. US EPA ID Number: NYR000007160
C. State Transporter's ID
D. Transporter's Phone (702) 6437245

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address: FULL CIRCLE INC 509 MANIDA ST BRONX NY 10474
10. US EPA ID Number: NYD981498023?
G. State Facility's ID
H. Facility's Phone (718) 3284667

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste Number
a. RQ, POLY CHLORINATED BIPHENYLS MIXTURE, 9 UN2315-PGII	004	DM	1172	K	State 261; EPA/Other NONE
b.					State; EPA/Other
c.					State; EPA/Other
d.					State; EPA/Other

J. Additional Descriptions for Materials Listed Above: USED FLUORESCENT LIGHT BALLAST CONTAINING SMALL CAPACITOR BALLAST ARE BEING SHIPPED FOR AND RECYCLING

K. Handling Codes for Wastes Listed Above: a. b. c. d.

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY 1-800 4248802
WITHIN CALIFORNIA CALL 1 800 852 7550
60417-04

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: DAN BARR — Signature: [signature] — Month 9 Day 2 Year 98

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: JUAN M TORRES — Signature: [signature] — Month 09 Day 02 Year 98

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: HECTOR RUIZ — Signature: [signature] — Month 9 Day 29 Year 98

DO NOT WRITE BELOW THIS LINE.

GENERATOR — TRANSPORTER — FACILITY

96585503 IN CASE OF EMERGENCY OR SPILL, CALL THE NATIONAL RESPONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA, CALL 1-800-852-7550

DTSC 8022A (1/95)
EPA 8700—22

White: TSDF SENDS THIS COPY TO DTSC WITHIN 30 DAYS.
To: P.O Box 3000, Sacramento, CA 95812

HWTS EPA ID Profile (FACSRCH03)

DTSC INTRANET

Department of Toxic Substances Control

Department of Toxic Substances Control

Site Summary

Database Search

HWTS EPA ID Profile

EPA ID: CAC002100480 **Name:** LUTHER BURBANK MEMORIAL FOUNDATION
Status: INACTIVE **Inactive Date:** 2000-10-25 **Contact:** CLAUDIA HASKEL-CHAIRPERSON
County: SONOMA **NAICS:** **Record Entered:** 1998-08-31 **Last updated:** 2000-10-25
MAAPS of this site Google Map and Satellite View EnviroMapper of this site

	Name	Address	City	State	ZIP	Phone
Location	LUTHER BURBANK MEMORIAL FOUNDATION	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	954030000	
Mailing		50 MARK WEST SPRINGS RD	SANTA ROSA	CA	954030000	
Owner	LUTHER BURBANK MEMORIAL FOUND	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	954030000	7075277006
Oper/Contact	CLAUDIA HASKEL-CHAIRPERSON	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	954030000	7075277006

Based ONLY upon EPA ID: CAC002100480:

Calif. Manifests?	Out-of-State Manifests?	Transporter Registration?	Toxic Release Inventory Data?	Envirostor Data?
YES	NO	NO	NO	NO

Calif. Manifest Counts and Total Tonnage

m = Manifest Count t=Total Tonnage

Ship Year	Generator	Trans. 1	Trans. 2	TSDF	Alt. TSDF
1998	1 (m) 1.29150 (t)	0 (m) 0.00000 (t)	0 (m) 0.00000 (t)	0 (m) 0.00000 (t)	0 (m) 0.00000 (t)

Waste Code By Year Matrix Report

Calif.	Generator	Trans. 1	Trans. 2	TSDF	Alt. TSDF
RCRA	Generator	Trans. 1	Trans. 2	TSDF	Alt. TSDF

End of Report

Post-it™ brand fax transmittal memo 7671 # of pages ▸ 3

To Shawn	From McRy
Co.	Co.
Dept.	Phone #
Fax # 888-2792698	Fax #

Linda S. Adams
Secretary for
Environmental Protection

Department of Toxic Substances Control

Maziar Movassaghi, Acting Director
1001 "I" Street
P.O. Box 806
Sacramento, California 95812-0806

Arnold Schwarzenegger
Governor

EPA ID PROFILE

ID Number: CAC002570781 **Name :** LUTHER BURBANK CENTER FOR THE ARTS

Status: INACTIVE **Inactive Date:** 06/22/2004 **Record Entered:** 10/09/2003 **Last Updated:** 06/22/2004

County: SONOMA **NAICS:** **SIC:**

	Name	Address	City	State	Zip Code	Phone
Location	LUTHER BURBANK CENTER FOR THE ARTS	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	95403	
Mailing		50 MARK WEST SPRINGS RD	SANTA ROSA	CA	95403	
Owner	LUTHER BURBANK CENTER FOR THE ARTS	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	95403	7075277006
Operator/ Contact	MARK SILVA	50 MARK WEST SPRINGS RD	SANTA ROSA	CA	95403	7075277006

Based ONLY upon ID Number **CAC002570781**

Calif. Manifests ?	Non Calif. Manifests ?	Transporter Registration ?
NO	NO	NO

California and Non California Manifest Tonnage Total and Waste Code by Year Matrix by Entity Type (if available) are on the next page

APPENDIX H

Qualification(s) of Environmental Professional(s)

APPENDIX H

SHAWN MUNGER, PG, CHG, REA II

PRINCIPAL

EDUCATION

B.S. Geology, UC Davis

REGISTRATIONS

Registered Geologist in California 5810

Certified Hydrogeologist in California 413

Registered Environmental Assessor in California #20201

Certified Environmental Manager in Nevada 1332

SPECIALIZATIONS

- Hazardous materials
- Due diligence evaluations for portfolio property acquisitions
- Hydrogeologic Studies
- UST characterization and remediation
- VOC release assessments and remediation
- Risk Based Corrective Action (RBCA) evaluations
- Agrichemical impact assessments

REFERENCE

Ms. Patty Hirota – Cohen
BART Real Estate Department
1330 Broadway, Suite 1800
Oakland, CA 94612
510- 464-6000

Since joining ENGEO in 1985, Mr. Munger has been managing groundwater supply evaluations, hydrogeologic studies, chemical assessments, phase one and two site assessment projects, UST site investigations, risk based corrective action (RBCA), VOC remediation, and agricultural impact evaluations. He serves as Principal-in-Charge or Project Manager for environmental and hazardous materials projects involving groundwater hydrology, contaminant fate and transport, and remediation.

620 North 9th Street, San Jose, CA
Mr. Munger is Principal-in-Charge for groundwater and soil gas characterization study for former Del Monte Packing Plant site in San Jose. His scope of services included meetings and interaction with multiple members of the San Francisco Regional Water Quality Control Board, and preparation of a Remedial Management Plan and public participation notifications.

ENGEO performed a Phase One Environmental Site Assessment and a subsequent Phase Two Environmental Site Assessment for the 3.1-acre proposed residential property. The property is currently occupied by two commercial warehouses and surrounding asphalt parking. The purpose of the Phase Two study was to provide an assessment of possible remaining soil gas impacts related to residual groundwater impairments from on- and off-site sources. ENGEO prepared a Remedial Action Plan (RAP) for the mitigation of volatile organic compounds (VOCs) and management of potential petroleum impacted soil.

Ivy Glen, Fremont, CA
Mr. Munger is the Principal-in- Charge. ENGEO is providing groundwater sampling, including collecting groundwater samples from existing monitoring wells. Field activities have been conducted by an ENGEO Environmental Engineer. Static water levels are measured in surrounding wells, then checked for the presence of free product or sheen, with no measurable product or sheen found. Prior to groundwater sampling, a well was purged with at least four casing volumes until the field parameters (temperature, conductivity and pH) had stabilized.

Groundwater samples are collected in accordance with ENGEO's standard sampling procedures. Water samples are collected for laboratory testing using a dedicated polyethylene bailer. The samples are decanted into a pre-cleaned 40 ml vial preserved with HCL and cooled in an ice chest until delivery under documented chain-of-custody to Entech Analytical Laboratory in

Santa Clara, California. Samples are analyzed for Volatile Organic Compounds (VOCs) by EPA Method 8260B. Detectable concentrations of VOCs are reported in the laboratory test results.

Cecchini Property, Contra Costa County, CA
Mr. Munger provided an agrichemical study. ENGEO is providing geotechnical, environmental, hydrologic, and long-term storm water Best Management Practices (BMP) consultation services for the project. ENGEO previously performed several surface and subsurface explorations at the site for the purpose of providing geotechnical and environmental design recommendations. The project site is located on Byron Tract at the eastern edge of Contra Costa County. The irregularly shaped parcel is bounded by Old River to the east, Highway 4 to the south, Discovery Bay to the west, and Indian Slough to the north. The site is agricultural in nature with existing farm-related structures in the north central part of the site. Numerous small irrigation and drainage ditches traverse the property. The ditches help maintain artificially depressed ground-water levels that serve as a permanent dewatering system.

Discovery Bay West, Tracts 7686 and 8143, Discovery Bay, CA
Mr. Munger was Principal-in-Charge. ENGEO provide a modified phase one site assessment addressing the entire 756-acre property. The lots have been rough graded with streets and curb/gutter in place. Most underground utilities are also in place. The proposed development consists of single-family homes and areas graded for residential development.

River Islands School Site Preliminary Endangerment Assessment, Lathrop, CA
Mr. Munger was Principal-in-Charge. ENGEO recently performed a Preliminary Endangerment Assessment for a proposed school site, located in the eastern portion of the River Islands project, a 4,800 acres residential development in Lathrop, California. The PEA was completed for the Banta School District for the proposed River Islands middle and elementary schools. ENGEO conducted environmental sampling of the site near surface soils since the site was historically used for agricultural usages since at least the 1930's. ENGEO determined that residual levels of the pesticides DDE and DDT detected onsite were below the acceptable thresholds and did not pose a threat to the future school site. We concluded the onsite concentrations of mercury, arsenic and lead were consistent with the range and mean concentrations of the background soil results. Based on our evaluation of the soil sampling results, we proposed that no further action was necessary for the proposed school site. ENGEO recently received verbal approval by DTSC for the PEA.

Discovery Bay West Villages 4 and 5, Discovery Bay, CA
Mr. Munger was Principal-in- Charge. ENGEO provided environmental services for the installation of three groundwater monitoring wells and advancement of six Geoprobe borings at the project site—adjacent to the existing pipeline easement of ±3,400 lineal feet on the property. The purpose of the additional services is to provide further delineation of the extent of low-level petroleum impacts identified at the site. We also created a letter report presenting the results of the Kinder-Morgan petroleum pipeline assessment.

ENGEO completed a previous petroleum pipeline assessment for the development in 1998. The study did not reveal any appreciable concentrations of target analytes associated with petroleum products. It was concluded that no soil or groundwater impact had occurred to-date. This subsurface assessment was performed to evaluate whether pipeline operations since the 1998 study have subsequently impacted the soil and/or groundwater.

Hogan Drive, Santa Clara, CA
Mr. Munger is the Principal-in-Charge for the active groundwater remediation services for 3 acre former dry cleaner site in Santa Clara. Our scope of services has included an initial site characterization, groundwater plume delineation and ongoing bioremediation services. ENGEO provided a soil and groundwater study to monitor the presence of VOCs, TPHg, BTEX, MTBE, and PCE. All were non-detectable except for PCE. ENGEO recommended that remediation take place to clean the soil and groundwater of PCE.

Mayfield Avenue Site, Mountain View, CA
Mr. Munger is the Principal-in-Charge for groundwater study and dewatering system design for former Hewlett Packard Site in Mountain View. His scope of services included the installation and monitoring of four piezometers.

Aerially Deposited Lead (ADL) Assessment Program, Alcosta Boulevard/Interstate 680 Interchange Improvement, San Ramon, CA
Mr. Munger provided Principal Review. ENGEO performed an Aerially Deposited Lead (ADL) assessment program for the Alcosta Boulevard/Interstate 680 Interchange Improvement. The purpose of the investigation was to determine existing lead levels in surface soils. The scope of services included the recovery of soil samples from the surface to a depth of 3 feet below the ground surface, analytical testing of the samples to determine hydrogen ion content (pH testing), total lead, STLC WET soluble lead, and STLC TCLP soluble lead analyses, and a statistical analysis to determine Confidence Intervals (CI) of soil lead concentrations.

An innovative risk-based statistical analysis was performed to assure site soils were suitable for on-site reuse in accord with Caltrans/State of California regulations. This analysis led to significant project budget savings by avoiding removal and disposal at a solid waste disposal facility.

SR 121 Improvements, Napa, CA
As Principal in Charge, Mr. Munger provided quality assurance and oversight while ENGEO personnel performed aerially deposited lead (ADL) sampling and laboratory analysis for the State Route 121 improvement project. The purpose of the investigation was to determine total lead concentrations in surface soils within the proposed improvement area. Our scope or services included: recovery of 20 surface soil samples from 20 sampling locations and submittal of the soil samples for hydrogen ion content (pH testing) and total lead analyses. The area of study consisted of approximately one-half mile of right-of-way on either side of the existing roadway.

Builder's Square, Multiple States—USA
Mr. Munger led the ENGEO team that provided Phase One Environmental Site Assessments for 90 properties located within 22 states as part of a pre-acquisition due diligence. We completed the work within five and a half weeks and on budget. The properties consisted of 48,000 to

115,000 square foot cornet tilt-up commercial buildings developed as home improvement centers. The existing structures were constructed in the 1980s and 1990s.

Hercules Wastewater Treatment Plant, Hercules, CA—2004
Mr. Munger was Principal-in-Charge of the project. ENGEO performed a phase one environmental site assessment at the 12-acre property currently occupied by the Hercules Waste Water Treatment Plant (WWTP), previously operated by the City of Hercules. The property is also a former parcel of the Hercules Powder Works site (HPW). Remnant facilities previously associated with the WWTP include a treatment vault, above-ground chemical storage tank, and aeration ponds. Based on the findings of the assessment, there were potential environmental concerns associated with the past and current uses of the property:

- The lack of environmental documentation prior to the construction of the Waste Water Treatment Plant and the past history of the site as a part of the Hercules Powder Works represented a potential environmental concern for impacts to the site.
- Sampling and analysis data compiled by Questa Engineering in association with the 1991 – 1992 UST and dispenser removal suggests residual soil and groundwater impacts may exist on the property.
- The use of hazardous materials and waste associated with the Waste Water Treatment Plant present a potential environmental concern for possible impact to the site.

Lockeford Wastewater Treatment Plant Expansion, Lockeford, CA
Mr. Munger is Principal-in-Charge. ENGEO is providing environmental services regarding private party activities to assist the Lockeford Community Services District (LCSD) in acquiring property to support expansion of the existing wastewater treatment plant's capacity. The LCSD operates a wastewater treatment plant (WWTP) that is designed to process wastewater to secondary water quality standards and is reported to have a current design capacity of 340,000 gallons per day. The existing disposal capacity for treated effluent is reported to limit the WWTP to approximately 280,000 gallons per day. Our scope of services includes obtaining clarification of Preliminary Vernal Pools Determination, identifying existing WWTP capacity and identifying use alternatives for 120 acres.

ENGEO is completing study to characterize groundwater for the purpose of preparing a Report of Waste Discharge submittal to the Central Valley Regional Water Quality Control Board. This application is in support of a plan to convert use of an existing agricultural property to effluent reclamation for secondary treated water.

City of Plymouth Treated Water Pipeline Project, Tanner Reservoir to Plymouth Water Treatment Plant, Amador County, CA—on-going
Mr. Munger is Principal-in-Charge. ENGEO is preparing a geotechnical report for the project which will consist of construction of a treated water pipeline connecting the existing Amador Water Agency Water Treatment Plant at Tanner Reservoir, with the existing City of Plymouth treated water storage tank. ENGEO is also providing environmental services related to disposal issues. We created a letter

determining if naturally occurring asbestos issue was a factor. The project also includes construction of a water storage tank north of Sutter Creek. We will perform a geologic reconnaissance of the selected pipeline alignment. We will also perform subsurface explorations and provide design recommendations for foundation design and excavatability.

Bear Creek Property, Contra Costa County, CA
ENGEO has provided a wide range of services for the 83-acre site, a proposed cemetery location. We performed a groundwater availability study to evaluate the underlying aquifer(s) with regard to potential sustained well yield and water quality. We also provided a hydrogeologic evaluation of the groundwater availability on an existing well. In addition, we submitted plans for the installation of an additional groundwater observation well and monitoring, required by Contra Costa County as a Condition of Approval for the project. Most recently we summarized the findings of the groundwater monitoring.

Burroughs Property (State Parcels), Jersey Island Road, Oakley, CA
Mr. Munger conducted a Phase Two Site Assessment to address the environmental concerns associated with the one active natural gas well site and five former natural gas well sites identified in the referenced site assessment report. Mr. Munger identified the following potential environmental concerns associated with the six active/former natural gas well sites:

- Hydrocarbon impacts to soil/groundwater as a result of spillage from condensate tanks
- Spillage from above-ground diesel and motor oil tanks
- Hydrocarbon impacts within the area of compressor units
- Mercury impacts adjacent/beneath meter sheds
- Hydrocarbon/barium impacts associated with former drill sumps
- Hydrocarbon impacts around well heads

Pay N' Pak Real Estate Transactions, CA
A financial money manager of Harvard University hired ENGEO to undertake 18 Phase One Environmental Site Assessments prior to their purchasing a number of Pay N’ Pak stores. The scope of work included site walkovers with an asbestos inspector, review of aerial photographs and available Sanborn Fire Insurance maps, and record research. We prepared a detailed plan showing nearby contaminated sites that could potentially affect the subject property. The reports were prepared under a strict four-week deadline for completion. The full reports were completed within the time limits with no revisions required prior to the completion of the real estate transaction.

170 King Street, San Francisco, CA
Mr. Munger served as the Project Manager for the proposed residential project. The planned development includes an 11-story building and the upper eight levels will consist of residential units with parking on the lower three levels. Our services focused on characterizing the environmental aspects of the project and provide design level recommendations to guide land planning.

Pleasant Hill BART Station, Walnut Creek, CA
ENGEO provided a Phase Two Environmental Site Assessment for this BART station that encompasses 20 acres, including the platform/station area, electrical facilities, a parking garage and additional paved parking areas. The purpose of our study was to address the general soil quality across the area of the parcels (not those underneath the platform or parking structure). The comprehensive scope of services included soil and groundwater samples from 85 locations across the site, laboratory analysis and the preparation of a final report for the client that included an evaluation of reported constituents with comparisons to applicable State and Federal guidelines.

In order to minimize impacts to BART travelers and operations, ENGEO provided our services during the weekends. ENGEO also obtained a right-of-way permit through BART Real Estate Services Division to gain access to the site before the project commenced.

San Ramon Village Plaza, Dublin, CA
Mr. Munger conducted an environmental peer review for the proposed residential development within the mixed-use 4.68-acre San Ramon Village Plaza site. According to the general plan, the proposed development will consist of commercial and residential usage. Approximately 2.94 acres will be developed for residential use and includes construction of 11 townhome buildings and access roadways. The residential townhouses are three-story wood-framed structures, and each building may contain 4, 5 or 8 units.

Arroyo Crossings, Livermore, CA
Mr. Munger was Project Manager while ENGEO provided geotechnical and environmental engineering services for this 34-acre site. The extensive scope of work included supplemental geotechnical exploration, phase one and two environmental site assessments, underground storage tank removal as well as groundwater monitoring. The proposed development for the site will consist of 155 residential lots with associated roadways and underground utilities. The client has received documented site characterization and recommendations necessary to move forward with development.

Iron Horse Trail Improvements, Pleasanton, CA
Mr. Munger was Project Manager while ENGEO performed near surface soil sampling in the proposed landscape “pod” areas along the Iron Horse Trail for the City of Pleasanton. The improvement project includes a bicycle/walking trail, drainage facilities and landscape improvements. The area consists of a strip of land that is ±2,350 feet long and 100 feet wide. ENGEO collected soil samples to determine if the soil had been adversely impacted as a result of its past use as a railroad right-of-way.

Kelseyville Unified School District, Lake County, CA
Mr. Munger was Principal-in-Charge. ENGEO prepared a Preliminary Endangerment Assessment (PEA) for the Kelseyville Unified School District in Lake County, California. The purpose of the PEA was to evaluate the likelihood for elevated levels of Naturally Occurring Asbestos (NOA) and CAM 17 metals to be present at the proposed Cobb School Site. Working under the direction of DTSC we developed a DTSC approved scope of services which included:

- A classification of the sub surface geology at the Site
- Soil and groundwater sample collection. Samples were analyzed for NOA and CAM 17 metals.
- Preparation of a PEA report summarizing our findings for the Site.

Our assessment revealed no significant levels of asbestos and CAM 17 metals at the Site and concluded that Naturally Occurring Asbestos is not a concern for development of the Cobb School facility.

In February 2006, ENGEO's PEA was approved by the DTSC.

S&S Farms, 12-Acre Proposed Grant Street School Site, Brentwood, CA
Mr. Munger completed an updated Phase One Environmental Site Assessment (ESA) for the proposed Grant Street School. The previous phase one site assessment was completed by ENGEO in October 2002, for a larger ±94-acre property. The 12-acre school site is located in the northeast corner of this site. The October 2002 Phase One scope of services was modified to include limited sampling to initially evaluate soil for evidence of leakage from an underground petroleum pipeline and for the presence of agricultural chemical residues in soil from agricultural activities that occurred on the property.

ENGEO also performed a soil vapor study that involved collecting soil vapor samples for analysis of hydrogen sulfide and methane. This objective of this study was to evaluate whether these compounds were introduced to shallow soil by historic natural gas exploration in the area. The results of this study in conjunction with the results from prior soil vapor studies performed at the site indicated hydrogen sulfide and methane were not present at concentrations in soil vapor beneath the site that merited further study.

ENGEO's reports included calculations for cancer risk and hazard quotient posed to human health for the two pesticides and two metals detected in the surface soil. Based on the calculated cancer risk being less that 1 in a million and the hazard quotient being less than 1, ENGEO recommended that a Preliminary Endangerment Assessment (PEA) may not be necessary.

Proposed Cobb School Site, Cobb, CA
Mr. Munger was Principal-in-Charge. ENGEO prepared a work plan for a Preliminary Endangerment Assessment (PEA) regarding Naturally Occurring Asbestos (NOA) and metals in surface and near surface soil and Title 22 contaminants in groundwater. Our scope of services included:

- Collecting soil samples from two depths at three locations previously sampled in December 2004 for analysis of naturally occurring asbestos using the transmitted light microscopy (TEM) method.

- Collecting soil samples from the upper 6 inches of soil at four locations for analysis of the seventeen metals listed in the California Assessment Manual.

- Collecting one groundwater sample from the existing water supply wells for laboratory analysis.

DTSC requested that one groundwater sample be collected from the neighboring water supply well for laboratory analysis. Observation of the well head suggests that the well's condition allows for surface water and debris to enter the well bore. Since this condition is not consistent with the California Water Well Standards, we recommend a limited suite of analyses that is intended to assess the presence of the constituents.

Petersen Mine Tailings Pile, Pine Grove, Amador County, CA
Mr. Munger was Principal-in-Charge. The Site consists of an approximate ½-acre parcel that is surrounded by approximately 141 acres of land proposed for development as the Petersen Ranch subdivision (Petersen Ranch). The Site was used as a repository for mine tailings generated from gold recovery using mercury amalgamation in connection with the former Petersen Mine, which was operated between approximately 1930 and 1948. Closures of the other aspects of the former mine, such as the closure of tunnels, have been addressed to the satisfaction of Amador County.

As the lead agency for the PEA process, the Department of Toxic Substances Control (DTSC) is providing regulatory oversight under the authority of a Voluntary Cleanup Agreement (VCA) executed between DTSC and Mr. Fred Petersen, the project proponent. The RAW objective is to establish a plan for relocating the MTP in a manner that is protective of the public health and the environment.

Proposed Mixed-Use Development Site, Suisun City, CA
Mr. Munger is Principal-in-Charge. ENGEO is performing additional groundwater sampling for the proposed mixed-use development site at the northwestern corner of Highway 12 and Marina Boulevard and is comprised of four parcels totaling approximately 30 acres. The proposed development will consist of a mixture of townhomes and single-family residential housing, commercial, greenscapes, parking and associated roadways. The purpose of the proposed additional groundwater sampling is to provide further delineation of the extent of groundwater impact associated with the former USTs.

The recently completed Phase Two Environmental Site Assessment included a groundwater assessment of the former City Corporation Yard. Although a previous Phase Two assessment did not determine the horizontal and vertical extent of contamination, it was our opinion that the area of impact is limited to the immediate vicinity of the former USTs at the City Corporation Yard, since laboratory testing yielded non-detectable results for samples 2-E6 and 2-E8.

Dougherty Valley High School, Contra Costa County, CA
Mr. Munger is environmental principal-in-charge. Shapell Industries and Windemere BLC are jointly undertaking the construction of the Dougherty Valley High School project. The target capacity for the new high school is 2200 students. The new high school will consist of Four 2 story classroom Buildings, a Library/commons building, a 400 seat Theater, a Career Tech Building, an Administration Building, a Main Gymnasium, an Auxiliary Gymnasium, an Olympic size Swimming Pool, Basketball courts, Baseball fields, Softball Fields,

Soccer/Lacrosse Fields, a football Stadium with a rubberized track, Tennis Courts and approximately 700 student parking stalls. Mr. Munger managed a scope or services for the project including:

- A geotechnical exploration of the site using soil borings and cone penetration testing methods.
- A geotechnical and seismic hazards analysis of the site including probabilistic earthquake magnitudes, mitigation measures for the highly expansive on-site soil materials, and remedial grading and foundation recommendations for the proposed structures and pavements planned for the project. The seismic hazards analysis was reviewed and approved for the project by the California Geological Survey (CGS).
- Plans and Specifications for approximately 2,000 linear feet of Mechanically Stabilized Earth (MSE) walls up to 11-feet in height. The wall plans and specifications were reviewed and approved by the California Division of the State Architect (DSA).
- Testing and Observation services of all earthwork operations involved in the construction of the school.
- Special Inspection services for all on-site retaining wall structures including MSE walls and concrete masonry unit (CMU) walls.

Live Oak Elementary School within Windemere Phase IV, Contra Costa County, CA
Mr. Munger is principal-in-charge. We are currently providing geotechnical engineering services for the school and school park sites, which total approximately 15 acres. ENGEO provided geotechnical explorations for the Windemere Development, Phase IV including the project site, in 1995 and 2002. Geological conditions for the school site were also provided in this report which is located primarily on bedrock material. Mr. Munger provided a site-specific geotechnical exploration for the school site to provide detailed foundation recommendations and related site construction based on the building layouts, local geologic constraints and regional seismicity. He also reviewed all construction specifications for the project for conformance with the recommendations outlined in the geotechnical report.

Gale Ranch Elementary School Site, Contra Costa County, CA
We provided a geologic hazard evaluation and a geotechnical exploration for the proposed school site. The proposed elementary school campus will consist of eight two-story masonry and steel buildings with a combined floor space area of 114,145 square feet. Associated parking, emergency access, recreation, landscape and hardscape areas, and underground utilities are also planned. We anticipated that minor cutting and filling will be required to create relatively level building pads.

Gale Ranch Middle School, San Ramon, CA
Mr. Munger was environmental principal-in-charge. ENGEO provided environmental geotechnical engineering services for the ±15.8-acre school site is located south of Bollinger Canyon Road. Improvements will include the construction of five to six buildings that will

house a library, classroom structures, an administration building and a gymnasium. These buildings will be one to two stories high. Basketball courts and two soccer fields will be constructed at the western half of the site.

Executive Jet Hangar, Concord, CA
ENGEO conducted a geotechnical exploration and Mr. Munger led the Phase One and Phase Two Environmental Site Assessments for the proposed executive jet hangar and surrounding parking area improvements. The proposed jet hangar will be approximately 125 feet wide and 300 feet long with a parking area to the west of the hanger. It is our understanding that the hangar will consist of a first floor totaling 46,906 square feet with 39,320 square feet for hanger use and 7,386 square feet set aside for offices. A second floor is also planned with office space totaling 7,386 square feet.

Suisun City Marina Project, Suisun City, CA
ENGEO was retained by the Suisun City Redevelopment Agency to conduct Phase One Environmental Site Assessments on five parcels totaling 35 acres along the east side of Suisun Channel. The parcels included a number of boat repair and storage facilities; warehouses and light manufacturing. Multiple tenants had occupied the properties since the early 1900s. Subsequent site assessments found areas of questionable in filling of ancient marine inlets with unknown materials. Phase Two assessments found evidence of leaking underground fuel storage tanks; heavy metal contaminated soil, solvents and semivolatile organic material in the site soil and ground water. The degree of environmental impact was evaluated on a parcel-by-parcel basis. Removal of underground storage tanks, installation of ground water monitoring wells, and excavation of contaminated soil have to date resulted in four letters of site closure from the Solano County Department of Environmental Management. Soil remediation techniques included reclassification of soil for less costly landfill disposal, off-site incineration and on-site aeration.

Terminal One, Richmond, CA
ENGEO is providing geotechnical and environmental consultation for the subject development. Our environmental services are focused on reviewing and commenting on the planned environmental remediation and mitigations plans, and to serve as the site consultant for the Toll Brothers. ENGEO evaluated the proposed plans to mitigate the known site contamination to allow for future residential development. ENGEO is also providing geotechnical services related to site development. Design issues include soft bay mud soils over sloping bedrock conditions and high building loads for this multi-level podium residential structure.

Sea Cliff Marina, Richmond, CA
The 12-acre Seacliff Marina site is located west of the Port of Richmond's Shipyard No. 3 and east of the Brickyard Cove Development. The Seacliff Marina site was formerly part of Kaiser Shipyard No. 3 and was used for ship repair and maintenance along with scrap metal and salvage yards. A 1986 soil investigation found elevated concentrations of metals and asbestos at the site. In 1995, a DTSC-approved Remedial Action Plan required the consolidation and capping of contaminated soil at the site, and this remedial action was completed in 1998. ENGEO provided oversight, review, and consultation regarding remediation work performed by the Seacliff

Marina consultant. ENGEO has also provided design level geotechnical studies for the development.

Proposed West Shore Project, Richmond, CA
ENGEO is providing design level geotechnical and environmental studies for this multi level podium structure. The property is currently undeveloped land surrounded by predominately commercial parcels. High -density residential construction is proposed for the site, including a proposed 6-story podium structure to include five residential floors with 269 units and one parking floor.

The site was reclaimed in the late 1920s by constructing a rock bulkhead between the San Francisco Bay and the margins of the peninsula now occupied by the West Shore Areas. Geotechnical issues include consolidation and possible liquefaction of dredge spoils that generally consist of soft silt and loose silty sand.

California Rock & Asphalt, Brisbane, CA
ENGEO provided field and laboratory services in an evaluation of potential lead impacts to imported fill material placed at Cal Rock during the spring and summer of 2002. Based on a review of information on file with the San Mateo County Department of Environmental Health (DEH), potentially lead-contaminated soil was exported to the Cal Rock site in 2002. According to DEH information, approximately 2,350 truckloads of soil was exported from the Prometheus Real Estate Group's (PREG) Metropolitan Apartment development site in the City of San Mateo. Additional soil from the PREG site was transported to the former Burlingame Drive-In property (301 Beach) and San Mateo property (2nd Avenue and B Street) The volume of soil transported to Cal Rock has been estimated at 28,200 cubic yards. Previous analysis of near-surface soils at the Metropolitan Apartment site found total lead concentrations up to 620 parts per million (ppm) and soluble lead concentrations up to 21 milligrams per liter (mg/l). Based on these findings, DEH requested that PREG submit a work plan to address all three of the import fill locations. DEH staff also contacted Cal Rock personnel to inform them that lead-impacted soil may have been transported to the property. Finally in 2004, DEH requested that the City of Brisbane require Cal Rock to develop a work plan to address the potentially impacted fill material.

Former McKesson Facility, Union City, CA
Mr. Munger was the Project Manager who reviewed selected documents provided by a developer, former owners, and the San Francisco Regional Water Quality Control Board (SFRWQCB). The purpose of the review was to evaluate the adequacy of site cleanup efforts to allow proposed single-family residential development across the property. Part of our scope included a review of selected technical reports and letters, comparison of residual soil and groundwater concentrations to applicable residential risk criteria maintained by USEPA and the SFRWQCB and the preparation of a final letter report with conclusions. ENGEO also provided a geotechnical exploration and environmental work. The proposed development includes 62 lots at the northern portion of the site and two parcels at the southwestern corner. The 62 residential lots consist of 58 single-family lots and four duplex lots. Parcel D will contain a park and Parcel E will contain a fire station. Lot 13 at the southeast corner will be used as an interim water treatment facility.

Los Banos Airport, Los Banos, CA
The Los Banos Airport is approximately 112 acres in area. ENGEO provided a draft Phase One Environmental Site Assessment and a Conceptual Soil Remediation Work Plan as part of a multi-phase development for Stonecreek Properties, LLC. The scope of the environmental site assessment consisted of a Phase One environmental site assessment and a soil and groundwater characterization program. A review of regulatory databases at the local, state and federal level revealed that the property is listed in both federal and state databases as a site that has been subjected to environmental impacts.

Blackwelders Iron Works, Extractable Hydrocarbon Contaminated Soils, Rio Vista, CA
The Blackwelders facility was a former manufacturer of farm equipment and machine products. A Phase One Environmental Site Assessment was performed for a property transfer. The initial investigation identified areas of surface and subsurface discharge of hydrocarbon bearing condensate from an extensive air compression system. A Phase II Assessment which included hollow stem auger borings with soil and ground-water sampling found that extractable hydrocarbon contamination of the soil had occurred from both surface discharge and underground piping leaks. The primary area of contamination was located beneath the former compressor building. The affected soil adjacent to and beneath the building was excavated, stockpiled and profiled by laboratory analysis. Discrete soil samples were recovered from the excavation to confirm the removal of the contaminated soils to the regulatory agreed cleanup level of 100 parts per million. Excavated soil volume was approximately 250 cubic yards. Several potential remedial alternatives were evaluated including on-site biodegradation, landfilling and low-temperature rotary kiln thermal treatment. After considering cost, liability, and time constraints, off-site thermal treatment was selected as the most economical for soil treatment.

Richmond Transit Project, BART right of way drilling, Richmond, CA
ENGEO was retained by the Olson Company with the cooperation of the City of Richmond Redevelopment Agency to perform a geotechnical investigation for the proposed transit project. An application was made for permission to drill, and consequently to encroach on or over BART property at the following locations:

Borehole 2: Approximately 110 feet West of 19th Street and approximately 480 feet North of Macdonald Avenue.
Borehole 3: Approximately 340 feet West of 19th Street and approximately 650 feet North of Macdonald Avenue.
Borehole 4: Approximately 60 feet West of 18th Street and approximately 120 feet South of Barret Avenue.
Borehole 5: Approximately 330 feet West of 18th Street and approximately 130 feet South of Barret Avenue.
Borehole 8: Approximately 730 feet East of Marina Way and approximately 300 feet North of Macdonald Avenue.
Borehole 9: Approximately 510 feet East of Marina Way and approximately 270 feet North of Macdonald Avenue.

The purpose of drilling at the said locations was to conduct a geotechnical investigation involving soil borings at 6 locations within the BART right of way (5 of which requiring pavement penetration), and at 3 locations on property belonging to the City of Richmond. A truck mounted drill rig was used, and drive samples were taken at approximately every five feet.

Hercules Village for Bixby Land Development Company LLC, Hercules, CA
The project area consists of ±167 acres located near and along the southeastern shore of San Pablo Bay in Hercules, California. The property was once a portion of a 1300-acre manufacturing facility that was operated by DuPont from 1879 to 1913 and Hercules Incorporated from 1913 to 1979. The planned development included single/multi family residential development with some commercial components. Mr. Munger provided environmental due-diligence services for the prospective purchaser/developer of the property. Previous site operations included the manufacture of explosives, fertilizer products and chemicals such as methanol, nitric acid and nitrogen tetroxide. Initial investigations confirmed the presence of arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, petroleum hydrocarbons and polynuclear aromatic hydrocarbons in site soils. ENGEO's scope of work included:

Site Asbestos Survey
In March 1999, an asbestos survey was conducted for structures on the site. The survey included a physical inspection of the buildings, the recovery of bulk material samples, and analysis of the samples using Polarized Light Microscopy (PLM). The survey identified significant quantities of regulated asbestos-containing materials and Category II materials including pipe wrap, ducts, air cell, wall panels, and linoleum/vinyl tile. An estimate of the potential abatement costs was provided for the preparation of bid specifications.

Site Characterization
In order to verify past remedial efforts for the property, ENGEO excavated approximately 110 test pits across the property. Samples recovered from the test pits were submitted for metal, PCB, PNA and TPH analysis. Statistical analyses were performed to determine upper confidence levels (UCLs) for the various contaminants. Contaminant levels were compared to the existing site-specific risk criteria developed for the site.

Demolition Observation/Contaminant Assessment
Remnant foundation elements, utilities, and drainage structures existed across the property. These structures were proposed for demolition prior to initiating the reworking of un-engineered fill material and mass grading work.

ENGEO provided full-time observation services during demolition and pregrading work. This work included a physical inspection of areas around and beneath the structures/foundations, along with the recovery of soil samples with laboratory testing.

Phase One Site Assessment
The Phase One Assessment included a site reconnaissance, a review of regulatory records and interviews with owner/occupants. The areas were viewed for hazardous materials

storage, surficial staining or discoloration, debris, stressed vegetation, or other conditions indicative of potential sources of soil or ground-water contamination. The areas were also inspected for fill/ventilation pipes, ground subsidence, or other evidence of existing or preexisting underground storage tanks.

Based on the findings of the site assessment, ENGEO identified several environmental concerns associated with the property, including potential metal, PCB and petroleum hydrocarbon impacts.

Brann Parcels, Rio Vista, CA
Mr. Munger provided Phase One and Two Environmental Site Assessments. The Phase Two Environmental Assessment included Division of Oil and Gas research, magnetometer survey, exploratory test pits, soil sampling and laboratory analyses.

Hydrogeologic Evaluation for Groundwater Availability, Fox Creek Country Club, Contra Costa County, CA
Mr. Munger provided a general hydrogeologic site characterization of this 350-acre property to determine the potential for an adequate source of groundwater on the subject property for golf course irrigation and other non-potable applications. The proposed development included an 18-hole golf course, a clubhouse, driving range and access roads. The scope of services included a review of geologic and hydrogeologic maps and literature regarding site geologic stratigraphy and structure, groundwater availability and quality; a review of available black and white stereo aerial photographs; an evaluation of available pump test data for existing on and off site groundwater wells; drilling and logging of four exploratory borings on the property; preliminary calculations of anticipated surface water runoff; and evaluation of groundwater availability.

Stop & Go Service Station, Suisun City, CA
Mr. Munger managed the characterization and remediation of service station site in Suisun City. He implemented an innovative sparging and bacterial treatment approach, which resulted in attainment of rapid site closure from the State with no off-site disposal costs.

Suisun City Marina Redevelopment Project, Suisun City, CA
Mr. Munger conducted an environmental assessment, characterization and remediation of a 40-acre redevelopment. His innovative remediation methodologies resulted in savings of over $75,000 to the city.

Builders Square/Home Quarters Site Assessment Project, throughout the United States
Mr. Munger was the Principal in charge of due diligence assessment of 95 commercial properties throughout the country within a one-month time frame.

Former Dry Cleaner Facility, San Ramon, CA
Mr. Munger managed characterization, monitoring and remediation of solvent contamination. His proactive approach to monitoring and characterization using rapid assessment techniques allowed developer to proceed with planned residential subdivision.

Agrichemical Contamination, Brentwood, CA
Mr. Munger managed the characterization, statistical evaluation, and health risk assessment for this large-scale former orchard/row crop property. Statistical methodologies and risk evaluation resulted in expedited site closure allowing rezoning and residential construction. The estimated cost savings to the client was approximately $250,000.

Select Foods Property, Hayward, CA
ENGEO conducted Phase One and Phase Two Environmental Site Assessments on the Select Foods manufacturing facility, which includes an educational facility with associated parking and a playground. The Phase Two Assessment was conducted on the property to address potential soil contamination associated with the past and present use of the property and the removal of five underground fuel tanks. We also provided services to determine if additional soil and groundwater studies were required before planning could continue.

Play Field Improvements, Closed Turk Island Landfill, Union City, CA
Mr. Munger was the Project Manager for this site consisting of approximately 46 acres of land proposed for recreational improvements to include play fields such as soccer and baseball fields and recreational trails. The site contained debris and municipal waste and was capped and considered "closed landfill" by the State of California. The scope of work included a review of available reports including literature and pertinent maps; subgrade requirements for synthetic play-field surfaces; a stability analysis for the placement of fill; geotechnical recommendations for site grading including fill placement criteria for the new cap and playfield surfaces; assess possible geological hazards in the general project area; and provide recommendations for treatment of geotechnical constraints, foundation recommendations, preliminary pavement design for parking areas, drainage considerations and utility trench backfill.

7th Street & East Taylor Street Project, San Jose, CA
ENGEO provided environmental consultation and field services during the removal of metal-impacted soil identified. ENGEO provided additional soil sampling and laboratory analysis services. Approximately 1,100 cubic yards of soil exceeding state hazardous waste criteria was found from the soil sampling and testing. Previous sampling and laboratory testing conducted identified elevated metal concentrations across several areas of the property.

Hacienda Avenue, Campbell, CA
Mr. Munger was the Principal in Charge providing a geotechnical exploration and a Phase Two Environmental Site Assessment for the proposed ±7.5-acre site consisting of 30 single-family residential homes. The geotechnical exploration included a geologic hazards assessment, field exploration, preparation of site development recommendations and a geotechnical design report. The assessment update included a review of the operations, maintenance and hazardous materials management practices, with an evaluation of their potential to adversely impact the site soil and groundwater. In addition, the phase two environmental services addressed the potential environmental impacts of the former orchards and dry cleaners.

Southern Pacific Property - Park Sierra Residential Development, Scarlett Drive/Dougherty Road, Dublin CA

ENGEO performed a Phase One and Phase Two Environmental Site Assessment for the former Southern Pacific property located along the railway corridor between the northern end of the current Scarlett Drive extending northwest across Dougherty Road (*within proposed Scarlett Drive Extension area*). This area has since been developed as a residential subdivision. Work included a review of past management practices associated with the Southern Pacific operation and a review of environmental data compiled for the abutting Camp Parks site. Phase Two work included recovery of soil and groundwater samples along the SP right of way, adjacent to the existing Kinder Morgan petroleum pipeline.

Camp Parks Fire Station, Dublin, CA

ENGEO performed a Phase One Environmental Site Assessment Update for the proposed Camp Parks Fire Station. The assessment included a review of the operations, maintenance and hazardous materials management practices, with an evaluation of their potential to adversely impact the site soil and groundwater.

Dublin Ranch, Dublin, CA

ENGEO performed a Phase One Environmental Site Assessment Update for Phase I – Tract 6956 of the Dublin Ranch subdivision. The assessment included a review of the operations, maintenance and hazardous materials management practices, with an evaluation of their potential to adversely impact the site soil and groundwater.

Valley Plaza, Pleasanton, CA

In 2003, Mr. Munger provided an update to ENGEO's previous environmental site assessment (ESA) from 1998 for this combined retail and residential site. After a review of the previous report, Mr. Munger directed a new reconnaissance of the property and was able to document, within the final report, comparative data from each ESA and, finally, identified potential environmental concerns for the property.

3rd & Connolly Utility Corridor, Mare Island, CA

Mr. Munger provided Principal oversight. ENGEO monitored demolition and soil excavation activities required to prepare for construction of a 300 – foot water and sewer utility corridor along Connelly Street between 3rd Street and Azuar Street for indications of chemical contaminants. The utility corridor, which will service planned residential development on Mare Island, lies adjacent to historic and large facilities that supported the Department of Navy operation of the former Mare Island Shipyard. Plans to excavate the corridor included geotechnical evaluation of trenching to protect the adjacent facilities, geotechnical evaluation of trench backfill to protect against settlement within the future street alignment and environmental evaluation to identify, classify and document to presence of soil contaminants. The environmental consideration was necessary to fulfill the obligations of the identified responsible parties.

Existing/former improvements within the alignment included water and steam pipelines, a former fuel oil pipeline (FOPL), natural gas lines and an industrial waste water line. In addition, a previous fuel island, hydraulic hoists and two underground storage tanks were associated with Buildings 637 and 811. The zones of impacted soil removal were delineated within an approximate 9,300 square foot footprint area and extend to depths from 5 to 10½ feet below existing grade.

Appendix G4

Supplemental Agrichemical Assessment Report, Sutter Medical Center

Project No.
6486.201.102

May 27, 2009

Ms. Nadin Sponamore
Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, CA 95405

Subject: WFC / SMCSR Properties
Sonoma County, California

SUPPLEMENTAL AGRICHEMICAL ASSESSMENT REPORT

Reference: ENGEO Incorporated, Phase Two Environmental Site Assessment Report, Sutter Medical Center of Santa Rosa, Project No. 6486.2.002.01, February 24, 2005.

Dear Ms. Sponamore:

ENGEO Incorporated is pleased to present this supplemental agrichemical assessment of the subject property (Property) located southeast of the intersection of US Highway 101 and Mark West Springs Road in Sonoma County, California (Figure 1). The Property is the home for the Wells Fargo Center for the Arts (WFC) and a portion of the Property is the proposed future location of the Sutter Medical Center – Santa Rosa (SMCSR). An orchard previously occupied the Property. This supplemental agrichemical study was performed to update our previous agrichemical study, and perform additional sampling and testing to comply with the most recent CAL-EPA guidance document for sampling agricultural properties.

ENGEO previously performed a Phase Two Environmental Site Assessment in 2005, which included an agrichemical study (Reference). The previous agrichemical study evaluated two areas of the Property for the presence of persistent organochlorine pesticides and metal impacts. Area 1 was identified as an approximately 12-acre area that historically supported orchard activities, but had not been disturbed by grading activities. Area 2, an approximate 10-acre area, historically supported orchard activities that was identified as later covered by approximately 3 feet of imported engineered fill. The 2005 ENGEO study documented concentrations of persistent organochlorine pesticides (OCPs) in the southern region of Area 1 and in the northern portion of Area 2. A risk analysis was evaluated for each composite soil sample to determine the potential carcinogenic and hazard risk of exposure to the soil. The evaluation was performed in accordance with procedures presented in the California Department of Toxic Substances Control document entitled, "*Preliminary Endangerment Assessment Guidance Manual*" dated January 1994. Based on the findings of the risk assessment, ENGEO determined that the soils at the site did not pose an unacceptable risk to human health.

This current supplemental agrichemical impact study is to provide an evaluation of historic agricultural field areas in general conformance with California Department of Toxic Substances Control, Cal-EPA, Interim Guidance for Sampling Agricultural Properties (Third Revision); August 7, 2008. In accordance with the referenced CAL-EPA guidance document, a total of 32 soil samples were recovered from the 22-acre study area for laboratory analysis. The sample locations are indicated on Figure 2. The scope of services included the following:

- Recovery of 16 soil samples from the open field located in the western portion of the Property (Area 1). The samples were collected from the interval of 0- to 6 inches below the ground surface.

- Recovery of 16 soil samples from the open fields located in the eastern portion of the Property (Area 2). The sample locations were excavated with the use of a backhoe. A determination of the thickness of fill was made in the field with the samples collected from the interval of 0- to 6 inches below the base of the fill. Upon sample recovery, the excavated pits were backfilled for safety.

- Submittal of the 32 soil samples to a State certified analytical laboratory under documented Chain-of-Custody for laboratory analysis.

- Analysis of the 32 soil samples as eight 4-point composite samples for organochlorine pesticides by EPA Method 8081. One selected discrete sample from each of the eight composites was analyzed for arsenic by EPA Method 6010.

- Preparation of this report with our findings and conclusions.

FINDINGS

The soil sampling results for organochlorine pesticides and arsenic are summarized in Table 1, and detailed analytical laboratory testing results by State Certified McCampbell Analytical, Inc. are provided in Appendix A.

Three OCPs were reported at the Property at levels above the laboratory reporting limit. The three OCP compounds, dichlorodiphenyltrichloroethane (DDT), dichlorodiphenyl-dichloroethylene (DDE), and dichlorodiphenyldichloroethane (DDD), were reported with cumulative concentrations ranging from the reported levels of DDT, DDE and DDD in the soil samples recovered at the Property are well below the California Human Health Screening Levels established by Cal/EPA.

Arsenic concentrations for the composite samples ranged from 4.4 mg/kg to 12 mg/kg with a mean of 6.3 mg/kg (Table 1). Natural background concentrations of arsenic in California are often well above the health-based, direct-exposure goals in soil of 0.07 mg/kg for residential land use. The reported arsenic levels are within the anticipated background concentrations and would not be from an anthropomorphic source.

TABLE 1
Sample Analysis Summary
(Concentrations are reported in milligrams per kilogram – mg/kg)

Sample ID (Composite)	**DDT**	**DDE**	**DDD**	**Cumulative OCPs**	**As** (Discrete sample ID)
CS-1A-D	0.074	0.10	0.0037	0.1777	6.2 (CS-1B)
CS-2A-D	0.058	0.083	0.0083	0.1493	5.0 (CS-2C)
CS-3A-D	0.0037	0.023	0.0065	0.0332	4.4 (CS-3D)
CS-4A-D	0.0043	0.015	0.0046	0.0239	8.6 (CS-4D)
CS-5A-D	ND	ND	ND	---	4.7 (CS-5B)
CS-6A-D	ND	0.020	ND	0.020	12 (CS-6C)
CS-7A-D	0.0024	0.017	0.0013	0.0207	4.4 (CS-7C)
CS-8A-D	ND	ND	ND	---	4.9 (CS-8C)
CHHSL[1]	1.6	1.6	2.3		0.07[2]

1. CHHSL- Cal/EPA California Human Health Screening Level, January 2005.
2. Naturally occurring background concentrations of arsenic may exceed its' soil CHHSL. Cal/EPA generally does not require cleanup of soil to below background levels. Reported concentrations are within the range of expected background arsenic concentrations for Northern California.

CONCLUSIONS

The reported concentrations of organochlorine pesticides are well below the applicable CHHSLs developed by CAL-EPA. The reported arsenic concentrations are within the range of expected background levels for Northern California. Based on the results of the current and previous soil assessments, the property has not been adversely affected as a result of past agricultural use.

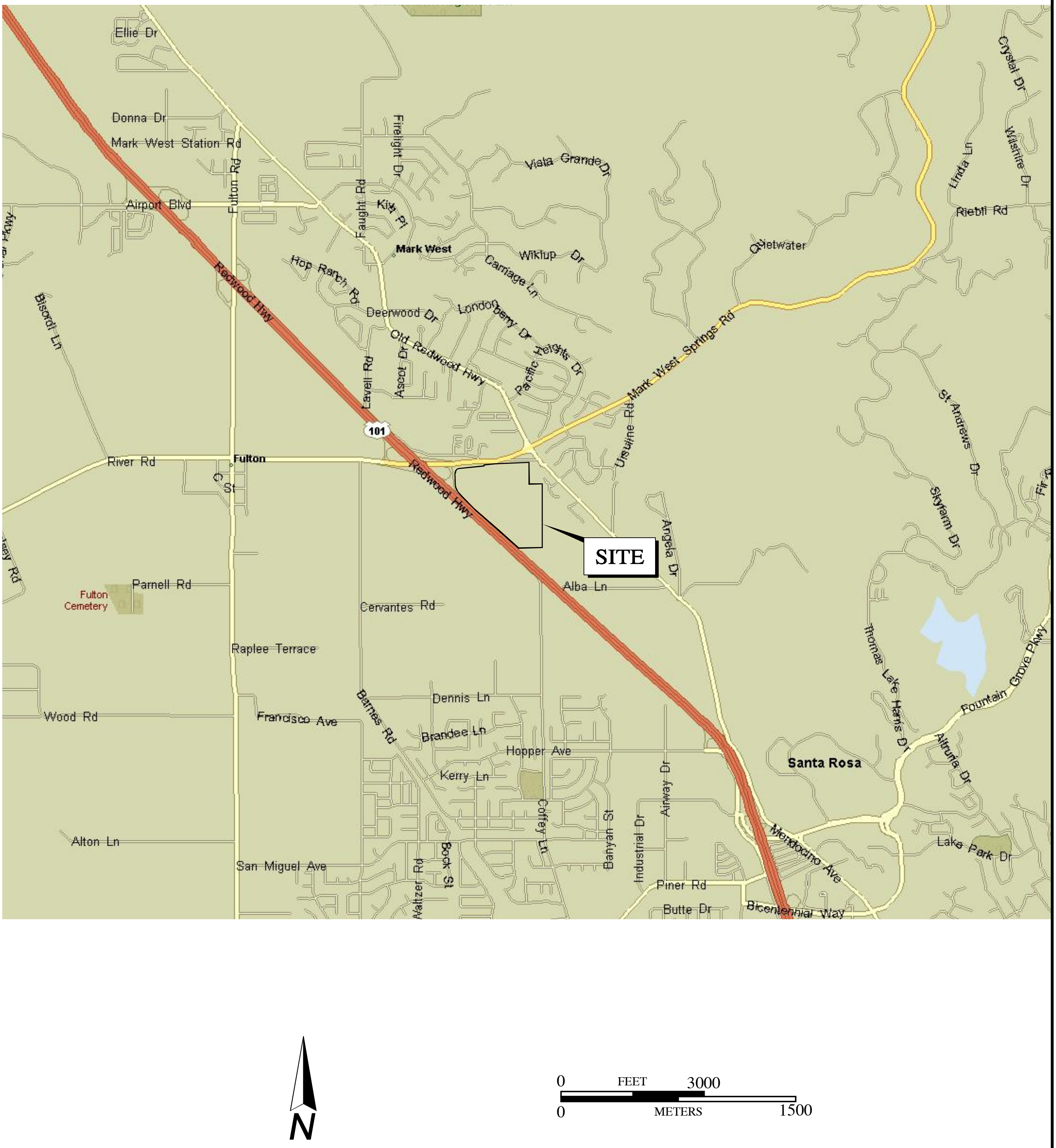
We appreciate the opportunity to work with you on this project. If you have any questions, please do not hesitate to contact us.

Very truly yours,

ENGEO Incorporated

Shawn Munger, CHG, REAII Theodore P. Bayham, GE, CEG

Attachments: Figure 1 – Vicinity Map
Figure 2 – Sample Location Map
Appendix A – McCampbell Analytical, Inc. – Analytical Lab Results

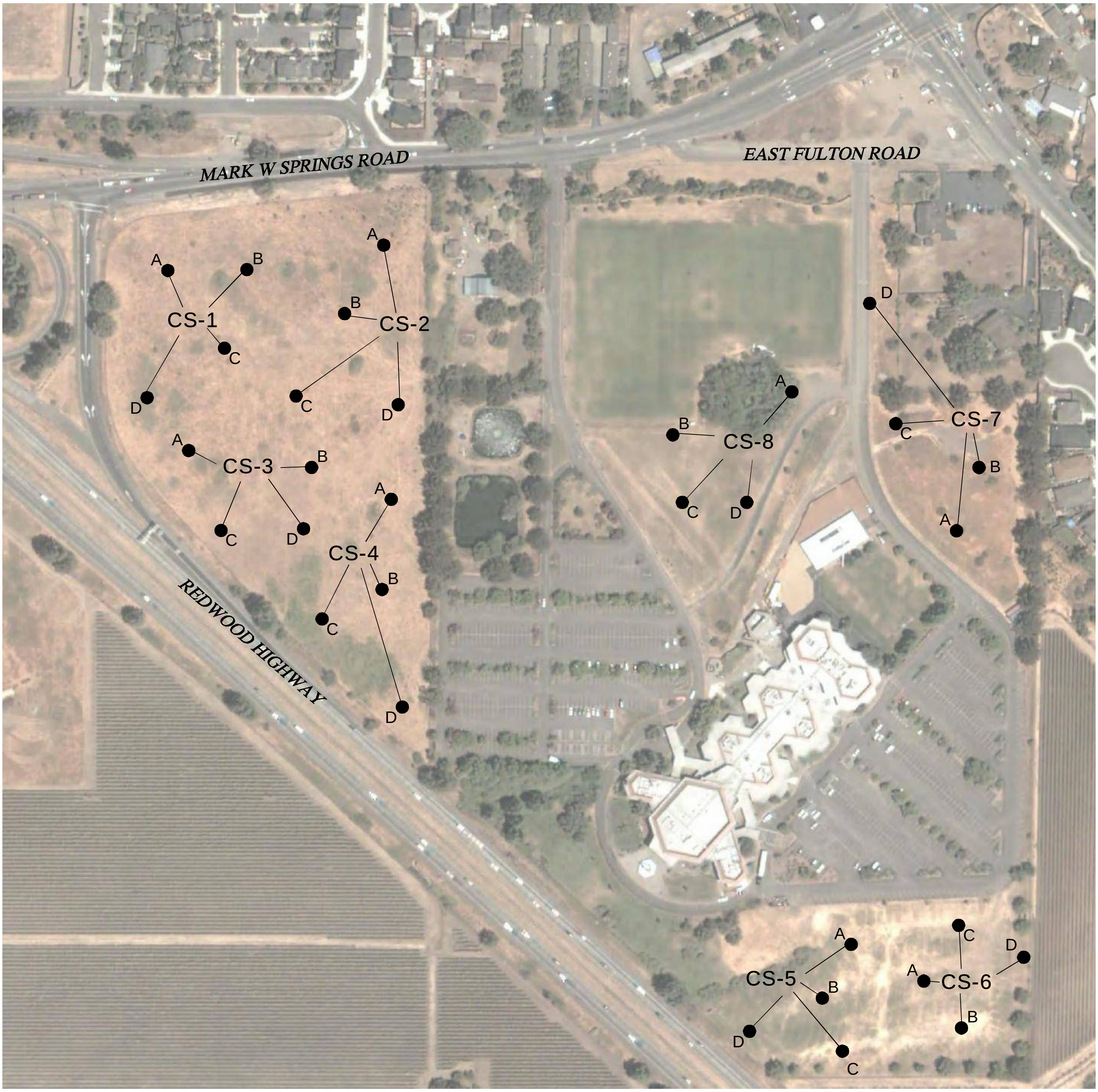


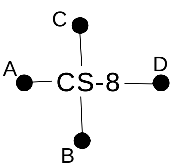
BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO Expect Excellence	VICINITY MAP WFC-SMCSR PROPERTY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.201.102 DATE: MAY 2009 DRAWN BY: SRP CHECKED BY: SM	FIGURE NO. 1

G:\Drafting\DRAFTING2_Dwg\6486\201\6486201102-1-VicinityMap-0509.dwg 5-27-09 04:03:33 PM dborde

ORIGINAL FIGURE PRINTED IN COLOR





EXPLANATION

APPROXIMATE LOCATION OF COMPOSITE SAMPLE

N

0 FEET 300
0 METERS 150

BASE MAP SOURCE: GOOGLE EARTH, 2008

ENGEO
Expect Excellence

SITE PLAN
WFC-SMCSR PROPERTY
SONOMA COUNTY , CALIFORNIA

PROJECT NO.: 6486.201.102		FIGURE NO. 2
DATE: APRIL 2009		
DRAWN BY: SRP	CHECKED BY: SM	

G:\Drafting\DRAFTING2_Dwg\6486\201\6486201102-2-SitePlan-0509.dwg 5-27-09 04:05:06 PM dborde

ORIGINAL FIGURE PRINTED IN COLOR

Appendix A

McCampbell Analytical, Inc. – Analytical Lab Results

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102; WFC-SMC Properties	Date Sampled:	04/16/09
		Date Received:	04/16/09
	Client Contact: Keith Nowell	Date Reported:	04/23/09
	Client P.O.:	Date Completed:	04/23/09

WorkOrder: 0904418

April 23, 2009

Dear Keith:

Enclosed within are:

1) The results of the **4** analyzed samples from your project: **#6486.201.102; WFC-SMC Properti**
2) A QC report for the above samples,
3) A copy of the chain of custody, and
4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.

0904418

ENGEO INCORPORATED

2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583
Phone: (925) 866-9000
Fax (888) 279-2698

CHAIN OF CUSTODY RECORD

EMAIL RESULTS TO: knowell@engeo.com

PROJECT NUMBER: 6486.201.102

PROJECT NAME: WFC-SMC Properties

Keith Nowell (Keith Nowell)

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESERVATIVE	TPH-- GASOLINE (EPA 8015/5030)	TPH-- DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	PNA / PAH (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	PCBs (EPA 605, 8082)		TITLE 22 METALS (CAM 17)	MtBE (EPA 602, 8020)	O-C PESTICIDES (EPA 605, 8081)	ASBESTOS by PLM		ARSENIC (EPA 6010)		REMARKS/ REQUIRED DETECTION LIMITS
CS-1A	4-16-09	1350	Soil	1	2"x4"	Ice												X					Run OCP as one 4-pt. Composite
CS-1B	4-16-09	1355	Soil	1	2"x4"	Ice												X			X		
CS-1C	4-16-09	1359	Soil	1	2"x4"	Ice												X					
CS-1D	4-16-09	1404	Soil	1	2"x4"	Ice												X					
CS-2A	4-16-09	1410	Soil	1	2"x4"	Ice												X					Run OCP as one 4-pt. Composite
CS-2B	4-16-09	1415	Soil	1	2"x4"	Ice												X					
CS-2C	4-16-09	1420	Soil	1	2"x4"	Ice												X			X		
CS-2D	4-16-09	1425	Soil	1	2"x4"	Ice												X					
CS-3A	4-16-09	1455	Soil	1	2"x4"	Ice												X					Run OCP as one 4-pt. Composite
CS-3B	4-16-09	1510	Soil	1	2"x4"	Ice												X					
CS-3C	4-16-09	1500	Soil	1	2"x4"	Ice												X					
CS-3D	4-16-09	1505	Soil	1	2"x4"	Ice												X			X		
CS-4A	4-16-09	1433	Soil	1	2"x4"	Ice												X					Run OCP as one 4-pt. Composite
CS-4B	4-16-09	1436	Soil	1	2"x4"	Ice												X					
CS-4C	4-16-09	1448	Soil	1	2"x4"	Ice												X					
CS-4D	4-16-09	1440	Soil	1	2"x4"	Ice												X			X		

ICE/t° 4.0
GOOD CONDITION
HEAD SPACE ABSENT
DECHLORINATED IN LAB
PRESERVATION VOAS | O&G | METALS | OTHER
APPROPRIATE CONTAINERS
PRESERVED IN LAB

RELINQUISHED BY:	DATE / TIME		RECEIVED BY:	RELINQUISHED BY:	DATE / TIME		RECEIVED BY:
Keith Nowell	4/16/09	1720	EnviroTech TL	EnviroTech TL	4/16	17:57	[signature]
RELINQUISHED BY:	DATE / TIME		RECEIVED BY:	RELINQUISHED BY:	DATE / TIME		RECEIVED BY:
RELINQUISHED BY:	DATE / TIME		RECEIVED FOR LABORATORY BY:	REMARKS:			
[signature] 6:20pm	4/16/09	1820	[signature]	5 Day TAT - Need Results by 1730, Thurs, 4/23			

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0904418 **ClientCode: ENGE**

☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Keith Nowell
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634
(925) 838-1600 FAX (925) 866-0199

Email: knowell@engeo.com
cc:
PO:
ProjectNo: #6486.201.102; WFC-SMC Properties

Bill to:
Chantelle
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634
cbryant@engeo.com

Requested TAT: 5 days

Date Received: 04/16/2009
Date Printed: 04/16/2009

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0904418-001	CS-1A,B,C,D	Soil	4/16/2009 13:50	☐	A											
0904418-001	CS-1B	Soil	4/16/2009 13:50	☐		B										
0904418-002	CS-2A,B,C,D	Soil	4/16/2009 14:10	☐	A											
0904418-002	CS-2C	Soil	4/16/2009 14:10	☐		B										
0904418-003	CS-3A,B,C,D	Soil	4/16/2009 14:55	☐	A											
0904418-003	CS-3D	Soil	4/16/2009 14:55	☐		B										
0904418-004	CS-4A,B,C,D	Soil	4/16/2009 14:33	☐	A											
0904418-004	CS-4D	Soil	4/16/2009 14:33	☐		B										

Test Legend:

1	8081_S	2	ASMS_S	3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Ana Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"
1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

Sample Receipt Checklist

Client Name: **ENGEO Incorporated**
Date and Time Received: **4/16/2009 6:57:10 PM**

Project Name: **#6486.201.102; WFC-SMC Properties**
Checklist completed and reviewed by: Ana Venegas

WorkOrder N°: **0904418** Matrix Soil
Carrier: Courier

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 8.6°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
TTLC Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	

(Ice Type: OTHERS)

** NOTE: If the "No" box is checked, see comments below.*

Client contacted: Date contacted: Contacted by:

Comments:

McCampbell Analytical, Inc.
"When Quality Counts"
1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102; WFC-SMC Properties	Date Sampled: 04/16/09
		Date Received: 04/16/09
	Client Contact: Keith Nowell	Date Extracted: 04/16/09
	Client P.O.:	Date Analyzed: 04/22/09

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081A Work Order: 0904418

Lab ID	0904418-001A	0904418-002A	0904418-003A	0904418-004A	Reporting Limit for DF =1	
Client ID	CS-1A,B,C,D	CS-2A,B,C,D	CS-3A,B,C,D	CS-4A,B,C,D		
Matrix	S	S	S	S	S	W
DF	2	5	1	1		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
a-BHC	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
b-BHC	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
d-BHC	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
g-BHC	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Chlordane (Technical)	ND<0.050	ND<0.12	ND	ND	0.025	NA
a-Chlordane	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
g-Chlordane	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
p,p-DDD	0.0037	0.0083	0.0065	0.0046	0.001	NA
p,p-DDE	0.10	0.083	0.023	0.015	0.001	NA
p,p-DDT	0.074	0.058	0.0037	0.0043	0.001	NA
Dieldrin	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Endosulfan I	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Endosulfan II	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Endosulfan sulfate	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Endrin	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Endrin aldehyde	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Heptachlor	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Heptachlor epoxide	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Hexachlorobenzene	ND<0.020	ND<0.050	ND	ND	0.01	NA
Hexachlorocyclopentadiene	ND<0.040	ND<0.10	ND	ND	0.02	NA
Methoxychlor	ND<0.0020	ND<0.0050	ND	ND	0.001	NA
Toxaphene	ND<0.10	ND<0.25	ND	ND	0.05	NA
Surrogate Recoveries (%)						
%SS:	86	85	93	95		
Comments						

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak/sample contains surrogate.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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Telephone: 877-252-9262 Fax: 925-252-9269

ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102; WFC-SMC Properties	Date Sampled: 04/16/09 Date Received: 04/16/09
	Client Contact: Keith Nowell	Date Extracted: 04/16/09
	Client P.O.:	Date Analyzed: 04/17/09

Arsenic by ICP-MS*

Extraction method: SW3050B Analytical methods: 6020A Work Order: 0904418

Lab ID	Client ID	Matrix	Extraction Type	Arsenic	DF	% SS
0904418-001B	CS-1B	S	TOTAL	6.2	1	111
0904418-002B	CS-2C	S	TOTAL	5.0	1	99
0904418-003B	CS-3D	S	TOTAL	4.4	1	102
0904418-004B	CS-4D	S	TOTAL	8.6	1	113

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TOTAL	NA	µg/L
	S	TOTAL	0.5	mg/Kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

TOTAL = acid digestion.
WET = Waste Extraction Test (STLC).
DI WET = Waste Extraction Test using de-ionized water.

DHS ELAP Certification 1644

AR Angela Rydelius, Lab Manager

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QC SUMMARY REPORT FOR SW8081A

W.O. Sample Matrix: Soil QC Matrix: Soil BatchID: 42718 WorkOrder: 0904418

EPA Method SW8081A	Extraction SW3550C								Spiked Sample ID: 0904416-006A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Aldrin	ND	0.010	80.9	80.8	0.163	83.5	82.2	1.64	70 - 130	30	70 - 130	30
g-BHC	ND	0.010	102	103	0.351	105	105	0	70 - 130	30	70 - 130	30
p,p-DDT	ND	0.025	110	110	0	111	110	1.07	70 - 130	30	70 - 130	30
Dieldrin	ND	0.025	116	116	0	119	117	1.31	70 - 130	30	70 - 130	30
Endrin	ND	0.025	105	103	1.48	102	102	0	70 - 130	30	70 - 130	30
Heptachlor	ND	0.010	83.3	84.2	1.14	83.8	83.2	0.704	70 - 130	30	70 - 130	30
%SS:	100	0.050	94	94	0	99	94	4.96	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 42718 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0904418-001A	04/16/09 1:50 PM	04/16/09	04/22/09 5:21 AM	0904418-002A	04/16/09 2:10 PM	04/16/09	04/22/09 6:17 AM
0904418-003A	04/16/09 2:55 PM	04/16/09	04/22/09 7:12 AM	0904418-004A	04/16/09 2:33 PM	04/16/09	04/22/09 1:53 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix inteference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644

_______ QA/QC Officer

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QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder: 0904418

EPA Method 6020A **Extraction SW3050B** **BatchID: 42696** **Spiked Sample ID 0904390-007A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Arsenic	6.5	50	101	94.9	5.13	10	95.8	91.3	4.86	75 - 125	20	75 - 125	20
%SS:	101	250	99	95	4.23	250	100	95	5.11	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 42696 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0904418-001B	04/16/09 1:50 PM	04/16/09	04/17/09 7:37 PM	0904418-002B	04/16/09 2:10 PM	04/16/09	04/17/09 7:46 PM
0904418-003B	04/16/09 2:55 PM	04/16/09	04/17/09 7:54 PM	0904418-004B	04/16/09 2:33 PM	04/16/09	04/17/09 8:03 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644 _______ QA/QC Officer

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ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102;WFC-SMC Properties	Date Sampled: 04/21/09 Date Received: 04/21/09
	Client Contact: Keith Nowell	Date Reported: 04/27/09
	Client P.O.:	Date Completed: 04/24/09

WorkOrder: 0904529

April 27, 2009

Dear Keith:

Enclosed within are:

1) The results of the **4** analyzed samples from your project: **#6486.201.102;WFC-SMC Propertie**
2) A QC report for the above samples,
3) A copy of the chain of custody, and
4) An invoice for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits.

If you have any questions or concerns, please feel free to give me a call. Thank you for choosing McCampbell Analytical Laboratories for your analytical needs.

Best regards,

Angela Rydelius
Laboratory Manager
McCampbell Analytical, Inc.

ENGEO INCORPORATED

2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583
Phone: (925) 866-9000
Fax (888) 279-2698
EMAIL RESULTS TO: knowell@engeo.com

0904529

CHAIN OF CUSTODY RECORD

PROJECT NUMBER: 6486.201.102

PROJECT NAME: WFC-SMC Properties

Keith Nowell Keith Nowell

SAMPLE NUMBER	DATE	TIME	MATRIX	CONTAINER NUMBER	CONTAINER SIZE	PRESERVATIVE	TPH– GASOLINE (EPA 8015/5030)	TPH– DIESEL & MO (EPA 8015/3550/3510)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601,8010)	VOLATILE ORGANICS (EPA 624, 8260)	PNA / PAH (EPA 8270)	TOTAL OIL & GREASE (SWWW 5520 (E/F))	PCBs (EPA 605, 8082)		TITLE 22 METALS (CAM 17)	MtBE (EPA 602, 8020)	O-C PESTICIDES (EPA 605, 8081)	ASBESTOS by PLM		ARSENIC (EPA 6010)		REMARKS/ REQUIRED DETECTION LIMITS
CS-5A	4-21-09	1118	Soil	1	2"x4"	Ice												X					
CS-5B	4-21-09	1123	Soil	1	2"x4"	Ice												X			X		Run OCP as
CS-5C	4-21-09	1129	Soil	1	2"x4"	Ice												X					one 4-pt.
CS-5D	4-21-09	1137	Soil	1	2"x4"	Ice												X					composite
CS-6A	4-21-09	1210	Soil	1	2"x4"	Ice												X					
CS-6B	4-21-09	1218	Soil	1	2"x4"	Ice												X					Run OCP as
CS-6C	4-21-09	1235	Soil	1	2"x4"	Ice												X			X		one 4-pt composite
CS-6D	4-21-09	1227	Soil	1	2"x4"	Ice												X					
CS-7A	4-21-09	1303	Soil	1	2"x4"	Ice												X					
CS-7B	4-21-09	1310	Soil	1	2"x4"	Ice												X					Run OCP as one
CS-7C	4-21-09	1316	Soil	1	2"x4"	Ice												X			X		4-pt. composite
CS-7D	4-21-09	1324	Soil	1	2"x4"	Ice												X					
CS-8A	4-21-09	1343	Soil	1	2"x4"	Ice												X					
CS-8B	4-21-09	1351	Soil	1	2"x4"	Ice												X					Run OCP as one
CS-8C	4-21-09	1357	Soil	1	2"x4"	Ice												X			X		4-pt. composite
CS-8D	4-21-09	1402	Soil	1	2"x4"	Ice												X					
—	—	—	—																				

RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:
Keith Nowell	4/21/2009 1555	Derek Carter	Derek Carter	4/21/09 16:45	
RELINQUISHED BY:	DATE / TIME	RECEIVED BY:	RELINQUISHED BY:	DATE / TIME	RECEIVED BY:

RELINQUISHED BY: DATE / TIME

ICE/t° 94
GOOD CONDITION ____ APPROPRIATE
HEAD SPACE ABSENT ____ CONTAINERS ____
DECHLORINATED IN LAB ____ PRESERVED IN LAB ____
PRESERVATION VOAS | O & G | METALS | OTHER

RECEIVED FOR LABORATORY BY: Ana Vega

REMARKS: 5 Day TAT - Need Results by 1700 4/28

McCampbell Analytical, Inc.
1534 Willow Pass Rd
Pittsburg, CA 94565-1701
(925) 252-9262

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0904529 **ClientCode:** ENGE

☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☑ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Report to:
Keith Nowell
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634
(925) 838-1600 FAX (925) 866-0199

Email: knowell@engeo.com
cc:
PO:
ProjectNo: #6486.201.102;WFC-SMC Properties

Bill to:
Chantelle
ENGEO Incorporated
2010 Crow Canyon Place, Ste 250
San Ramon, CA 94583-4634
cbryant@engeo.com

Requested TAT: 5 days

Date Received: 04/21/2009
Date Printed: 04/21/2009

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0904529-001	CS-5A,B,C,D	Soil	4/21/2009 11:18	☐	A											
0904529-001	CS-5B	Soil	4/21/2009 11:18	☐		B										
0904529-002	CS-6A,B,C,D	Soil	4/21/2009 12:10	☐	A											
0904529-002	CS-6C	Soil	4/21/2009 12:10	☐		B										
0904529-003	CS-7A,B,C,D	Soil	4/21/2009 13:03	☐	A											
0904529-003	CS-7C	Soil	4/21/2009 13:03	☐		B										
0904529-004	CS-8A,B,C,D	Soil	4/21/2009 13:43	☐	A											
0904529-004	CS-8C	Soil	4/21/2009 13:43	☐		B										

Test Legend:

1	8081_S	2	ASMS_S	3		4		5	
6		7		8		9		10	
11		12							

Prepared by: Ana Venegas

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

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Telephone: 877-252-9262 Fax: 925-252-9269

Sample Receipt Checklist

Client Name: **ENGEO Incorporated** Date and Time Received: **4/21/2009 5:20:17 PM**

Project Name: **#6486.201.102;WFC-SMC Properties** Checklist completed and reviewed by: Ana Venegas

WorkOrder N°: **0904529** Matrix Soil Carrier: Derik Cartan (MAI Courier)

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Sample IDs noted by Client on COC?	Yes ☑	No ☐	
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐	
Sampler's name noted on COC?	Yes ☑	No ☐	

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature	Cooler Temp: 9.4°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☐	No VOA vials submitted ☑
Sample labels checked for correct preservation?	Yes ☑	No ☐	
TTLC Metal - pH acceptable upon receipt (pH<2)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

** NOTE: If the "No" box is checked, see comments below.*

Client contacted: Date contacted: Contacted by:

Comments:

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ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102;WFC-SMC Properties	Date Sampled: 04/21/09 Date Received: 04/21/09
	Client Contact: Keith Nowell	Date Extracted: 04/21/09
	Client P.O.:	Date Analyzed: 04/23/09-04/24/09

Organochlorine Pesticides by GC-ECD (8080 Basic Target List)*

Extraction Method: SW3550C Analytical Method: SW8081A Work Order: 0904529

Lab ID	0904529-001A	0904529-002A	0904529-003A	0904529-004A	Reporting Limit for DF =1	
Client ID	CS-5A,B,C,D	CS-6A,B,C,D	CS-7A,B,C,D	CS-8A,B,C,D		
Matrix	S	S	S	S	S	W
DF	1	1	1	2		
Compound	**Concentration**				mg/kg	µg/L
Aldrin	ND	ND	ND	ND<0.0020	0.001	NA
a-BHC	ND	ND	ND	ND<0.0020	0.001	NA
b-BHC	ND	ND	ND	ND<0.0020	0.001	NA
d-BHC	ND	ND	ND	ND<0.0020	0.001	NA
g-BHC	ND	ND	ND	ND<0.0020	0.001	NA
Chlordane (Technical)	ND	ND	ND	ND<0.050	0.025	NA
a-Chlordane	ND	ND	ND	ND<0.0020	0.001	NA
g-Chlordane	ND	ND	ND	ND<0.0020	0.001	NA
p,p-DDD	ND	ND	0.0013	ND<0.0020	0.001	NA
p,p-DDE	ND	0.020	0.017	ND<0.0020	0.001	NA
p,p-DDT	ND	ND	0.0024	ND<0.0020	0.001	NA
Dieldrin	ND	ND	ND	ND<0.0020	0.001	NA
Endosulfan I	ND	ND	ND	ND<0.0020	0.001	NA
Endosulfan II	ND	ND	ND	ND<0.0020	0.001	NA
Endosulfan sulfate	ND	ND	ND	ND<0.0020	0.001	NA
Endrin	ND	ND	ND	ND<0.0020	0.001	NA
Endrin aldehyde	ND	ND	ND	ND<0.0020	0.001	NA
Heptachlor	ND	ND	ND	ND<0.0020	0.001	NA
Heptachlor epoxide	ND	ND	ND	ND<0.0020	0.001	NA
Hexachlorobenzene	ND	ND	ND	ND<0.020	0.01	NA
Hexachlorocyclopentadiene	ND	ND	ND	ND<0.040	0.02	NA
Methoxychlor	ND	ND	ND	ND<0.0020	0.001	NA
Toxaphene	ND	ND	ND	ND<0.10	0.05	NA
Surrogate Recoveries (%)						
%SS:	93	95	93	88		
Comments				a3		

* water samples in µg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter, product/oil/non-aqueous liquid samples and all TCLP & SPLP extracts are reported in mg/L.

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis.

surrogate diluted out of range or surrogate coelutes with another peak/sample contains surrogate.

a3) sample diluted due to high organic content.

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Angela Rydelius, Lab Manager

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ENGEO Incorporated 2010 Crow Canyon Place, Ste 250 San Ramon, CA 94583-4634	Client Project ID: #6486.201.102;WFC-SMC Properties	Date Sampled: 04/21/09 Date Received: 04/21/09
	Client Contact: Keith Nowell	Date Extracted: 04/21/09
	Client P.O.:	Date Analyzed 04/23/09

Arsenic by ICP-MS*

Extraction method SW3050B Analytical methods 6020A Work Order: 0904529

Lab ID	Client ID	Matrix	Extraction Type	Arsenic	DF	% SS
0904529-001B	CS-5B	S	TOTAL	4.7	1	102
0904529-002B	CS-6C	S	TOTAL	12	1	99
0904529-003B	CS-7C	S	TOTAL	4.4	1	97
0904529-004B	CS-8C	S	TOTAL	4.9	1	104

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	TOTAL	NA	µg/L
	S	TOTAL	0.5	mg/Kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

TOTAL = acid digestion.
WET = Waste Extraction Test (STLC).
DI WET = Waste Extraction Test using de-ionized water.

DHS ELAP Certification 1644

Angela Rydelius, Lab Manager

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QC SUMMARY REPORT FOR SW8081A

W.O. Sample Matrix: Soil QC Matrix: Soil BatchID: 42784 WorkOrder: 0904529

EPA Method SW8081A **Extraction SW3550C** **Spiked Sample ID: 0904482-027A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Aldrin	ND<0.010	0.010	NR	NR	NR	84.1	84.1	0	70 - 130	30	70 - 130	30
g-BHC	ND<0.010	0.010	77.5	81.3	4.80	106	106	0	70 - 130	30	70 - 130	30
p,p-DDT	ND<0.010	0.025	NR	NR	NR	118	117	0.426	70 - 130	30	70 - 130	30
Dieldrin	0.027	0.025	NR	NR	NR	119	119	0	70 - 130	30	70 - 130	30
Endrin	ND<0.010	0.025	89.8	92.9	3.41	115	113	1.24	70 - 130	30	70 - 130	30
Heptachlor	ND<0.010	0.010	72.5	75.7	4.37	97.3	97.1	0.250	70 - 130	30	70 - 130	30
%SS:	93	0.050	85	93	8.50	107	106	1.11	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 42784 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0904529-001A	04/21/09 11:18 AM	04/21/09	04/23/09 6:02 PM	0904529-002A	04/21/09 12:10 PM	04/21/09	04/24/09 10:01 AM
0904529-003A	04/21/09 1:03 PM	04/21/09	04/23/09 10:26 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix inteference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644

JR QA/QC Officer

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Web: www.mccampbell.com E-mail: main@mccampbell.com
Telephone: 877-252-9262 Fax: 925-252-9269

QC SUMMARY REPORT FOR SW8081A

W.O. Sample Matrix: Soil QC Matrix: Soil BatchID: 42825 WorkOrder: 0904529

EPA Method SW8081A **Extraction SW3550C** **Spiked Sample ID: 0904529-004A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)			
	mg/kg	mg/kg	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Aldrin	ND<0.0020	0.010	81.8	81	1.10	83.3	82.5	0.912	70 - 130	30	70 - 130	30
g-BHC	ND<0.0020	0.010	93.2	89.7	3.78	106	105	1.07	70 - 130	30	70 - 130	30
p,p-DDT	ND<0.0020	0.025	90.6	89.2	1.56	115	113	1.86	70 - 130	30	70 - 130	30
Dieldrin	ND<0.0020	0.025	104	101	2.49	120	119	0.996	70 - 130	30	70 - 130	30
Endrin	ND<0.0020	0.025	109	109	0	87.4	87	0.453	70 - 130	30	70 - 130	30
Heptachlor	ND<0.0020	0.010	81.1	80.2	1.13	83.9	84.7	0.941	70 - 130	30	70 - 130	30
%SS:	88	0.050	89	88	0.966	98	94	3.86	70 - 130	30	70 - 130	30

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 42825 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0904529-004A	04/21/09 1:43 PM	04/21/09	04/23/09 9:30 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not enough sample to perform matrix spike and matrix spike duplicate.

NR = matrix inteference and/or analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644

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QC SUMMARY REPORT FOR 6020A

W.O. Sample Matrix: Soil QC Matrix: Soil WorkOrder 0904529

EPA Method 6020A			Extraction SW3050B				BatchID: 42813		Spiked Sample ID 0904529-004B			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	Spiked	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)		
	mg/Kg	mg/Kg	% Rec.	% Rec.	% RPD	mg/Kg	% Rec.	% Rec.	% RPD	MS / MSD	RPD	LCS/LCSD	RPD
Arsenic	4.9	50	102	104	1.22	10	95.1	93.7	1.49	75 - 125	20	75 - 125	20
%SS:	104	250	102	101	0.865	250	95	99	4.33	70 - 130	20	70 - 130	20

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 42813 SUMMARY

Lab ID	Date Sampled	Date Extracted	Date Analyzed	Lab ID	Date Sampled	Date Extracted	Date Analyzed
0904529-001B	)4/21/09 11:18 AM	04/21/09	04/23/09 9:26 PM	0904529-002B	)4/21/09 12:10 PM	04/21/09	04/23/09 9:59 PM
0904529-003B	04/21/09 1:03 PM	04/21/09	)4/23/09 10:07 PM	0904529-004B	04/21/09 1:43 PM	04/21/09	04/23/09 2:58 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS ELAP Certification 1644 QA/QC Officer

Appendix G5

Interview with FAA and Helicopter Operators Regarding Sutter Santa Rosa Medical Center Helistop

Memorandum

Date: May 26, 2009

To: Nadin Sponamore, Sponamore Associates

From: Bradley Musinski, Mead & Hunt

Subject: Interviews with FAA and Helicopter Operators regarding Sutter Santa Rosa Medical Center Helistop

As part of the environmental assessment for the proposed Sutter Medical Center, Mead & Hunt contacted the primary helicopter operators for their thoughts and concerns on alternative designs and locations for the helipad at the hospital. The agencies contacted were REACH and the Sonoma County Sheriff Helicopter Unit. The topics of discussion included: rationale for a ground based versus a rooftop helistop, flight paths into the preferred location and each alternative sites, and issues with a helistop location that is adjacent to a major highway. General thoughts were also provided on each alternative location. The control tower at Sonoma County Airport was also asked to provide a point of view on the two alternatives nearest the Airport.

Ground based versus rooftop based helistops – Both REACH and the Sheriff would not have any issues with a ground or a rooftop based helistop at the Mark West location or any of the alternatives. REACH prefers rooftop helistops, and stated wind around a ground based helistop is unpredictable and swirls due to the presence of multiple tall buildings near the helistop, as the hospital is designed. The Sheriff favors ground based helistops over rooftop helistops. The Sheriff feels helistops on the ground offer more room for error should an incident arise and the helicopter needs a location to land under duress. A rooftop helistop does not offer this same room for error. Should an incident involving a helicopter occur on the roof, it may require the evacuation of the entire building. The Sheriff also expressed that a more intricate design for a rooftop helistop is required and the possibility that air conditioning units would have to be shut down when helicopters are using the roof.

Flight path at the Mark West Road location – The proposed approach and departure path is oriented with the prevailing wind. Each agency was satisfied with the flight paths which allow them to approach and depart over US Highway 101. The Sheriff did express some concern over the power lines crossing 101, north of Mark West Road and suggested lighting the poles. REACH was also concerned with noise generated from approaches and departures over the Wells Fargo Center, especially during private functions and religious ceremonies.

Alternative locations – Three other alternative locations were presented to REACH and the Sheriff. These include the Todd Road near Highway 101, Stony Point and Highway 12, and Shiloh Road and Highway 101. The Shiloh Road site and Todd Road site were deemed adequate by both agencies. It was suggested that if a ground based helistop was necessary at the Todd Road location, its best location would be closer to Highway 101, on the east side of the facility away from buildings. The Stony Point site provided the least positive response from each agency. REACH was especially concerned with this site and making approaches to the south, which would require a teardrop turn over a residential neighborhood.

Helistops near major highways – REACH and the Sheriff indicated the helistop at the Children's Hospital Oakland is located about 200' away from a limited access highway (State Highway 24). REACH acknowledged that a helistop this close to a highway probably causes motorists to glance at a helicopter when it is arriving and departing. The Sheriff acknowledged this also, but could not offer any statistics which would indicate helicopter activity near a highway directly results in the distraction of motorists and leads to accidents. REACH also stated a rooftop helistop may keep helicopter activity out of the peripheral vision of motorists on the ground.

Sonoma County Airport (STS) Control Tower – Two of the proposed locations of the hospital would be situated within the airspace of STS. Neither site is of a concern to the tower due to the low amount of activity expected at the hospital. The Shiloh Road site is located at the fix point where the REACH and Sheriff helicopters are at 500' above ground altitude and are to report to the tower. The Shiloh Road location is in the approach path for Runway 19, but the tower indicated this would not be a problem as this runway approach is seldom used.

Appendix G6

Heliport Safety Issues

Memorandum

Date: August 10, 2009

To: SMCSR Project Team

From: Ken Brody, Mead & Hunt

Subject: Heliport Safety Issues

This memo addresses several topics concerning the safety of helicopter operations at the proposed Sutter Medical Center Santa Rosa (SMCSR) helistop. Some of these topics were covered in prior Mead & Hunt memos. For completeness, the information previously provided is incorporated here, but the discussion is expanded to include additional information more recently obtained.

Does the proposed proximity of the helistop to Highway 101 pose a hazard to highway traffic? What data is available on this issue? What other sources of information were investigated? Are there examples of other similarly situated helicopter facilities in the state? How long will helicopters be in view when using the SMCSR helistop? Will lighting of the helistop be a distraction or annoyance?

Several avenues of research were followed in an effort to answer these questions.

First, no data on the topic appears to exist. We contacted the Statewide Integrated Traffic Records System (SWITRS) of the California Highway Patrol on July 21, 2009. The SWITRS stated that there are no records available which would determine if automobile traffic accidents were caused by nearby aircraft activity. The reason is that fault is placed on the driver of the automobile(s), not outside influences such as aircraft activity. We also conducted a search of the National Highway Traffic Safety Administration (NHTSA) online database using keywords such as 'aircraft' and 'helicopter.' This search did not yield any results. This outcome is not unexpected, given that this agency would need to obtain its data from the states and that California and presumably other states do not record the type of data in which we are interested.

Mead & Hunt next contacted the California Department of Transportation Division of Aeronautics and helicopter operators. Division of Aeronautics staff (Division Chief Gary Cathey and Aviation Safety Officers Patrick Miles and Michael Smith) indicated that they were not aware of any general conditions or specific incidents in which helicopter operations have been cited as a vehicle traffic hazard. As further verification, Division staff contacted the Air Operations Commander of the California Highway Patrol (Keith Dittimus) who responded that he had not heard of any problems caused by helicopters landing at a facility near a highway.

Other contacts made by Mead & Hunt were to local helicopter operators: REACH, the primary helicopter emergency medical services operator in Sonoma County; and the Sonoma County Sheriff's Helicopter Unit. Interviews were conducted in May 2009. REACH personnel acknowledged that a helipad close to a highway probably causes motorists to glance at a helicopter when it is arriving and departing. The Sheriff acknowledged this also, but could not offer any statistics which would indicate helicopter activity near a highway directly results in a distraction to motorists and leads to accidents.

Elsewhere in California, there are several existing helicopter facilities situated close to (within approximately 500 feet) a freeway. These include: Calstar (Auburn), Children's Hospital (Oakland), Good Samaritan Hospital (San Jose), Maguire Heliport (Los Angeles), San Joaquin General Hospital (Stockton), and St. Elizabeth Community Hospital (Red Bluff). See accompanying photos. Additionally, other hospitals no doubt have helicopter facilities near major surface roads. Also, many airports have airplane flight paths that pass over highways and major roads at low altitudes.

With respect to operations at the proposed SMCSR facility, approaching and departing helicopters are expected to be in view to motorists on Highway 101 for less than a minute and an average of no more than four to five flights (each flight includes one landing and one takeoff) per week day is anticipated (the number of helicopter flights at the current Sutter hospital in Santa Rosa has ranged between 186 and 213 during the past three years). Planned landscaping along the highway edge of the project site, once it grows in, is intended to shield motorists' view of helicopters on the landing pad.

Lights associated with the helistop are unlikely to be intrusive. The perimeter lights will be green and lead-in lights yellow; both are intended to be seen from the air and will be largely unnoticeable from the highway among parking lot and other lights on the property. The flood light or lights are to help helicopter and ground crews to work around the helistop at night. These lights would normally be on only when a helicopter is present and will be off during helicopter takeoffs and landings so as not to interfere with the vision of pilots. The exact placement and brightness of the flood lights is yet to be determined, but they do not need to be any greater than lighting for the ground ambulance area adjacent to the emergency room entrance.

What is the basis for the approach-departure paths as proposed? Are other alternatives available? Is there assurance that helicopters will not use other routes?

The proposed approach-departure paths to be followed by helicopters using the SMCSR helistop are designed to basically follow Highway 101. As with airplanes, helicopter takeoffs and landings are safest when the helicopter operates into the wind. Even though data from nearby Sonoma County Airport indicates winds are calm (under 10 knots) more than 90% of the time, alignment of the approach-departure paths with the strong winds is highly desirable. The prevailing direction of stronger winds at the airport and the SMCSR site are primarily from the south-southeast and secondarily from the northwest. Based on this data, and consistent with aircraft operations at the airport, helicopters are expected to mostly approach the SMCSR helistop from the northwest and depart to the southeast, though the opposite direction will also be common. These directions are nearly parallel to Highway 101. Highway 101 is also an en-route corridor already used by helicopters as they transit the area.

Obstacles close to the proposed helistop—primarily the redwood trees at the Highway 101 interchange with Mark West Springs Road and the high-voltage power lines north of that location, as well as the proposed hospital buildings themselves—dictate a slight deviation from the above directions in the immediate vicinity. See accompanying drawing. The inner portion of northwesterly approach-departure path is directed more west-northwest to avoid these obstacles, while the outer portion turns to parallel the freeway. Alternatives to at least the inner portions of these approach-departure paths are not possible with the helistop at the proposed location. Other locations for the helistop were investigated during the project site design and were found to have drawbacks including nearby obstructions, proximity to homes, and/or greater impact on on-site circulation and parking.

The operational capabilities of helicopters enable them to maneuver close to where they are landing and then stop immediately on landing—as opposed to airplanes that require a longer straight-in approach to a runway and then a continued distance to decelerate after landing. Thus, helicopters using the SMCSR facility theoretically could use approach-departure routes other than the ones specified. Slow-speed maneuvering, though, uses more fuel, creates additional noise, and adds risks compared to following the normal routes close to the landing pad. Lead-in lights at the helistop will show pilots the direction in which to approach the landing pad. Furthermore, all of the organizations expected to operate helicopters at SMCSR will require prior approval from the hospital and pilots will be expected to be familiar with the prescribed approach-departure routes.

These close-in limitations on helicopter routes do not necessarily apply where helicopters are flying at a higher altitude farther from the helistop (beyond approximately a quarter mile). Helicopters will not necessarily follow the entire length of the delineated approach-departure paths, but may instead make a turn to or from their direction of flight at some point along the outer portion of the route. The proposed northwest approach-departure path, for example, includes a bend that aligns the path with Highway 101, but some helicopters are likely to continue in a northwesterly directly to the Sonoma County Airport or to approach directly from the airport.

What are the risks of helicopter accidents associated with the proposed helistop?

Clearly, establishment of a helistop at the proposed SMCSR will add a risk of helicopter accidents on the site that would not be present without the helicopter facility. That said, the overall risks should be considered minimal, especially when viewed relative to the life-saving mission that the helicopter function will provide.

Design standards for all types of heliports, including those at hospitals, are established by the Federal Aviation Administration (FAA) and published in one of the agency's advisory circulars (AC 150/5390-2B, *Heliport Design*, 9/30/04). The standards specify, among other things, the dimensions of the landing pad and the required clearances around the pad and in the approach-departure paths. To ensure that public-use and hospital helicopter facilities in California are designed in accordance with the FAA standards, state law requires that a Heliport Permit be obtained from the Department of Transportation Division of Aeronautics. Division staff both review the plans for proposed heliports and then conduct annual inspections to check that the facilities continue to be in compliance with the standards and that the approach-departure paths remain free of obstructions.

As to the specific risk of helicopter accidents, a variety of nationwide data is available from various organizations, in particular the National Transportation Safety Board (NTSB) and the Helicopter Association International (HAI). NTSB is the federal government agency charged with investigating transportation accidents. HAI is an industry organization whose mission is to promote helicopter use and safety. Among the relevant information and national statistics gleaned from these sources are the following:

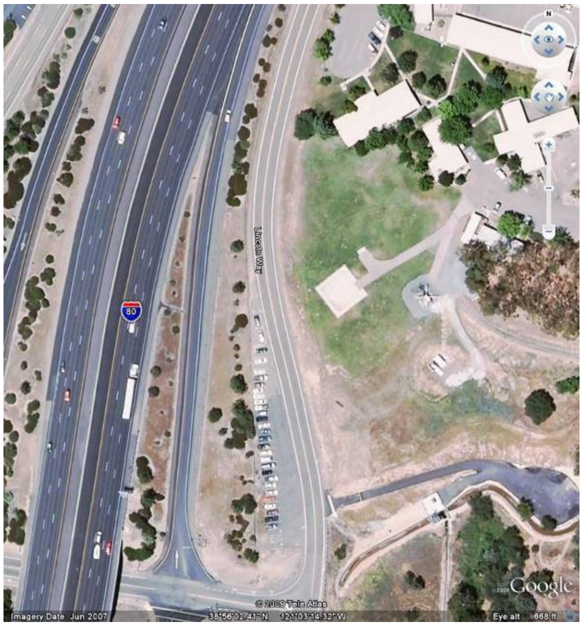
- The rate of accidents for all types of helicopter operations has trended downward over the last decade. The increased numbers of twin-engine turbine-powered helicopters in the helicopter fleet has been an apparent contributing factor both because of the engine reliability and the multiple engines. REACH flies this type of helicopters.

- The accident rate for helicopter emergency medical service (HEMS) operations had also been decreasing, but then experienced a marked increase in 2008. From 1998 through 2007, an average of 10.8 HEMS accidents occurred annually in the U.S. Whether the 2008 increase is an anomaly is uncertain, but the NTSB has investigated and offered recommendations pertaining to flight procedures.

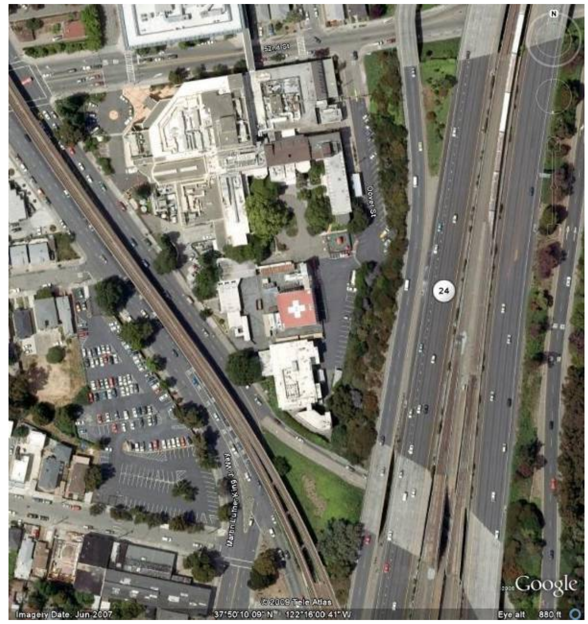
- The vast majority of helicopter accidents, particularly HEMS accidents, take place either en route or at a remote landing site rather than at an established heliport or airport.

- Weather was a significant factor in 19% of all HEMS accidents. The tendency of HEMS pilot to attempt to accomplish their live-saving mission despite adverse weather conditions no doubt is a factor in this regard.

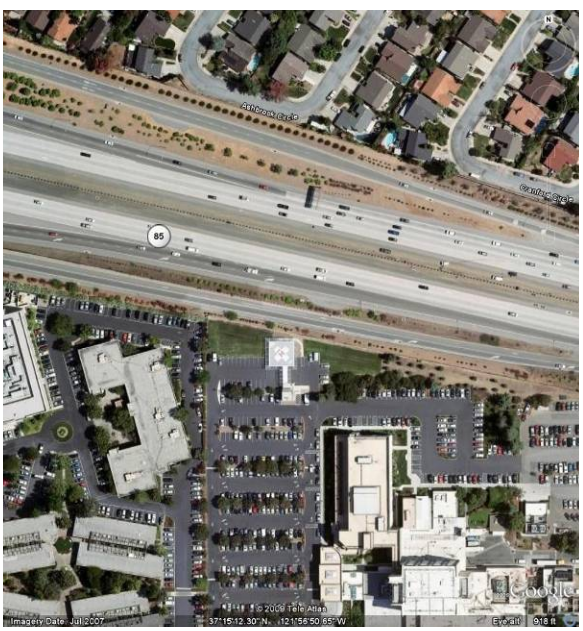
Hospital/Medical Heliports Near Freeways



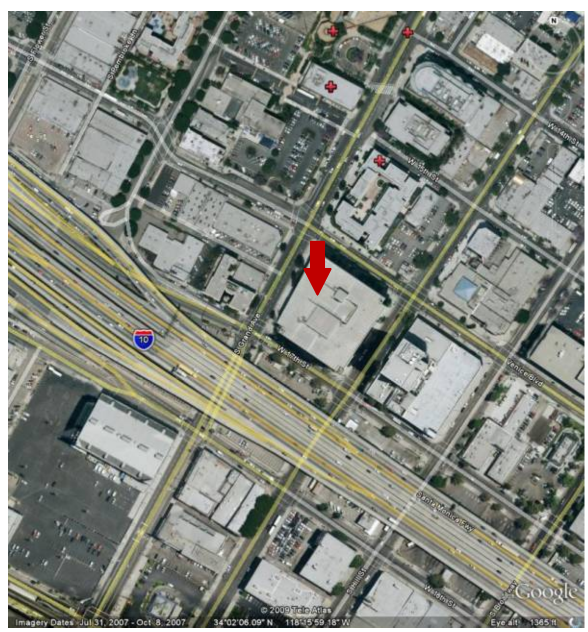
CalStar (Auburn)



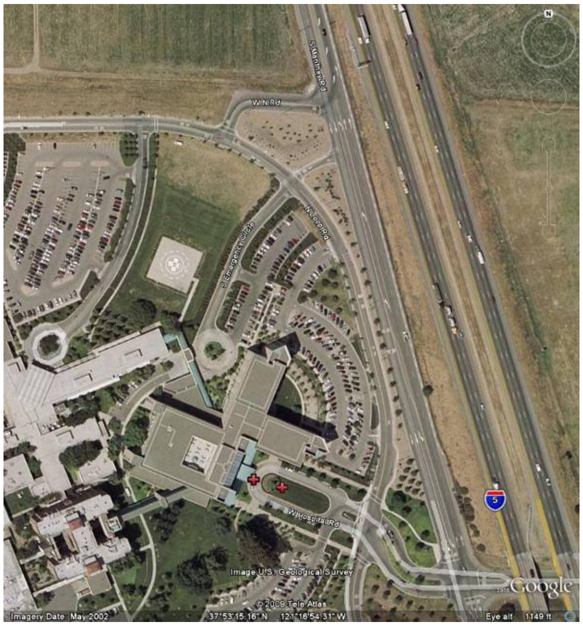
Children's Hospital (Oakland)



Good Samaritan Hospital (San Jose)



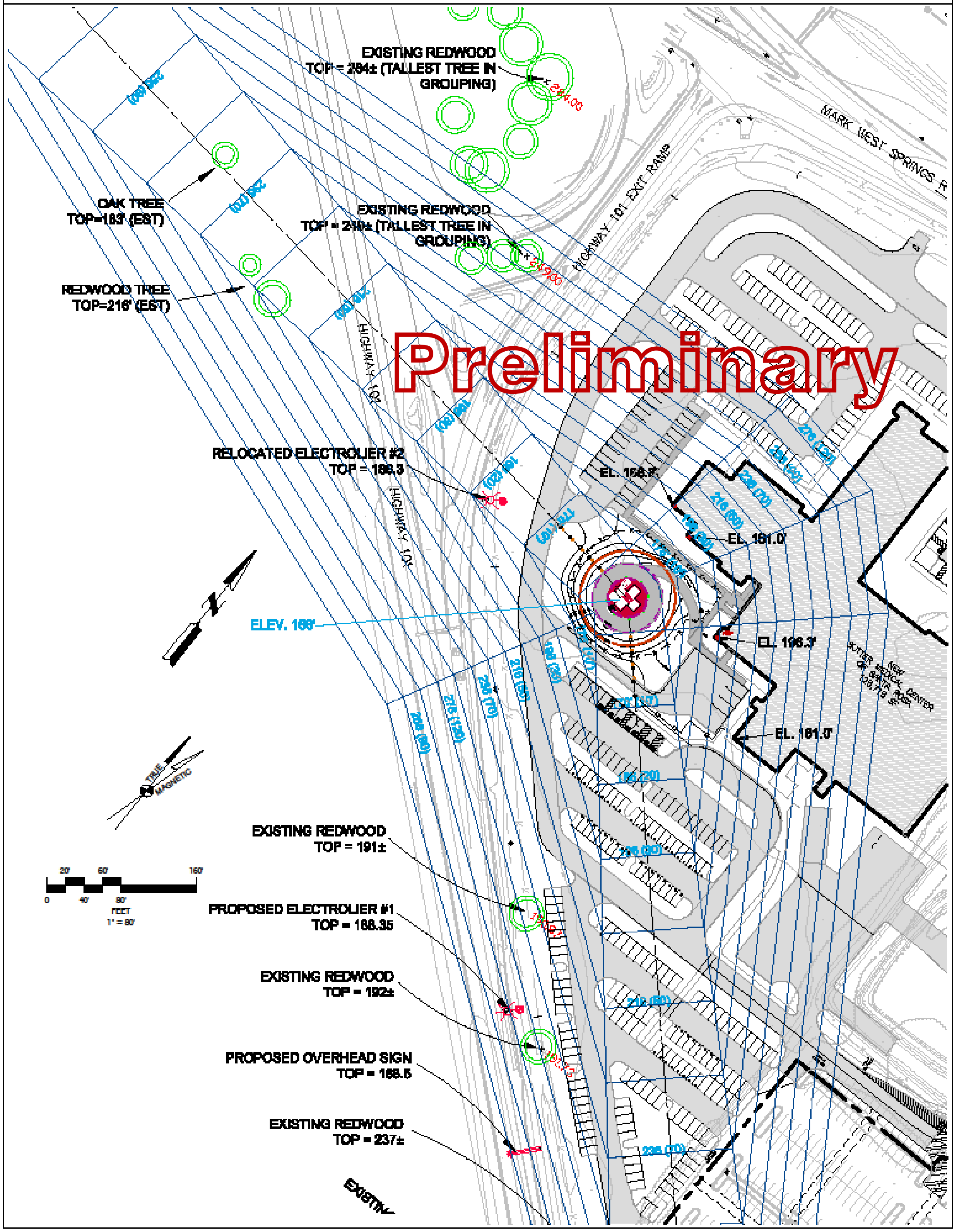
Maguire Heliport (Los Angeles)



San Joaquin General Hospital (Stockton)

St. Elizabeth Community Hospital (Red Bluff)

OBSTACLES


EXISTING REDWOOD
TOP = 264± (TALLEST TREE IN GROUPING)
OAK TREE
TOP=183' (EST)
EXISTING REDWOOD
TOP = 249± (TALLEST TREE IN GROUPING)
REDWOOD TREE
TOP=216' (EST)
HIGHWAY 101 EXIT RAMP
MARK WEST SPRINGS R
HIGHWAY 101
Preliminary
RELOCATED ELECTROLIER #2
TOP = 186.3
EL. 168.7'
EL. 161.0'
ELEV. 166'
EL. 196.3'
EL. 161.0'
EXISTING REDWOOD
TOP = 191±
PROPOSED ELECTROLIER #1
TOP = 188.35
EXISTING REDWOOD
TOP = 192±
PROPOSED OVERHEAD SIGN
TOP = 188.5
EXISTING REDWOOD
TOP = 237±
TRUE
MAGNETIC
FEET
1" = 80'

APPENDIX H

HYDROLOGY AND WATER QUALITY TECHNICAL REPORTS

Appendix H1

Groundwater Aquifer Test and Water Quality Analysis, Sutter Medical Center

Project No.
6486.2.005.01

February 21, 2006

Ms. Nadin Sponamore
Sponamore Associates
1205 McDonald Avenue
Santa Rosa, CA 95404

Subject: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Santa Rosa, California

GROUNDWATER AQUIFER TEST AND WATER QUALITY ANALYSIS

Dear Ms. Sponamore:

At your request and with your authorization, ENGEO Incorporated has performed aquifer testing analyses and has as evaluated groundwater quality for the subject site. The purpose of the study was to determine the well pumping characteristics, perform limited water quality testing, and predict aquifer capability for future land use.

SITE LOCATION AND DESCRIPTION

The site where the existing well is located at 50 Mark West Springs Road in Santa Rosa, California, as shown on the Site Vicinity Map (Figure 1). The property encompasses approximately 78 acres, including the Luther Burbank Center for the Arts (LBC) which is approximately 52 acres in size. In addition to the LBC, a rural residence with barn, out-buildings and undeveloped pasture land, as well as a single-family home that is currently used as law offices, are present within the property boundary.

The Luther Burbank Center (LBC) and associated parking areas are currently located at the center of the site. The LBC structure is a cultural and performing arts event center, and a part of the property is leased to the Sonoma Academy, an independent college-preparatory high school. This portion of the Property includes approximately 39 acres that are occupied by asphalt-covered parking areas, an athletic field, and an existing waste water treatment facility. Two ponds associated with the wastewater treatment facility are located along the main access road that connects to Mark West Springs Road. The athletic field is located opposite to the wastewater treatment facility at the north side of the site along Mark West Springs Road. A vineyard exists at the south and southeast corner of the site. The remainder of the site is currently vacant and covered with seasonal grasses.

GEOLOGIC CONDITIONS

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Locally, the site is mapped as underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). This alluvium consists of unconsolidated deposits of sand, silt, gravel and clay likely derived from the bedrock uplands and older unconsolidated deposits. Regional geology and information from the well driller's log (located in Appendix D) indicate that the alluvial deposits in this area may be greater than 400 feet in thickness.

FAULTS

The site is located in a region that contains numerous active[1] and potentially-active earthquake faults. The site is not located within the State of California Fault Hazard Zone. The active Rodgers Creek fault is located approximately 0.7 mile to the east of the project area. The Maacama Fault is located 6.3 miles to the east and the San Andreas Fault is located 19.5 miles to the west of the site. Regional faulting and seismicity is shown on Figure 4, which shows regional proximity to major active faults and significant historic earthquakes with in proximity to the site. No faults have been mapped that run through the subject site indicating that aquifers beneath the property are not fault controlled.

WATER DEMAND

Information provided to us by Brejle & Race Consulting Civil Engineers of Santa Rosa, California, indicates the planned construction of the proposed hospital will result in water demand of approximately 73,460 gallons per day. The daily demand equates to a yield of roughly 50 gallons per minute for a continuous 24-hour pumping period.

WELL AND PUMP INFORMATION

An existing agriculture groundwater supply well, W-LBC, is located near the center of the property at an elevation of approximately 160 feet above msl (mean sea level). The location of well W-LBC is presented on Figure 2. Reportedly, the LBC well was installed by Les Petersen Drilling and Pump, Inc., of Santa Rosa, California, in August 2000. The well was installed using rotary wash methods and is approximately 400 feet deep. The well consists of 10-inch diameter 200-guage PVC (polyvinyl chloride) casing and screen. The well screen is mill-slot casing with 0.032-inch slot openings. Three screened intervals were installed at 100 to 160 feet, 180 to 320 feet, and 360 to 400 feet. The completed State of California Well Completion Report was furnished to us and is included in Appendix D.

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[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene era (about the last 11,000 years) (Hart, 1997).

The existing agriculture groundwater supply well, W-LBC, served as the pumping well for the aquifer test. Drawdown during pumping and recovery after pumping ceased were recorded. A second existing agriculture groundwater supply well, W-SV, is located offsite near the southern end of the property, approximately 1,200 feet from W-LBC. The location of the well W-SV is also presented on Figure 2. Information about the construction details of this well had not been provided. The drawdown and recovery tests of W-SV during and after pumping of W-LBC were documented to serve as a monitoring well.

The following table summarizes well construction data related to the subject LBC and Sutter Vineyard wells:

Table 1 – Well Construction Data

Well Name	Date Constructed	Total Depth	Casing Type and Diameter	Perforation Intervals (ft bgs)
LBC Well (W-LBC)	2000	400 feet	10-inch PVC	100 to 160 160 to 320 360 to 400
Sutter Vineyard Well (W-SV)	unknown	unknown	10-inch PVC	unknown

Reportedly, the pump within the LBC well was installed by Bartley Pump of Santa Rosa, California, and consists of a Berkeley model 6T-275 submersible pump that is equipped with a 30 horsepower motor. Information from testing conducted shortly after the well was constructed is reported to show the well sustained a yield of 300 gallons per minute with 230 feet of drawdown during a 7 day pumping test. The Berkeley 6T-275 pump is rated to pump between 225 and 250 gallons per minute from the well. The pump curve and specifications for this pump model was furnished to us and is included in Appendix D. The pump was pulled out of the well for the purpose of video-surveying and the depth of the pump was found to be approximately 325 feet.

PHASE 1 – W-LBC STEP-DRAWDOWN TEST

Prior to commencing the 24-hour pumping test, an initial step-drawdown test was conducted at W-LBC, as requested by Mr. Richard Shatz, as a Hydrogeologist consultant for Cal American Water, who expressed concern that excessive pumping rates may adversely effect the well and aquifer if water levels were lowered below the upper screened interval (100 feet below ground surface (bgs)). Therefore, the step drawdown test was conducted about one week prior to the scheduled 24-hour pumping test on June 27, 2005. The step-drawdown began at a pumping rate of 100 gallons per minute (gpm); pumping started at 10:00 AM and ended at 11:20 AM as the water level equilibrated in the LBC well. The first few minutes of the test were actually conducted at a rate much higher than 100 gpm. As a result, the average rate over the 100 gpm rate step was roughly 153 gpm. The second step was 150 gpm, which began at 11:25 AM and ended at 4:25 PM. The pumping level did not stabilize while pumping at 150 gpm; the water level in the pumping well continued to decline throughout this second step. The overall rate of pumping during this step was 156 gpm, which we feel is effectively 150 gpm with regards to the equipment used. Based on the results of the step-drawdown test, we decided to implement a 24-hour pump test at a pumping rate of 100 gpm. The data collected during the step-drawdown test are included in Appendix B.

BACKGROUND WATER LEVELS

The water level of the pumping well, W-LBC, was recorded over the period of two weeks leading up to the pump test. The water level averaged a depth of 44 feet below top of casing (btc) which roughly correlates to an elevation of 116 feet above mean sea level (msl). The top of casing is approximately 14 inches above ground surface. On the day of the initial 24-hour pump test, a Bartley Pump technician proof-tested the pump approximately a half-hour before the start of the test, resulting in a background water level of 45.7 feet btc the morning of the test.

PHASE 2 – INITIAL W-LBC PUMPING TEST

A 24-hour pump test was initiated on the morning of July 5, 2005, at 10:00AM. Prior to the initiation of the pump test, groundwater levels were initially measured at pumping well W-LBC and the off-site monitoring well W-SV. The pumping concluded the following day at 10:00 AM. A flow rate meter and volume discharge meter was attached to the pump. The flow rate was maintained at ±100 gallons/minute. The flow rate was regularly verified by evaluating the measured totalizer data readings. The actual average pumping rate throughout the test, after evaluating the total gallons pumped during the 24 hours, was roughly 106 gpm. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot.

Once the pump test commenced, the depth to groundwater was recorded at W-LBC and W-SV as follows: every minute for the first 10 minutes; every 2 minutes from 10 to 30 minutes; every 5 minutes from 30 to 60 minutes; every 10 minutes from 60 to 120 minutes; every 20 minutes from 120 to 240 minutes; every 30 minutes from 240 to 360 minutes; every 60 minutes from 360 to 720 minutes; and every 120 minutes from 720 to 1,440 minutes. After 24 hours of continuous pumping, a recovery test began immediately following the shut down of the pump. The depth was recorded during recovery in the same intervals as during the pumping test to approximately 95% recovery and then at 24 hours. The field-recorded measurements of the drawdown and recovery, as well as observations and notes, are attached as Appendix B.

The drawdown at the pumping well, W-LBC, after 24 hours of continuous of pumping neared 23 feet and fully recovered following 24 hours of recovery. The observation well, W-SV, showed no significant drawdown from the continuous pumping 1,200 linear feet away.

At the request of Mr. Richard Shatz on behalf of Cal American, ENGEO measured sand content with a Rossum Sand Tester at the beginning and end of the 24-hour pumping test. The results of the sand test yielded few grains of sand, and the total amount of sand recovered fell far below the initial reading line of 1 part per million (ppm). The observations and notes from the sand test are included in Appendix B as part of the test data.

AQUIFER ANALYSIS

Using the pumping and recovery test records, we analyzed the aquifer characteristics, specifically, the transmissivity (**T**) and the storage coefficient (**S**). We have assumed in our analysis, based on previous geotechnical explorations, the aquifer is unconfined and the thickness of the aquifer extends from about 20 to 25 feet bgs to the bottom of the well for a total thickness of roughly 375 feet. The drawdown and recovery data obtained from the aquifer test was used to analyze the aquifer using the Cooper-Jacob and Theis Curve-Matching methods to determine the storage coefficient and transmissivity. A brief explanation of the different methods is included in Appendix B.

Transmissivity (**T**) is the hydraulic conductivity of the full thickness of the aquifer; it is a measure of the aquifer's ability to transmit water (i.e., how permeable it is). The values of transmissivity obtained from different methods of analysis are nearly uniform. The arithmetic mean value of transmissivity is 4,396 gallons per day per foot (gpd/ft), with a range between 3,860 gpd/ft and 4,825 gpd/ft. The geometric mean value of calculated transmissivities is 4,385 gpd/ft. These calculated values are characteristic for the type of materials encountered, such as alluvial materials, and an unconfined aquifer.

The storage coefficient (**S**), or storativity, is the volume of water released from or taken into storage per unit surface area per unit change of the hydraulic head; it is a measure of the aquifer's ability to release groundwater from storage. In typical unconfined aquifers, like the subject site, the value of storativity falls in the typical range of 0.01 and 0.35. Since the observation well felt no effect from the continual pumping in W-LBC, the calculations for storativity were limited. However, by assuming an effective well radius (i.e., the distance from the well where the water level is the same as the water level in the well), we estimate the range of storativity values for the tested aquifer to fall towards the upper bound of the typical range, roughly between 0.15 and 0.35. Further study may be warranted if a tighter range of the value of storativity is desired. (An observation well would have to be installed within 400 feet of W-LBC to successfully obtain the necessary data.)

The following table presents the results of our analysis:

TABLE 2 – Aquifer Characteristics

METHOD OF ANALYSIS	TRANSMISSIVITY **T** gpd/ft	STORAGE COEFFICIENT **S**
Cooper-Jacob Drawdown Method	4,825	0.19
Cooper-Jacob Recovery Method	4,177	N/A
Cooper-Jacob Residual Drawdown Method	4,442	N/A
Cooper-Jacob Calculated Recovery Method	3,860	0.35
Theis Curve Matching Drawdown Method	4,443	0.43
Theis Curve Matching Recovery Method	4,628	0.19

Based on a review of the pumping/recovery test data, the aquifer at the subject site can yield at least 100 gpm or 144,000 gallons per day.

Using the geometric mean value of transmissivity of 4,385 gpd/ft with the Cooper – Jacob modification of the Theis equation, we estimate the theoretical radius of influence may be as great as 600 to 800 feet for W-LBC.

PHASE 3 – SUPPLEMENTAL W-LBC PUMPING TEST

We supplemented our initial W-LBC pumping test with a second pumping test on November 14, 2005, in an effort to determine the adequacy of the well and aquifer. The set-up for this test was identical to the prior test. We pumped the well for over twenty-eight hours at ±80 gpm, roughly equivalent to 150% of the expected demand. No recordings were made at the off-site well W-SV due to the lack of drawdown during the step-drawdown and initial pumping tests at greater pumping rates. The actual average pumping rate throughout the test, after evaluating the total gallons pumped during the length of the test, was roughly 79 gpm. Recovery of the groundwater level was recorded for the following 10 hours. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot. The data for this test are presented in Appendix B.

PHASE 4 – W-SV STEP-DRAWDOWN TEST

As a means to preliminarily assess the capacity of the off-site well W-SV, we conducted a step-drawdown test on November 21, 2005. The set-up for this test was similar to the previous tests. We commenced testing at a rate of 80 gpm and found the groundwater levels to consistently fall. After six hours, we reduced the pumping rate to 60 gpm, and within a few hours of pumping at this lower rate, the groundwater level equilibrated and we halted pumping operations. Recovery of the groundwater level was then recorded over the following 4 hours. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot. The data for this test are presented in Appendix B.

GROUNDWATER AVAILABILITY

Review of the pumping/recovery test data and aquifer analysis indicates that the aquifer at Luther Burbank Center has capacity in excess of the predicted water demands for the proposed project. The yield of well W-LBC is at least 80 gallons per minute, or 115,200 gallons per day. The measurements indicate that the groundwater levels outside the LBC property limits and at the periphery of the property did not change. This indicates that pumping from the W-LBC does not impact the groundwater supply of adjacent properties.

WATER QUALITY

Table 3 provides water quality sample results for the two wells, W-LBC and W-SV, for the initial samples collected in July 2005 and the most recent collected in November 2005. W-LBC was only sampled in July 2005 and both wells were sampled in November 2005. For each of the sampling events, samples were collected during a 24-hour pumping test at three times: at the beginning (1 hour), at the middle (12 hours), and at the end (23 hours). The samples were collected from a tap that was installed near the pump. The samples were labeled, preserved in a chilled cooler, and transported to McCampbell Analytical, Inc., of Pacheco, California, with completed chain-of-custody forms the day following the pumping test.

The initial water quality samples collected in November 2005 were analyzed to collect the following water quality parameters: total hardness as $CaCO_3$, total dissolved solids (TDS), total alkalinity as $CaCO_3$, pH; total silica, electrical conductivity, and manganese, iron, and arsenic. The samples collected in November 2005 included additional metal parameters that were not analyzed in the initial samples and included: total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, hardness, pH, electrical conductivity, TDS, antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, and silica.

Analysis of the water quality results indicates that the results from the start, the middle, and the end of each test are similar in value. Additionally, results from the two sampling events conducted in July and November 2005 for well W-LBC are similar in value. The lab results from McCampbell Analytical are included in Appendix C and tabulated in Table 3.

The groundwater sampling results were compared to the California Department of Health Services (DHS) Drinking Water Standard and Secondary Standard Maximum Contaminate Levels (MCLs). For the parameters that were detected in the groundwater samples, the majority were below the DHS MCLs. One exception is manganese. Manganese was detected in all the samples at levels greater than the secondary MCL (SMCL) of 0.05 mg/L. Manganese values for well W-LBC ranged from 1.3 to 1.5 mg/L and for well W-SV ranged from 0.83 to 0.86.

GEOPHYSICAL LOGGING

At the request of Mr. Richard Shatz, Welenco of Bakersfield, Calif., a geophysical logging company, was retained to perform a plumbness and alignment survey, a deviation survey, and a video survey. These activities took place on November 19, 2005. A representative of Cal American, Ms. Julliana Harris of Bookman-Edmonston, was on-site during the operations. The full suite of data and the video are included as Appendix E.

The alignment of the well has come in question by Mr. Richard Shatz. Cal American's acceptable maximum allowable deviation of the well's alignment, according to Mr. Shatz, is two-thirds of the well casing diameter, in our case, approximately 7 inches, per every 100 feet of casing length. The data obtained by Welenco suggests that W-LBC's alignment exceeds this deviation standard. The alignment of the well has little affect on the capacity of the well; its importance regards the diameter of pump that may pass through the casing. Well casings that are extremely out-of-plumb may also affect the rate of wear experienced by a pump, which is an issue of the maintenance of the well.

Mr. Shatz's interpretation of the Welenco data is that the well's alignment results in an effective diameter of 2 inches, meaning that a 2-inch plumb-bob (or smaller) is capable of traversing the entire depth of the well without coming in contact with the casing wall. A low effective diameter suggests that the maintenance and occasional service of the pump within the well may be difficult. The pump, which is situated at approximately 325 feet bgs, was pulled out of the well on November 19, 2005, and resituated a few days later. This exhibits that the alignment of the well allows for the current pump to be lowered through the first 325 feet of well casing with little resistance.

WELL CLEANING

Mr. Richard Shatz has suggested that the well screens are clogged with biological fouling, or biofouling, an accumulation of living and deceased microorganisms, which would require cleaning to provide efficient well production.

The still pictures suggest the biofouling has not caused clogging of the well screen due to encrustation. We reviewed the driller's log to see if the zones of greatest fouling correspond to the lowest water producing intervals. Although our review is limited by the generalities of the depths photographed by Welenco and the vagueness of the driller's lithologic descriptions, we perceive that the zones of greatest biofouling correspond to zones that the driller described as clay.

The Welenco photographs indicate the greatest biofouling existed within the intervals: 158 to 178; 275 to 317, and 358 to 366 feet below ground surface. The driller's log describes these intervals below ground surface as: 160 to 194 being blue and brown clay; 268 to 310 being blue clay with gravel and brown clay; and 328 to 364 being blue clay. These data show a high level of correlation between the zones of greatest biofouling and the clayey layers within the subsurface. This correlation suggests that the biofouling is due to the groundwater's low entrance velocity through the well screen. Entrance velocity should be maintained above 0.1 feet per second to limit clogging as seen in the video.

The biofouling can be reduced by disinfection using bleach or pool chlorine to create a 100 mg/l chlorine solution in the well. This solution would remain in the well for at least four hours, during which light agitation may be applied to the well bore. Following the contact period, the well should be redeveloped. Since the well's alignment is in question, we would recommend the well be carefully developed using airlifting methods. This requires a 2- to 3-inch diameter pipe connected to an air compressor be lowered to the bottom of the well. Application of air creates an aerated water column that results in water being brought to the ground surface. Properly varying the rate of air flow and the pressure will remove the dead biomaterial and clean the screen and filter pack.

Drilling and pump installation companies are well versed at well disinfection and airlift development. We recommend that a video survey to assess the well development results be conducted following the well disinfection and development.

CONCLUSIONS

- The demand of 73,460 gallons per day or 50 gallons per minute is met by the existing production well. The anticipated drawdown of the water table should be less than measured during the test.

- The 24-hour pumping test data indicates that the aquifer at the LBC property has adequate transmissivity and reasonable storage capacity.

- After 24 hours of continuous pumping, the groundwater level measured at the closest adjacent well, W-SV on the Sutter Vineyard property (1,200 feet away), did not change. This indicates that the radius of influence for a 100 gallon per minute pumping rate at W-LBC is much less than

1,200 feet. This clearly indicates that pumping from the well W-LBC does not impact adjacent properties.

- Water quality results from the samples collected from both wells, W-LBC and W-SV, indicate good water quality. There is concern with the manganese concentrations that exceed the California DHS secondary maximum contaminant level. Manganese is not considered to present a risk to human health at the SMCL. EPA does not enforce these "secondary maximum contaminant levels" or "SMCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. Excessive manganese in groundwater will cause the water to be black to brown in color; possible black staining and potential bitter metallic taste.

- The similarity of chemical composition indicated by samples collected from the start, middle and end of the two pumping tests support the interpretation that pumping test data do not indicate aquifer boundary conditions affected the calculation of aquifer T and S.

- If water samples are to be collected from the wells in the future, cation and anion parameters should be included in the requested analysis. These parameters will be used to type the water for each well. This data will be used to determine if the wells are screened in the same aquifer.

- Mr. Richard Shatz, consultant to Cal American, has stated that from his review of the draft of this report that we supplied him, that "the aquifers are capable, there seems to be no issues with water quality, and the construction and materials of the well will work." The outstanding issue, in his opinion, is the alignment of the well. It is our experience that the vertical alignment of a well may pose a number of future considerations, which include:

    - If it is necessary to rehabilitate the well, such work may need to be performed using mechanical scrubbing devices if the screens in the well are clogged; and

    - It is possible that the ability to set the pump within the well at greater depths in the future, if necessary, may be restricted if the well deviation is excessive.

It should be noted that to assess these above items, it is possible to check the well for alignment at a later time prior to final acceptance.

We were pleased to be of continued service to you on this project. If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Very truly yours,

ENGEO INCORPORATED

Jeffrey B. Wisniewski, PE

for Dennis Nakamoto, CHG, CEG

jbw/dn/tpb/mb: pump

Reviewed by:

Theodore P. Bayham, GE, CEG

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Attachments: Selected References
Appendix A – Figures
Appendix B – Aquifer Test Data, Methods and Calculations
Appendix C – Water Quality Test Results
Appendix D – Miscellaneous Well and Pump Information
Appendix E – Well Logging Data and Video

SELECTED REFERENCES

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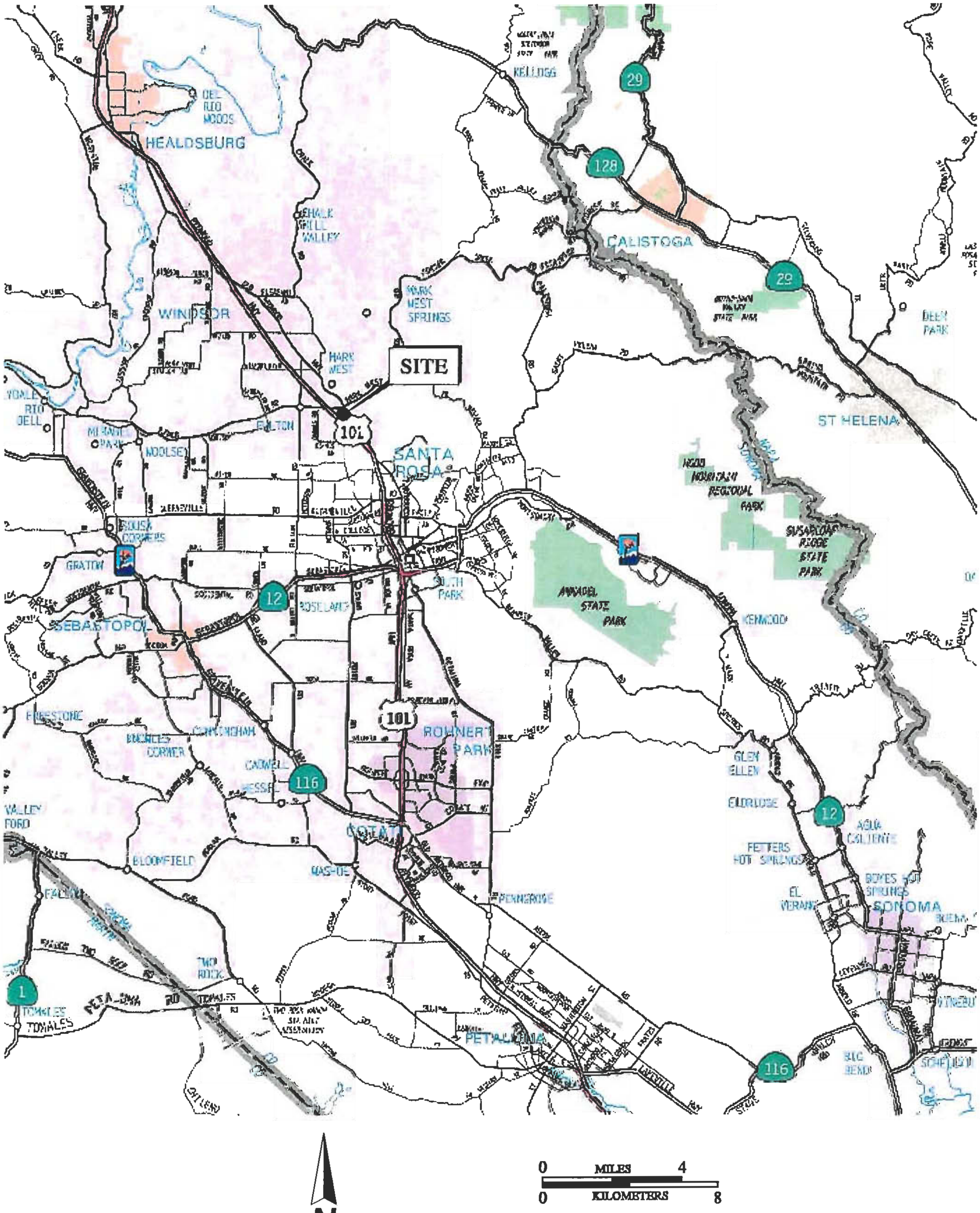
APPENDIX A

Figure 1	Site Vicinity Map
Figure 2	Site and Well Location Plan
Figure 3	Regional Geology
Figure 4	Regional Faulting & Seismicity
Figure 5	Southerly View



BASE MAP SOURCE: THOMAS BROTHERS

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SITE VICINITY MAP
SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: **6486.2.005.01**		FIGURE NO. **1**
DATE: **FEBRUARY 2006**		
DRAWN BY: JBW	CHECKED BY: TPB	

ORIGINAL FIGURE PRINTED IN COLOR

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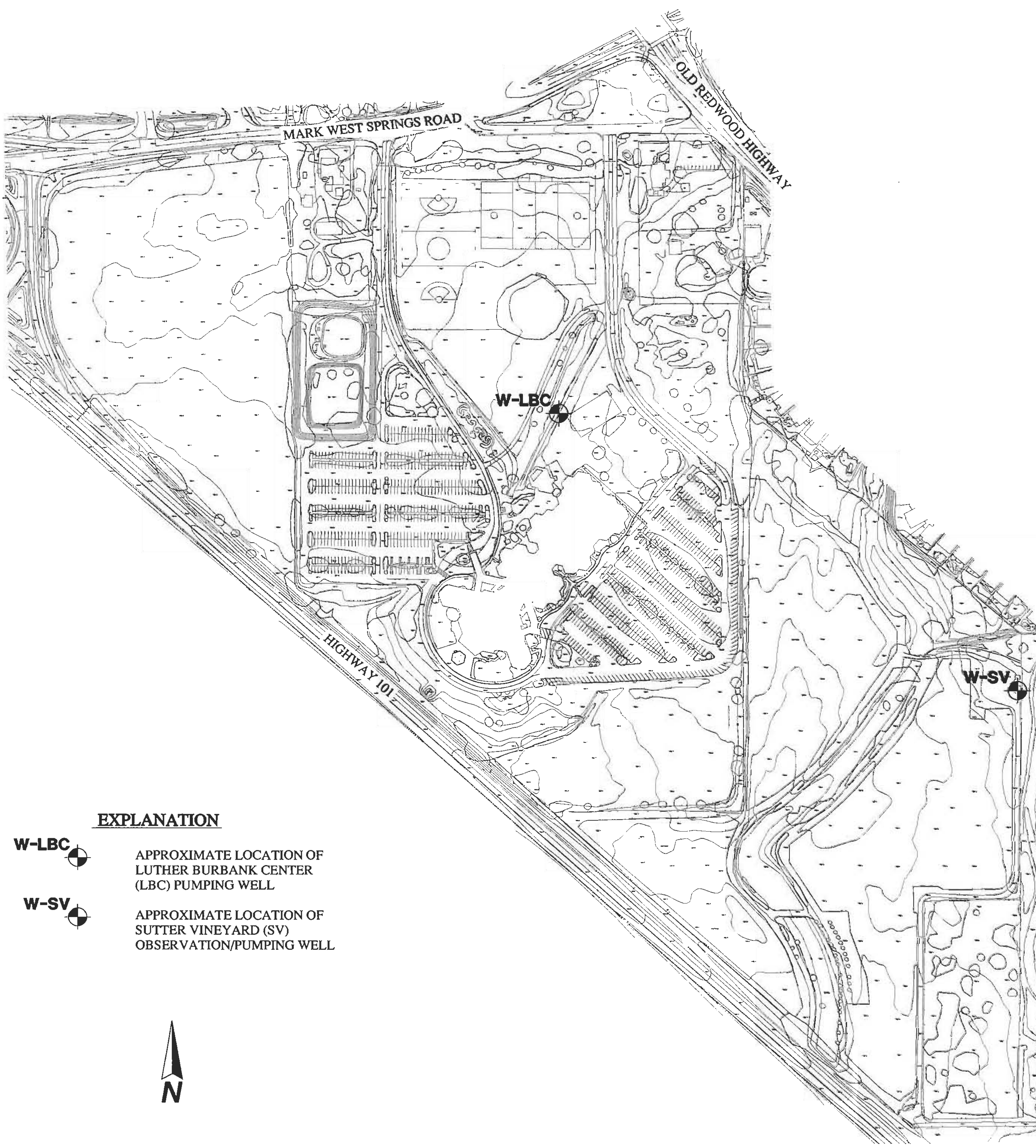

EXPLANATION

W-LBC — APPROXIMATE LOCATION OF LUTHER BURBANK CENTER (LBC) PUMPING WELL

W-SV — APPROXIMATE LOCATION OF SUTTER VINEYARD (SV) OBSERVATION/PUMPING WELL

BASE MAP SOURCE: BREJLE AND RACE CONSULTING CIVIL ENGINEERS

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SITE AND WELL LOCATION PLAN
SUTTER MEDICAL CENTER OF SANTA ROSA/
LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.005.01	
DATE: FEBRUARY 2006	
DRAWN BY: JBW	CHECKED BY: TPB

FIGURE NO. 2

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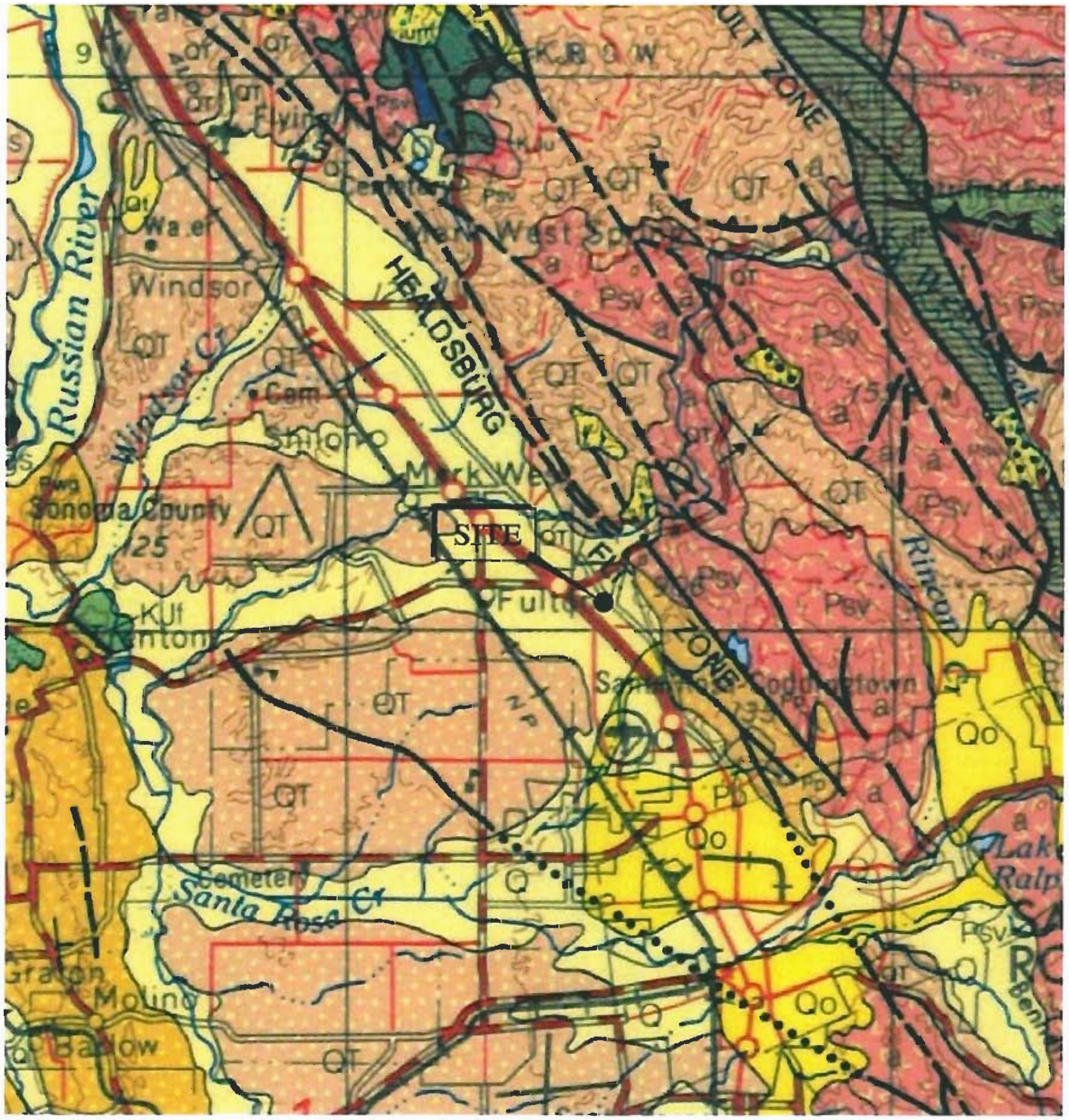

EXPLANATION

N

0 MILES 2

0 KILOMETERS 4

- Q — ALLUVIUM
- Qls — LANDSLIDE DEPOSITS
- Qo — OLD ALLUVIUM
- QT — HUICHICA AND GLEN ELLEN FORMATION; INCLUDES UNDIFFERENTIATED CONTINENTAL DEPOSITS
- Psv — SONOMA VOLCANICS
- FRANCISCAN COMPLEX
- LOWER CRETACEOUS GREAT VALLEY SEQUENCE
- SERPENTINIZED ULTRAMAFIC ROCK

BASE MAP SOURCE: WAGNER AND BORTUGNO, 1982

ENGEO INCORPORATED — EXCELLENT SERVICE SINCE 1971	**REGIONAL GEOLOGY** SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.005.01 DATE: FEBRUARY 2006 DRAWN BY: JBW CHECKED BY: TPB	FIGURE NO. 3

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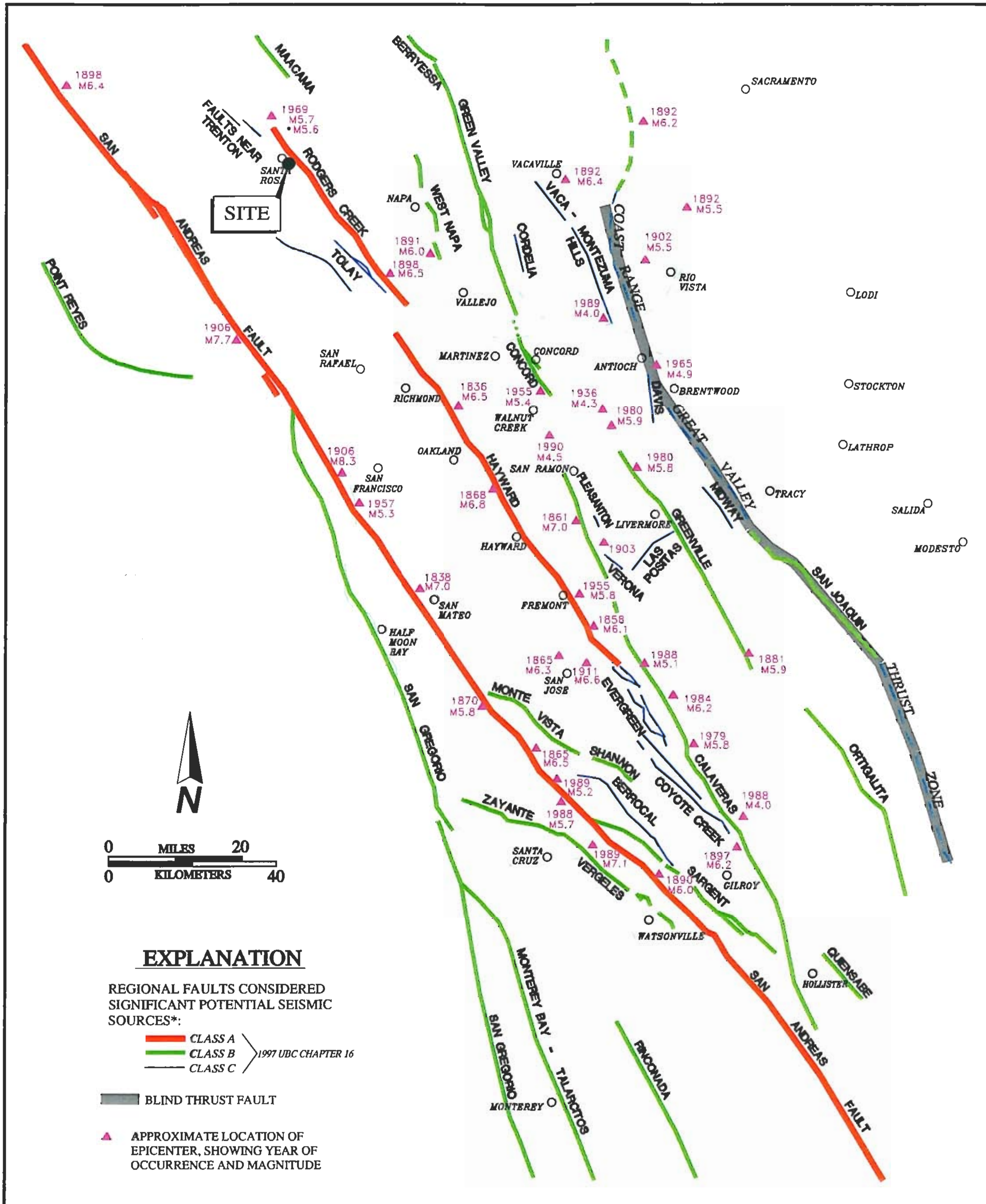

*BASED ON USGS OPEN FILE 96-706

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REGIONAL FAULTING AND SEISMICITY
SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.005.01	
DATE: FEBRUARY 2006	
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FIGURE NO. **4**

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BASE SOURCE: GOOGLE EARTH

NO SCALE

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	**SOUTHERLY VIEW** SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.005.01 DATE: FEBRUARY 2006 DRAWN BY: JBW CHECKED BY: TPB	FIGURE NO. 5

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APPENDIX B

W-LBC Step-Drawdown Test
Figure B-1: Depth of Groundwater during W-LBC Step-Drawdown Test
Figure B-2: Drawdown during W-LBC Step-Drawdown Test

W-LBC 24-hour Pump Test @ 100gpm
Figure B-3: Depth of Groundwater during W-LBC Pump Test @ 100gpm
Figure B-4: Drawdown during W-LBC Pump Test @ 100gpm

Aquifer Analysis Methodologies
Figure B-5: Cooper-Jacob Drawdown Method
Figure B-6: Cooper-Jacob Recovery Method
Figure B-7: Cooper-Jacob Residual Drawdown Method
Figure B-8: Cooper-Jacob Calculated Recovery Method
Figure B-9: Theis Curve-Matching Drawdown Method
Figure B-10: Theis Curve-Matching Recovery Method

W-LBC 24-hour Pump Test @ 80gpm
Figure B-11: Depth of Groundwater during W-LBC Pump Test @ 80gpm
Figure B-12: Drawdown during W-LBC Pump Test @ 80gpm

W-SV Step-Drawdown Test
Figure B-13: Depth of Groundwater during W-SV Step-Drawdown Test
Figure B-14: Drawdown during W-SV Step-Drawdown Test

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6468.2.005.01
Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27 10:03 AM
End Pumping:	2005-06-27 4:23 PM
Initial Volume (100gpm):	18612 x100 gal
Final Volume (100 gpm):	18734 x100 gal
Initial Volume (150gpm):	18734 x100 gal
Final Volume (150 gpm):	19201 x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	10:04 AM	73.00	36.80	Start 100gpm; actual rate closer to 350gpm for first 10 minutes
2	10:05 AM	75.00	36.80	
3	10:06 AM	-	36.80	
4	10:07 AM	77.00	36.80	
5	10:08 AM	78.00	36.80	
6	10:09 AM	79.00	36.80	
7	10:10 AM	-	36.80	
8	10:11 AM	80.50	36.80	
9	10:12 AM	81.00	36.80	Reduced rate to roughly 125gpm
10	10:13 AM	75.00	36.80	
12	10:15 AM	74.00	36.80	
14	10:17 AM	73.00	36.80	
16	10:19 AM	72.50	36.80	
18	10:21 AM	72.30	36.80	
20	10:23 AM	73.40	36.80	
22	10:25 AM	73.80	36.80	
24	10:27 AM	74.00	36.80	
26	10:29 AM	74.00	36.80	
28	10:31 AM	64.20	36.80	
30	10:33 AM	62.10	36.80	
35	10:38 AM	61.40	36.80	
40	10:43 AM	61.00	36.80	
45	10:48 AM	60.60	36.80	
50	10:53 AM	60.50	36.80	
55	10:58 AM	60.40	36.80	
60	11:03 AM	60.40	36.80	
70	11:13 AM	60.40	36.80	

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27	10:03 AM
End Pumping:	2005-06-27	4:23 PM
Initial Volume (100gpm):	18612	x100 gal
Final Volume (100 gpm):	18734	x100 gal
Initial Volume (150gpm):	18734	x100 gal
Final Volume (150 gpm):	19201	x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
80	11:23 AM	60.40	36.80	End 100 gpm, Start 150 gpm
81	11:24 AM	64.00	36.80	
82	11:25 AM	64.40	36.80	
83	11:26 AM	64.95	36.80	
84	11:27 AM	64.80	36.80	
85	11:28 AM	65.00	36.80	
86	11:29 AM	65.50	36.80	
87	11:30 AM	65.60	36.80	
88	11:31 AM	65.95	36.80	
89	11:32 AM	66.00	36.80	
90	11:33 AM	66.00	36.80	
92	11:35 AM	66.15	36.80	
94	11:37 AM	66.50	36.80	
96	11:39 AM	66.55	36.80	
98	11:41 AM	66.70	36.80	
100	11:43 AM	66.95	36.80	
102	11:45 AM	66.90	36.80	
104	11:47 AM	66.90	36.80	
106	11:49 AM	67.20	36.80	
108	11:51 AM	67.30	36.80	
110	11:53 AM	67.45	36.80	
115	11:58 AM	67.70	36.80	
120	12:03 PM	68.50	36.80	
125	12:08 PM	68.10	36.80	
130	12:13 PM	67.85	36.80	
135	12:18 PM	68.50	36.80	
140	12:23 PM	68.50	36.80	

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27	10:03 AM
End Pumping:	2005-06-27	4:23 PM
Initial Volume (100gpm):	18612	x100 gal
Final Volume (100 gpm):	18734	x100 gal
Initial Volume (150gpm):	18734	x100 gal
Final Volume (150 gpm):	19201	x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
150	12:33 PM	68.70	36.80	
160	12:43 PM	68.95	36.80	
170	12:53 PM	69.25	36.80	
180	1:03 PM	69.40	37.00	
190	1:13 PM	69.85	37.00	
200	1:23 PM	69.90	37.00	
220	1:43 PM	70.15	37.00	
240	2:03 PM	70.70	37.00	
260	2:23 PM	71.00	37.00	
280	2:43 PM	71.40	37.00	
300	3:03 PM	71.50	37.00	
320	3:23 PM	71.80	37.00	
350	3:53 PM	72.10	37.00	
380	4:23 PM	72.50	37.00	End 150 gpm

Figure B-1: Depth of Groundwater during W-LBC Step-Drawdown Test

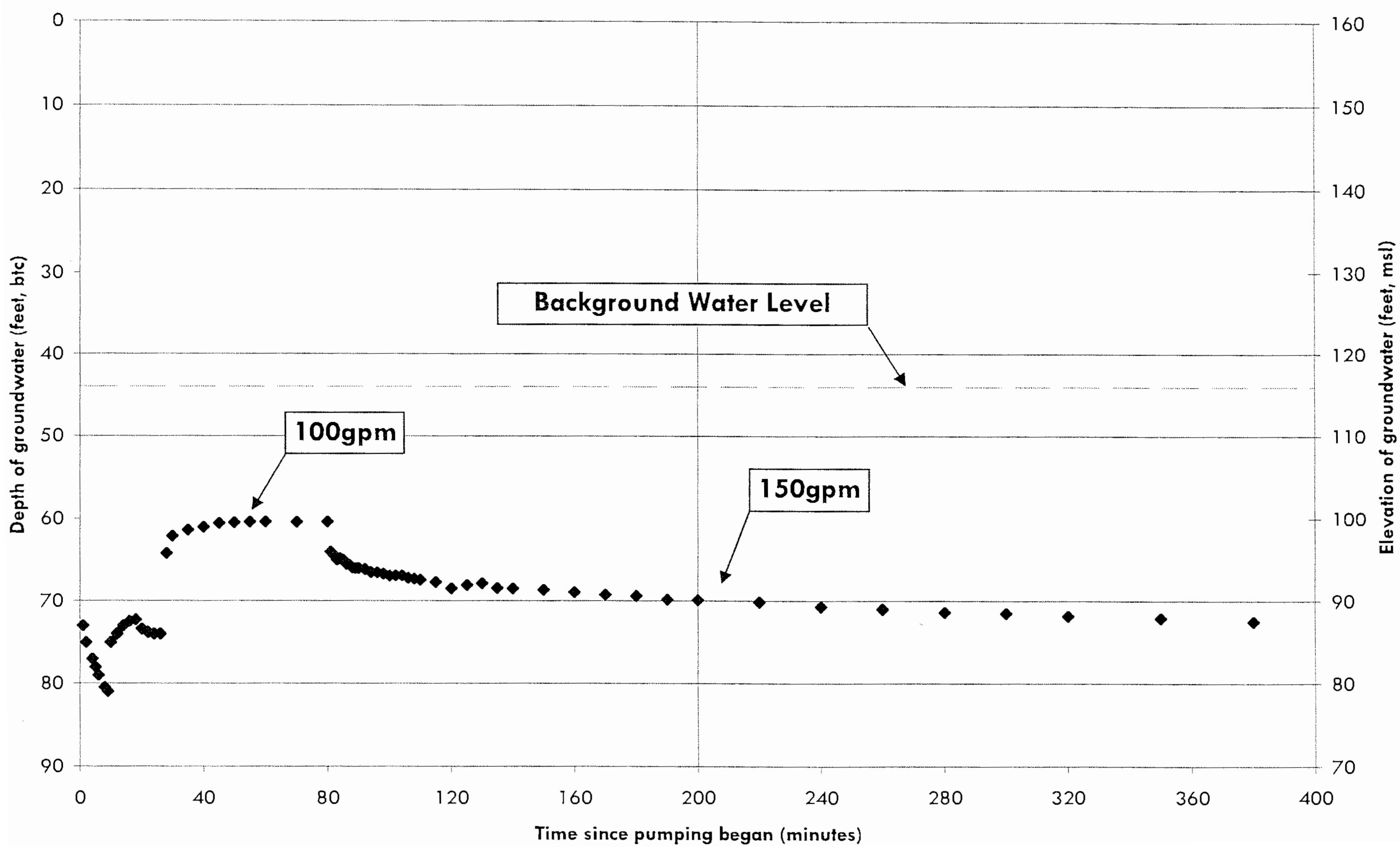
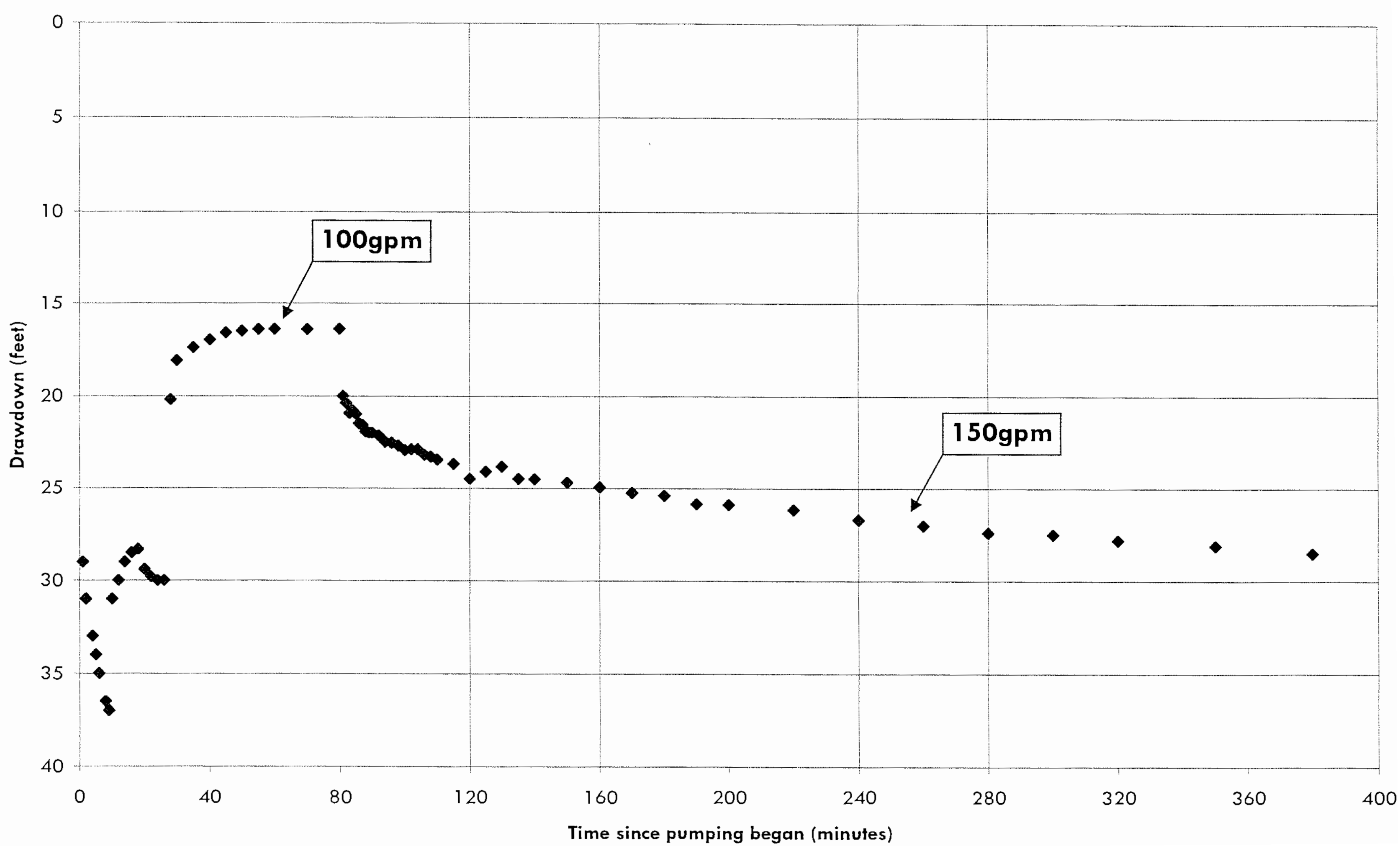


Figure B-2: Drawdown during W-LBC Step-Drawdown Test



W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06 10:00 AM
End Pumping:	2005-07-07 10:00 AM
Initial Volume:	19209 x100 gal
Final Volume:	20736 x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	10:01 AM	55.05	39.00	clear, no odors; Sand Test: 0 ppm
2	10:02 AM	56.05	39.00	
3	10:03 AM	56.60	39.00	
4	10:04 AM	56.85	39.00	
5	10:05 AM	57.10	39.00	first 10 min., 125 gpm @ 135 psi
6	10:06 AM	57.30	39.00	
7	10:07 AM	57.70	39.00	
8	10:08 AM	58.00	39.00	
9	10:09 AM	58.20	39.00	
10	10:10 AM	58.35	39.00	at 10 min., 138 back pressure reducing q to 100 gpm
12	10:12 AM	56.85	39.00	
14	10:14 AM	57.25	39.00	
16	10:16 AM	57.85	39.00	
18	10:18 AM	58.30	39.00	
20	10:20 AM	58.45	39.00	
22	10:22 AM	58.70	39.00	
24	10:24 AM	58.85	39.00	
26	10:26 AM	59.00	39.00	
28	10:28 AM	59.10	39.00	
30	10:30 AM	59.30	39.00	
35	10:35 AM	59.70	39.00	
40	10:40 AM	60.00	39.00	
45	10:45 AM	60.15	39.00	
50	10:50 AM	60.50	39.00	
55	10:55 AM	60.70	39.00	
60	11:00 AM	60.90	39.00	
70	11:10 AM	61.15	39.00	19285
80	11:20 AM	61.50	39.00	19295
90	11:30 AM	61.70	39.00	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06	10:00 AM
End Pumping:	2005-07-07	10:00 AM
Initial Volume:	19209	x100 gal
Final Volume:	20736	x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
100	11:40 AM	62.00	39.00	
110	11:50 AM	62.15	39.20	
120	12:00 PM	62.40	39.40	vineyard pump in use
140	12:20 PM	62.70	39.20	19357.5
160	12:40 PM	63.05	39.10	19378.5
180	1:00 AM	63.30	39.10	
200	1:20 AM	63.60	39.40	19422
220	1:40 AM	63.80	39.90	19442
240	2:00 AM	64.00	39.40	
270	2:30 AM	64.30	39.20	19500
300	3:00 AM	64.60	39.20	
330	3:30 AM	64.85	39.20	
360	4:00 AM	65.05	39.20	19589
420	5:00 AM	65.50	39.20	19652
480	6:00 AM	65.80	39.20	19715
540	7:00 AM	66.20	39.20	19778
600	8:00 AM	66.50	39.20	19842
660	9:00 AM	66.80	39.20	19906
720	10:00 AM	67.00	39.20	19969
840	12:00 PM	67.30	-	20100
960	2:00 AM	67.60	-	20226
1080	4:00 AM	67.90	-	20354
1200	6:00 AM	68.20	-	20483
1320	8:00 AM	68.40	42.10	20617; vineyard pump in use
1440	10:00 AM	68.55	39.90	20736; Sand Test: 0 ppm
1441	10:01 AM	61.40	39.90	
1442	10:02 AM	60.50	39.90	
1443	10:03 AM	59.70	39.90	
1444	10:04 AM	59.20	39.90	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06 10:00 AM
End Pumping:	2005-07-07 10:00 AM
Initial Volume:	19209 x100 gal
Final Volume:	20736 x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1445	10:05 AM	59.00	39.90	
1446	10:06 AM	58.65	39.90	
1447	10:07 AM	58.25	39.90	
1448	10:08 AM	58.05	39.90	
1449	10:09 AM	57.80	39.90	
1450	10:10 AM	57.50	39.90	
1452	10:12 AM	57.20	39.90	
1454	10:14 AM	56.90	39.90	
1456	10:16 AM	56.60	39.90	
1458	10:18 AM	56.35	39.90	
1460	10:20 AM	56.10	39.90	
1462	10:22 AM	55.80	39.90	
1464	10:24 AM	55.65	39.90	
1466	10:26 AM	55.45	39.90	
1468	10:28 AM	55.30	39.90	
1470	10:30 AM	55.10	39.90	
1475	10:35 AM	-	39.90	
1480	10:40 AM	54.25	39.90	
1485	10:45 AM	54.05	39.90	
1490	10:50 AM	53.70	39.90	
1495	10:55 AM	53.50	39.90	
1500	11:00 AM	53.30	39.80	
1510	11:10 AM	52.90	39.80	
1520	11:20 AM	52.60	39.80	
1530	11:30 AM	52.15	39.80	
1540	11:40 AM	51.90	39.80	
1550	11:50 AM	51.55	39.80	
1560	12:00 PM	51.35	39.80	
1580	12:20 PM	50.95	39.80	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06	10:00 AM
End Pumping:	2005-07-07	10:00 AM
Initial Volume:	19209	x100 gal
Final Volume:	20736	x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1600	12:40 PM	50.50	40.00	
1620	1:00 PM	50.10	40.60	vineyard pump in use
1640	1:20 PM	49.75	40.00	
1660	1:40 PM	49.50	40.00	
1680	2:00 PM	49.30	40.00	
1710	2:30 PM	48.95	40.00	
1740	3:00 PM	48.60	39.90	
1770	3:30 PM	48.30	39.90	
1800	4:00 PM	48.05	39.90	
1860	5:00 PM	47.50	39.90	
1920	6:00 PM	47.15	39.90	
1980	7:00 PM	46.80	39.90	
2880	10:00 AM	44.40	39.60	

Water Sampling Notes

Sample at 11:00 AM (START); no odor discernable

Sample at 10:00 PM (MIDDLE); mild sulfur-like smell in containers (rotten-egg like)

Sample at 9:00 AM (END); strong sulfur-like smell in container (rotten-egg like)

Figure B-3: Depth of Groundwater during W-LBC Pump Test @ 100gpm

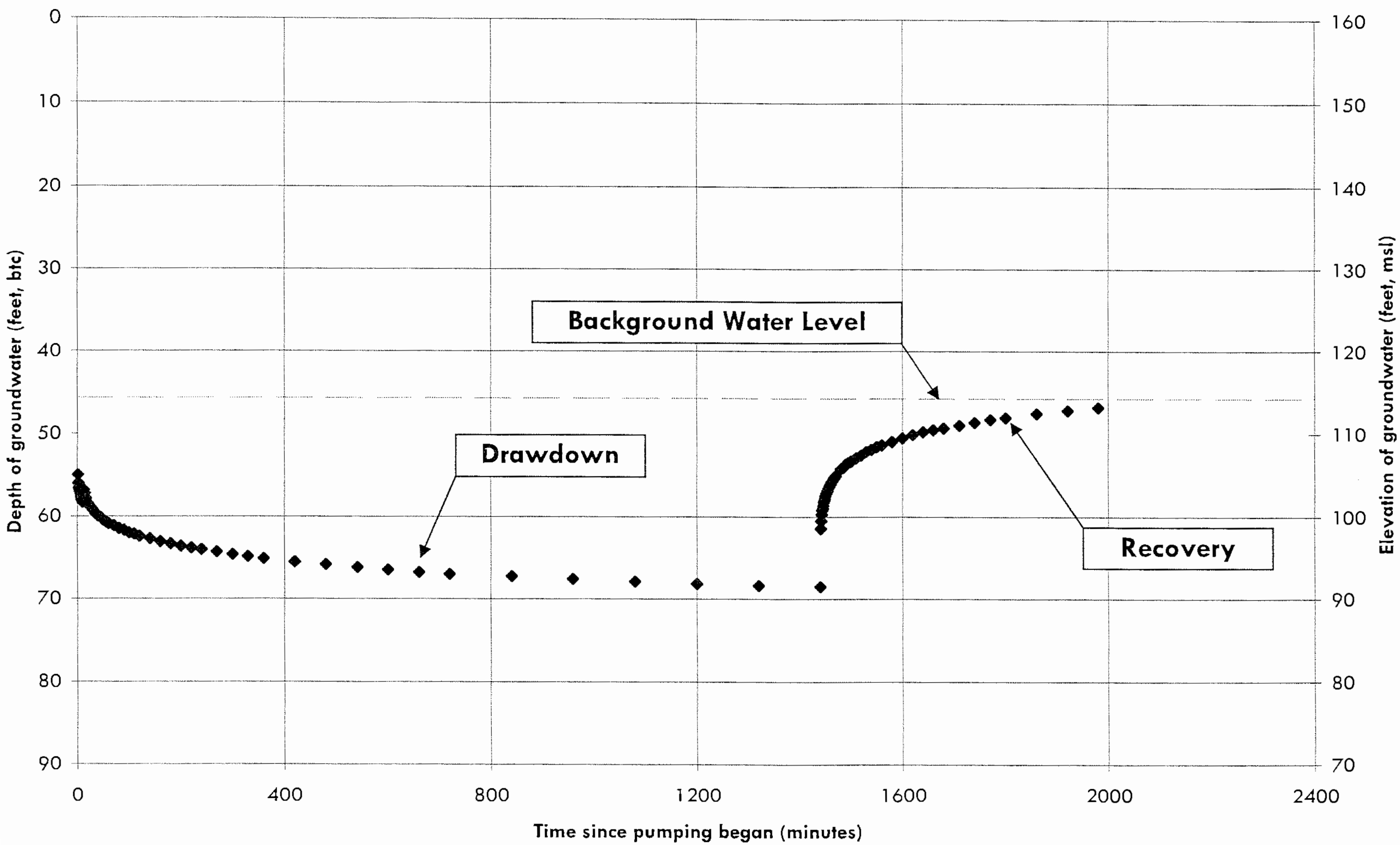
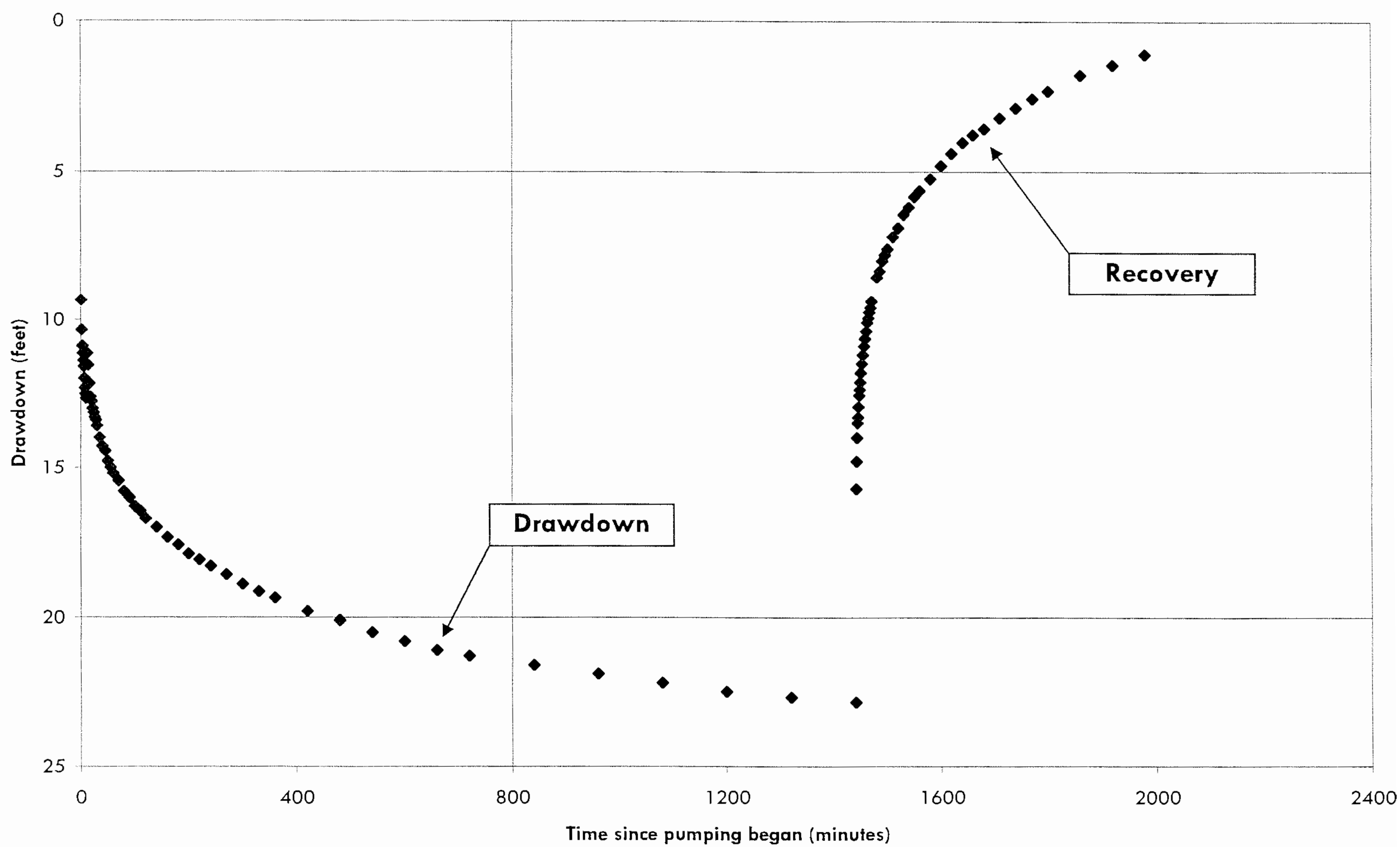


Figure B-4: Drawdown during W-LBC Pump Test @ 100gpm



AQUIFER ANALYSIS METHODOLOGIES

We have calculated the theoretical values of transmissivity and storativity in using the Cooper-Jacob and Theis Curve-Matching methods.

Cooper-Jacob Method

$$T = \frac{264Q}{\Delta s} \qquad S = \frac{0.3T \cdot t_0}{r^2}$$

...where T is the transmissivity in gpd/ft, Q is the flow discharge in gpm, Δs is the drawdown over one time-cycle in feet, S is the storativity, t_0 is the time at which a straight-line extension of the drawdown curve intersects with zero drawdown in days, and r is the distance from the well where the drawdown occurred in feet.

Theis Curve-Matching Method

$$T = \frac{Q \cdot W(u)}{4\pi \cdot s} \qquad S = \frac{4T \cdot t \cdot u}{r^2}$$

...where T is the transmissivity in cubic meters per second per meter, Q is the flow discharge in cubic meters per second, s is the drawdown in meters and t is the time in seconds from one point on the drawdown graph, W(u) is the well function and u is a parameter from the corresponding point on the well function graph, S is the storativity, and r is the distance from the well the drawdown occurred.

Maximum Radius of Influence

We have calculated the theoretical maximum radius of influence from the pumping of W-LBC using Cooper and Jacob modification of the Theis equation as follows:

$$s = \frac{264Q}{T} \log \frac{0.3Tt}{r^2 S}$$

...where *s* is equal to the maximum available drawdown in feet, Q is equal to the discharge in gpm, *T* is equal to the transmissivity in gpd/ft, t is equal to the time in days, *r* is equal to the radius from the well in feet, and *S* is equal to the storativity which is dimensionless.

Figure B-5: Cooper-Jacob Drawdown Method

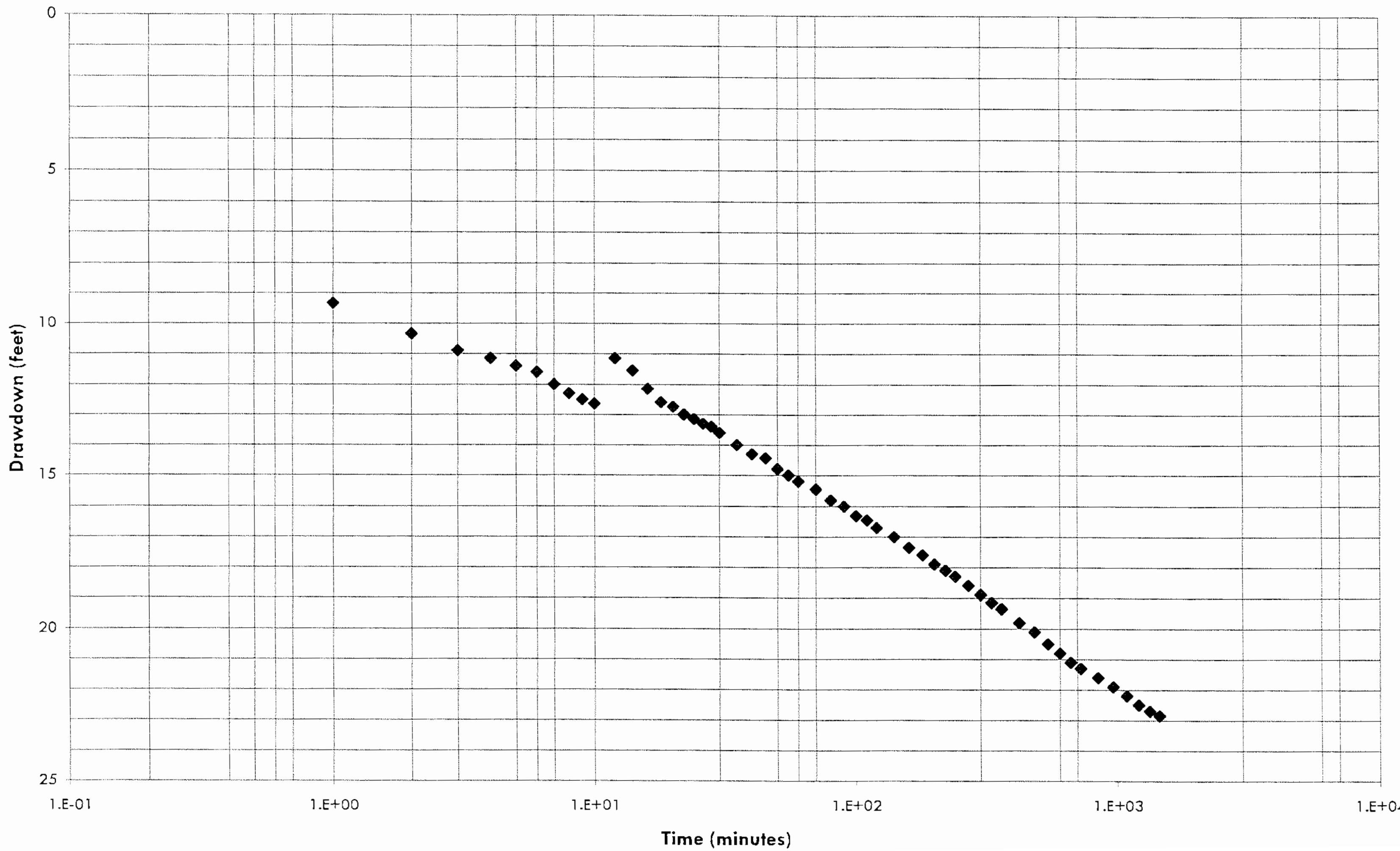


Figure B-6: Cooper-Jacob Recovery Method

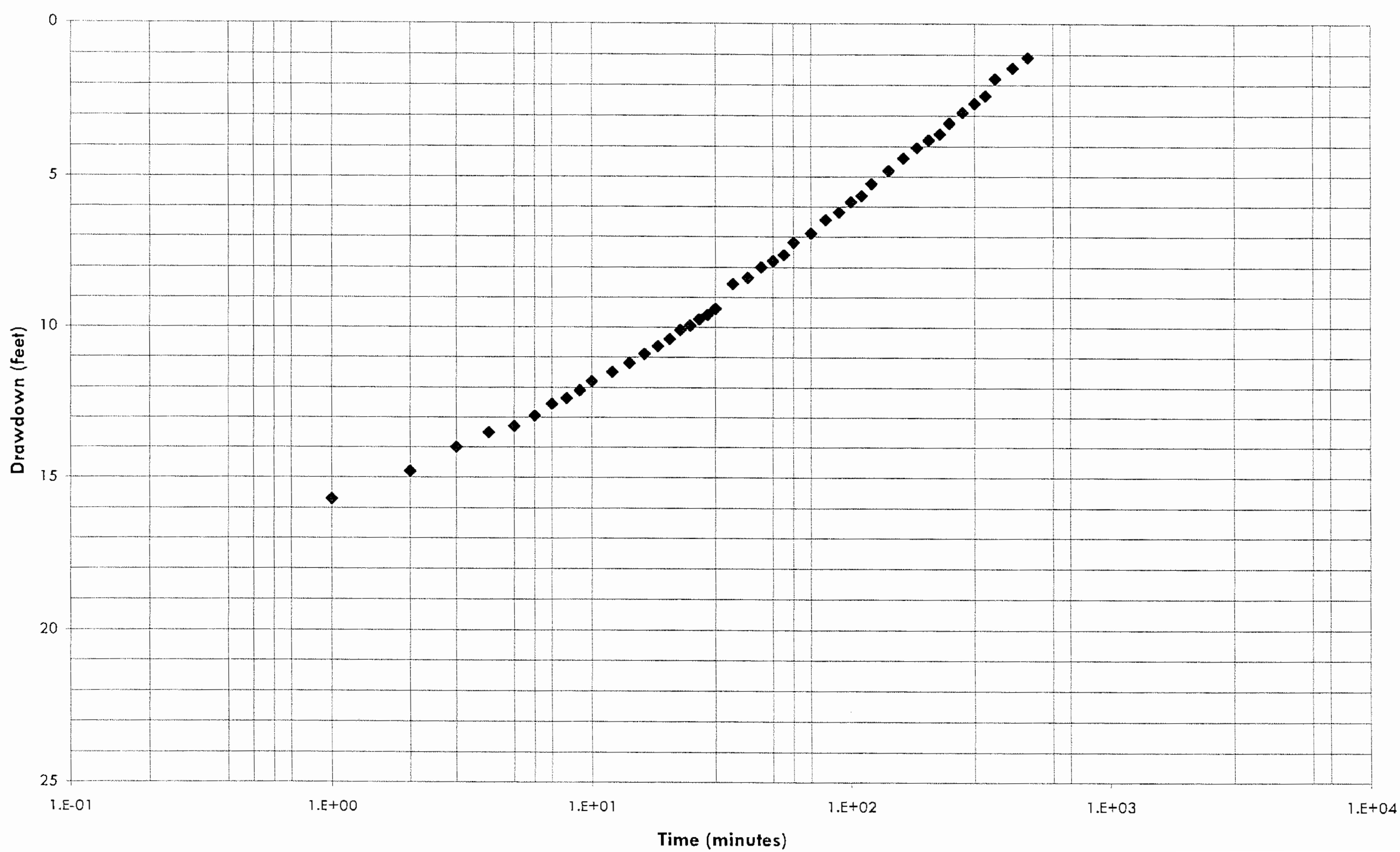


Figure B-7: Cooper-Jacob Residual Drawdown Method

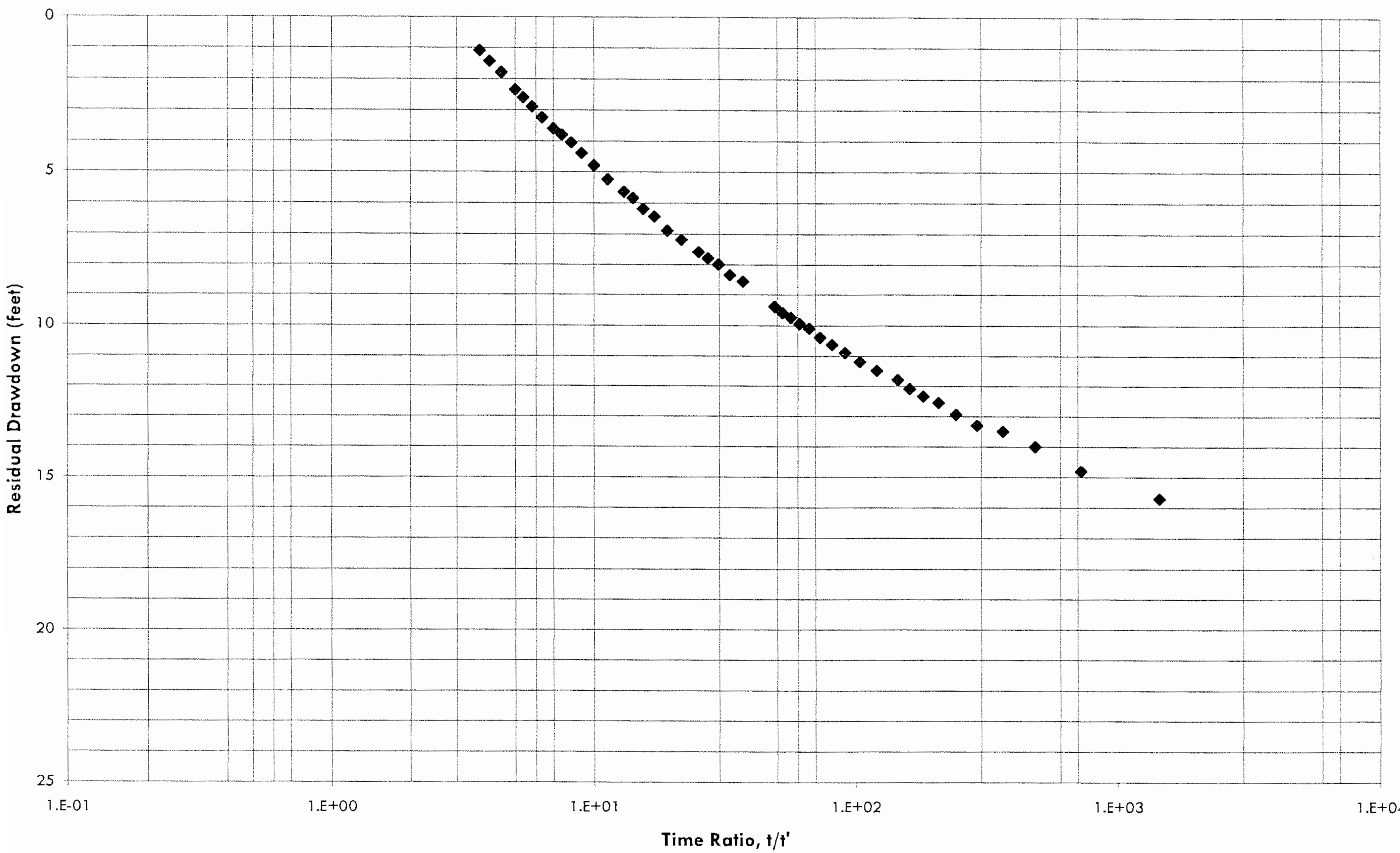


Figure B-8: Cooper-Jacob Calculated Recovery Method

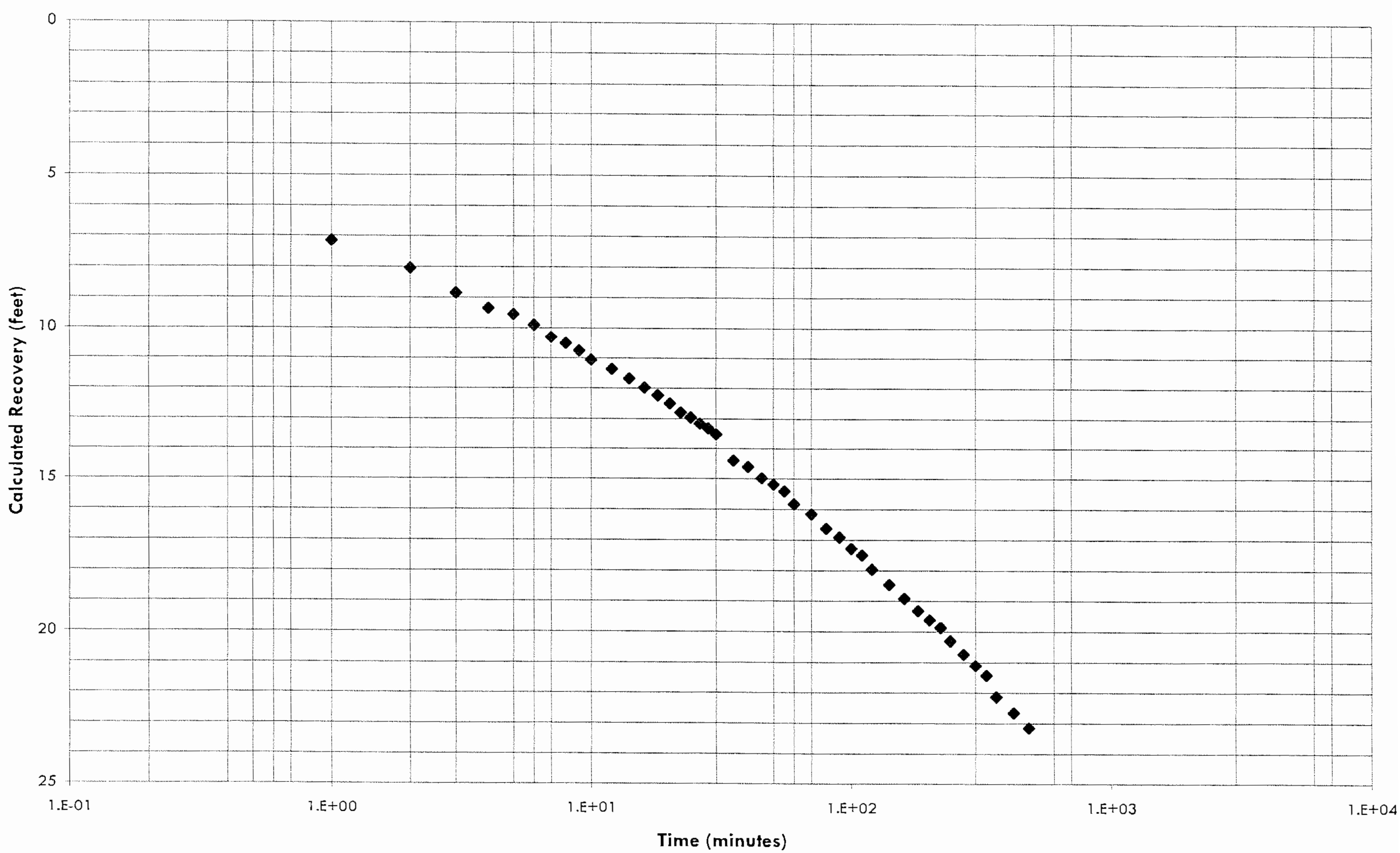


Figure B-9: Theis Curve-Matching Drawdown Method

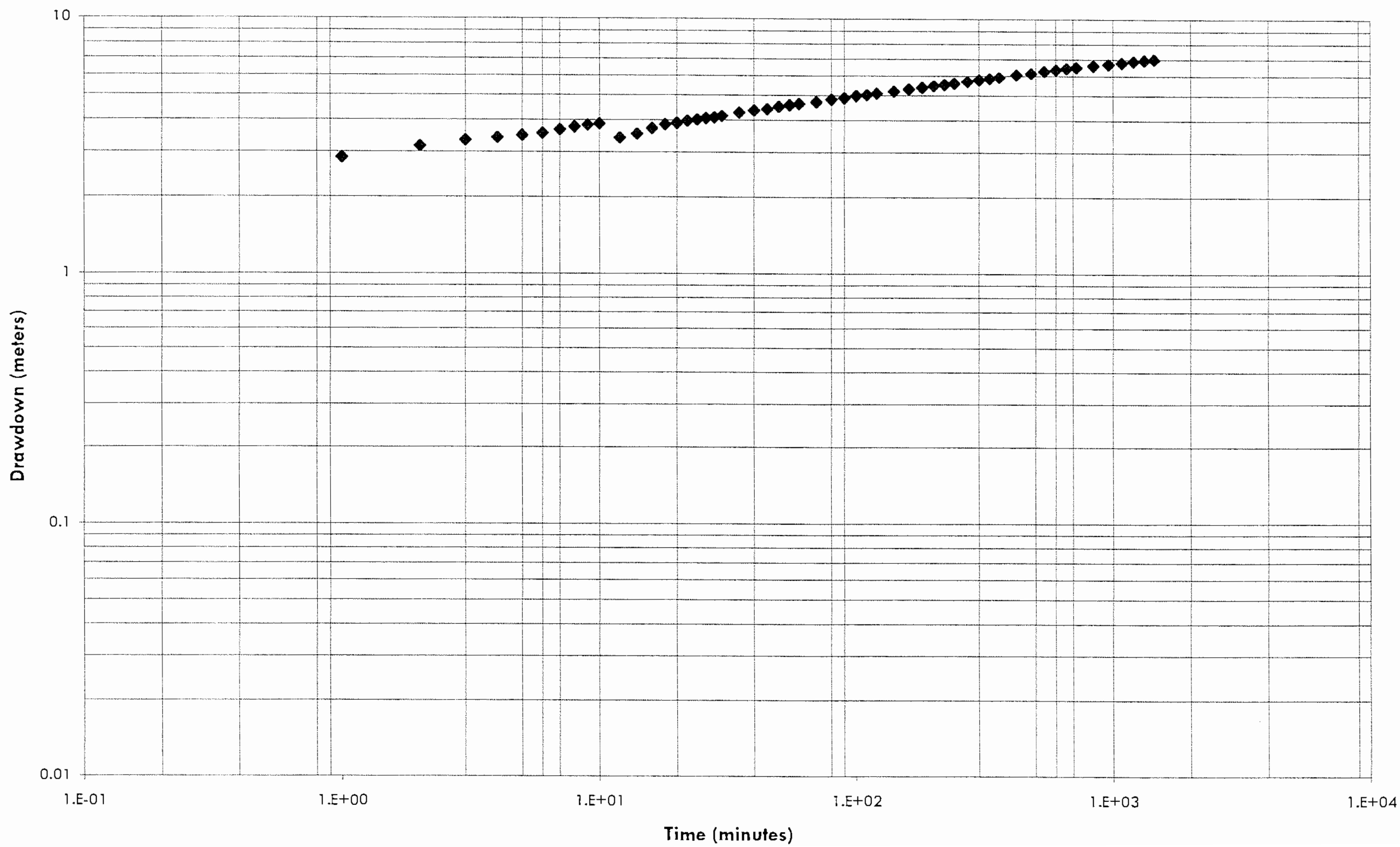
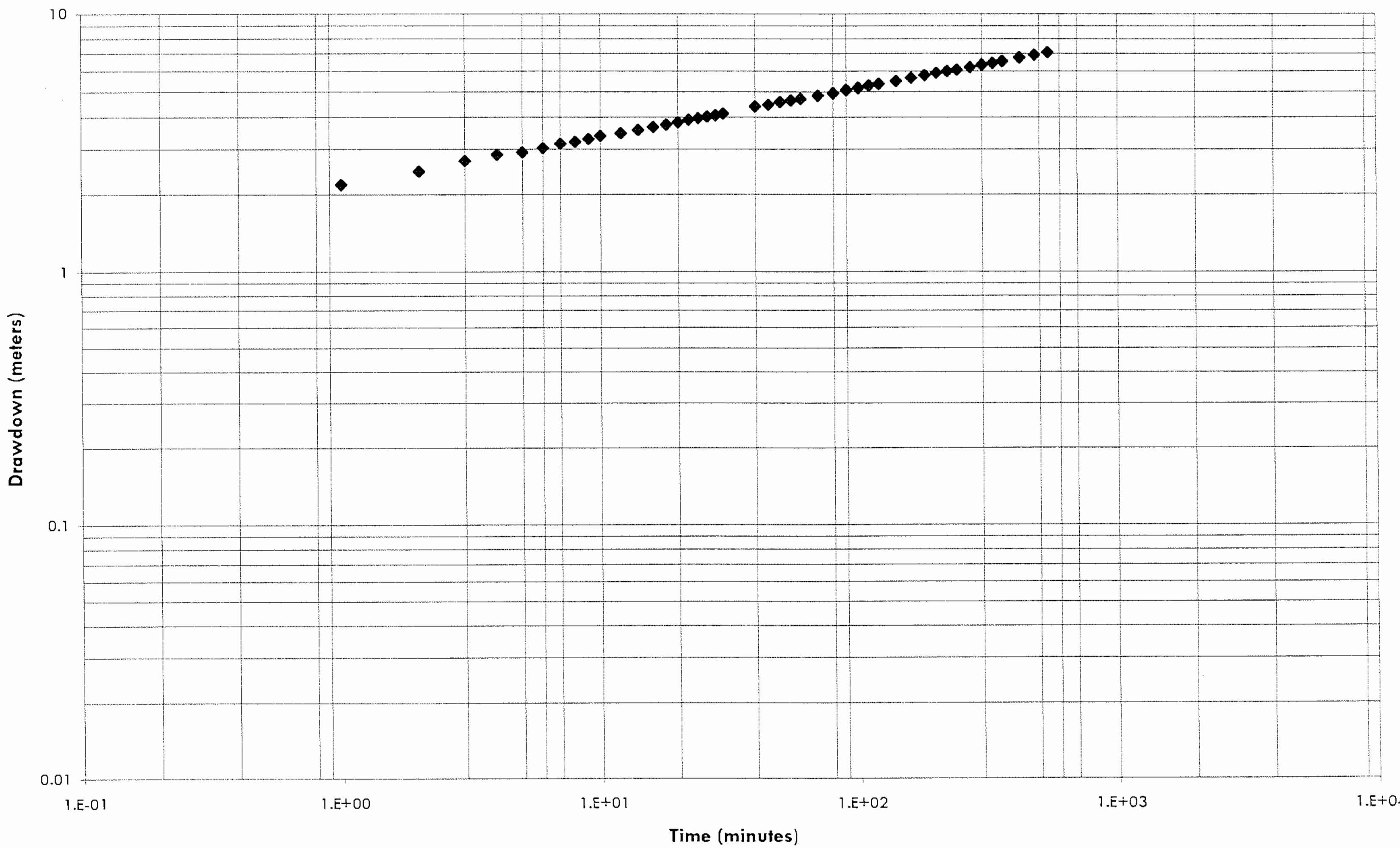


Figure B-10: Theis Curve-Matching Recovery Method



W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14	10:50 AM
End Pumping:	2005-11-15	3:00 PM
Initial Volume:	35964	x100 gal
Final Volume:	37304	x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	W-SV (feet, btc)	Totalizer readings, observations, odors, clarity, notes.
1	10:51 AM	-	-	
2	10:52 AM	53.40	-	Actually 200gpm
3	10:53 AM	53.70	-	
4	10:54 AM	52.60	-	~82gpm
5	10:55 AM	52.60	-	
6	10:56 AM	52.80	-	Sand Test: neglected due to disruption in well (rust particles, etc.)
7	10:57 AM	53.00	-	
8	10:58 AM	53.21	-	
9	10:59 AM	53.30	-	
10	11:00 AM	53.45	-	
12	11:02 AM	53.71	-	
14	11:04 AM	53.95	-	35977
16	11:06 AM	54.13	-	35979
18	11:08 AM	54.30	-	
20	11:10 AM	54.50	-	35981
22	11:12 AM	54.68	-	35983
24	11:14 AM	54.71	-	35985
26	11:16 AM	54.98	-	35987
28	11:18 AM	55.12	-	35989
30	11:20 AM	55.25	-	35990
35	11:25 AM	55.51	-	35994
40	11:30 AM	55.76	-	35998
45	11:35 AM	56.00	-	36002
50	11:40 AM	56.21	-	36006
55	11:45 AM	56.37	-	36009
60	11:50 AM	56.61	-	36014
70	12:00 AM	56.97	-	36022
80	12:10 PM	57.25	-	36032
90	12:20 AM	57.50	-	36040

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
100	12:30 PM	57.72	-	36048
110	12:40 AM	57.89	-	36055
120	12:50 PM	58.12	-	36062
140	1:10 PM	58.42	-	36078
160	1:30 PM	58.73	-	36094
180	1:50 PM	59.01	-	36111
200	2:10 PM	59.28	-	36127
220	2:30 PM	59.52	-	36144
240	2:50 PM	59.71	-	36158
270	3:20 PM	60.00	-	36182; Sand Test: 0 ppm
300	3:50 PM	60.24	-	36206
330	4:20 PM	60.49	-	36229
360	4:50 PM	60.71	-	36255
420	5:50 PM	61.10	-	36298
480	6:50 PM	61.50	-	36351
540	7:50 PM	61.85	-	36405
600	8:50 PM	62.10	-	36447
660	9:50 PM	62.36	-	36492
720	10:50 PM	62.60	-	36538
840	12:50 AM	62.96	-	36630
960	2:50 AM	63.30	-	36725
1080	4:50 AM	63.61	-	36819
1200	6:50 AM	63.88	-	36915
1320	8:50 AM	64.12	-	37021
1440	10:50 AM	64.32	-	37102
1590	1:20 PM	64.49	-	37233
1690	3:00 PM	64.65	-	37304; Sand Test: 0 ppm
1691	3:01 PM	59.61	-	
1692	3:02 PM	58.70	-	

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	W-SV (feet, btc)	Totalizer readings, observations, odors, clarity, notes.
1693	3:03 PM	58.15	-	
1694	3:04 PM	57.71	-	
1695	3:05 PM	57.39	-	
1696	3:06 PM	57.15	-	
1697	3:07 PM	57.00	-	
1698	3:08 PM	56.76	-	
1699	3:09 PM	56.58	-	
1700	3:10 PM	56.40	-	
1702	3:12 PM	56.15	-	
1704	3:14 PM	55.82	-	
1706	3:16 PM	55.56	-	
1708	3:18 PM	55.41	-	
1710	3:20 PM	55.24	-	
1712	3:22 PM	55.05	-	
1714	3:24 PM	54.85	-	
1716	3:26 PM	54.72	-	
1718	3:28 PM	54.58	-	
1720	3:30 PM	54.48	-	
1725	3:35 PM	54.18	-	
1730	3:40 PM	53.94	-	
1735	3:45 PM	53.70	-	
1740	3:50 PM	53.48	-	
1745	3:55 PM	53.32	-	
1750	4:00 PM	53.15	-	
1760	4:10 PM	52.81	-	
1770	4:20 PM	52.55	-	
1780	4:30 PM	52.28	-	
1790	4:40 PM	52.05	-	
1800	4:50 PM	51.84	-	

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1810	5:00 PM	51.66	-	
1830	5:20 PM	51.30	-	
1850	5:40 PM	51.00	-	
1870	6:00 PM	50.75	-	
1890	6:20 PM	50.50	-	
1910	6:40 PM	50.27	-	
1930	7:00 PM	50.07	-	
1960	7:30 PM	49.79	-	
1990	8:00 PM	49.52	-	
2020	8:30 PM	49.30	-	
2050	9:00 PM	49.10	-	
2110	10:00 PM	48.76	-	
2170	11:00 PM	48.47	-	
2230	12:00 AM	48.20	-	
2290	1:00 AM	47.92	-	

Water Sampling Notes

Sample at 12:00 PM (START)

Sample at 10:50 PM (MIDDLE)

Sample at 8:50 AM (END)

Figure B-11: Depth of Groundwater during W-LBC Pump Test @ 80gpm

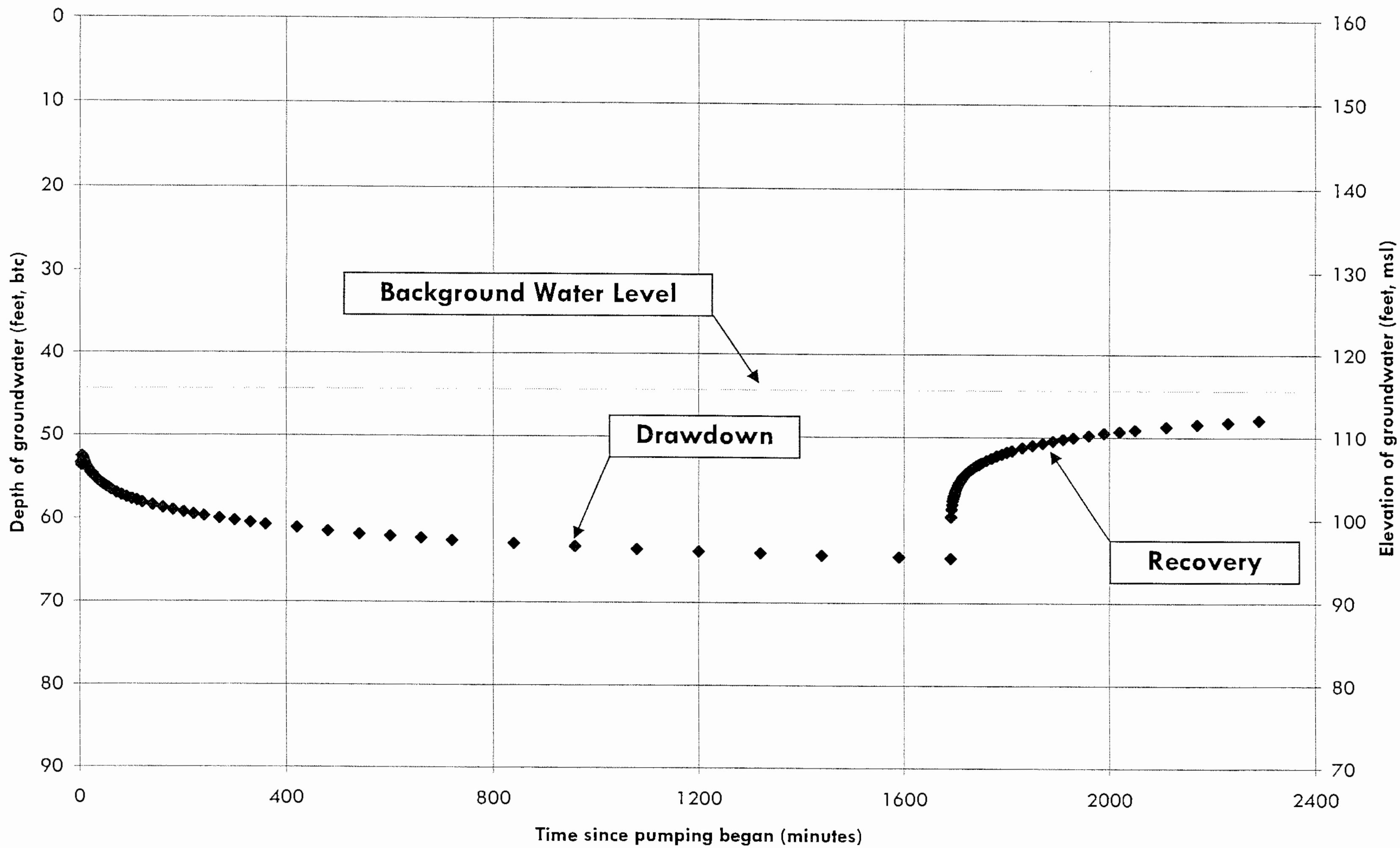
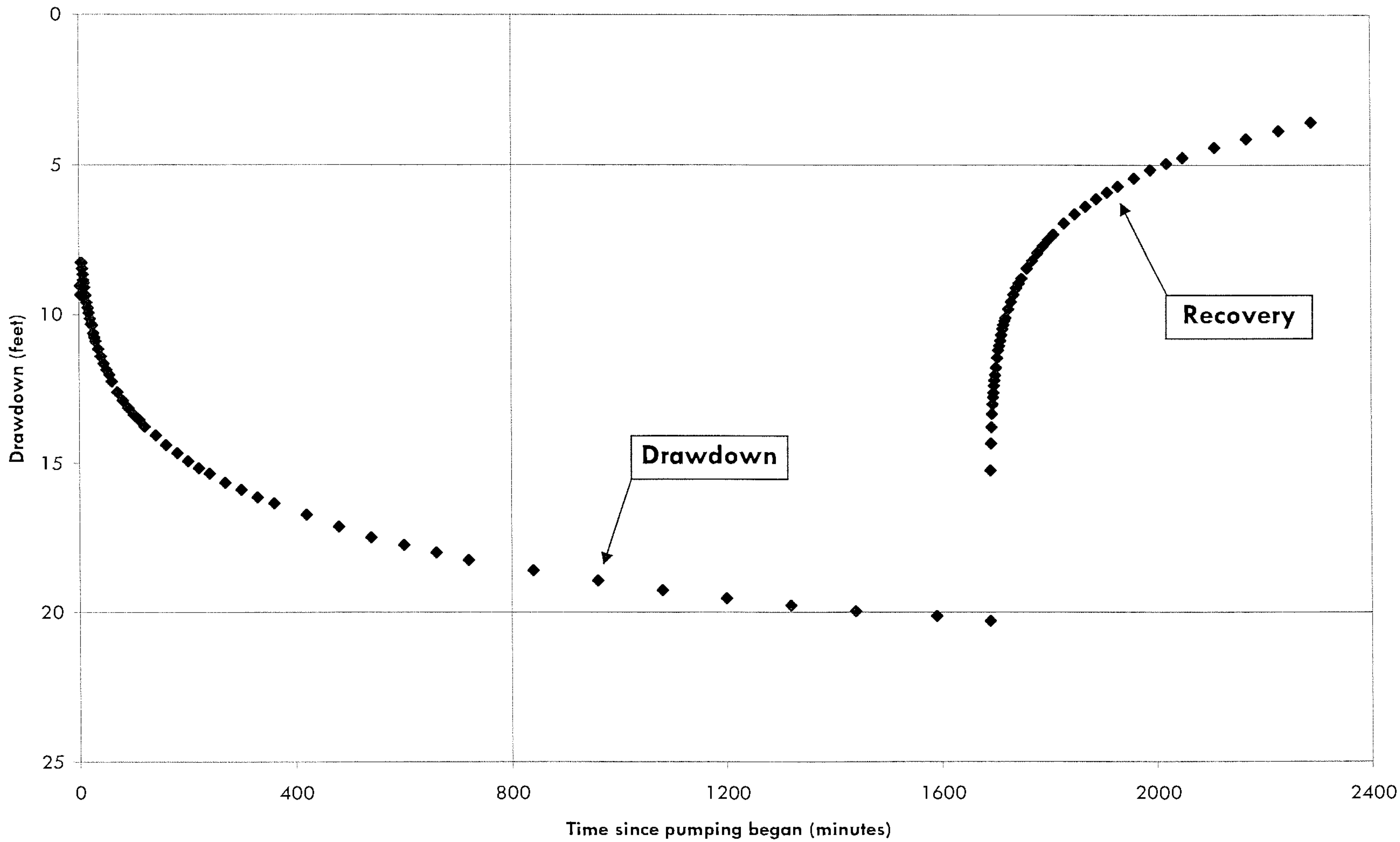


Figure B-12: Drawdown during W-LBC Pump Test @ 80gpm



W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	9:51 AM	-	47.88	Start 80gpm; 60psi back pressure
2	9:52 AM	-	49.89	
3	9:53 AM	-	51.45	
4	9:54 AM	-	52.07	
5	9:55 AM	-	52.85	
6	9:56 AM	-	54.12	
7	9:57 AM	-	54.54	
8	9:58 AM	-	55.00	
9	9:59 AM	-	55.49	
10	10:00 AM	-	55.87	
12	10:02 AM	-	56.57	
14	10:04 AM	-	57.11	40174
16	10:06 AM	-	57.73	40189
18	10:08 AM	-	58.63	40217
20	10:10 AM	-	59.08	40231; Sand Test: 0 ppm
22	10:12 AM	-	59.38	40242
24	10:14 AM	-	59.80	40258
26	10:16 AM	-	60.19	40275
28	10:18 AM	-	60.43	40290
30	10:20 AM	-	60.78	40306
35	10:25 AM	-	61.80	40358
40	10:30 AM	-	62.27	40380
45	10:35 AM	-	62.81	40424
50	10:40 AM	-	63.32	40468
55	10:45 AM	-	63.79	40507
60	10:50 AM	-	64.21	40546
70	11:00 AM	-	64.92	40628
80	11:10 AM	-	65.60	40718

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
90	11:20 AM	-	66.14	40803
100	11:30 AM	-	-	
110	11:40 AM	-	67.05	40967
120	11:50 AM	-	67.47	41052
140	12:10 PM	-	68.15	41218
160	12:30 PM	-	68.55	41385
180	12:50 PM	-	69.31	41851
200	1:10 PM	-	69.73	41728
220	1:30 PM	-	70.14	41879
240	1:50 PM	-	70.52	42042
270	2:20 PM	-	71.00	42288
300	2:50 PM	-	71.47	42537
336	3:26 PM	-	71.92	42842
360	3:50 PM	-	72.20	43037; End 80gpm, Start 60gpm; 82psi back pressure
361	3:51 PM	-	70.62	43042
362	3:52 PM	-	70.50	
363	3:53 PM	-	69.87	
364	3:54 PM	-	69.73	43057
365	3:55 PM	-	69.58	43064
366	3:56 PM	-	69.39	43070
367	3:57 PM	-	69.18	43076
368	3:58 PM	-	69.10	43082
369	3:59 PM	-	68.93	43088
370	4:00 PM	-	68.85	43094
372	4:02 PM	-	68.68	43106
374	4:04 PM	-	68.47	43121
376	4:06 PM	-	68.35	43133
378	4:08 PM	-	68.24	43145

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
380	4:10 PM	-	68.16	43158
382	4:12 PM	-	68.08	43169
384	4:14 PM	-	68.01	43179
386	4:16 PM	-	67.93	43192
388	4:18 PM	-	67.87	43203
390	4:20 PM	-	67.82	43215
395	4:25 PM	-	67.70	43248
400	4:30 PM	-	67.60	43279
405	4:35 PM	-	67.55	43308
410	4:40 PM	-	67.46	43338
415	4:45 PM	-	67.40	43368
420	4:50 PM	-	67.34	43402
430	5:00 PM	-	67.26	43461
440	5:10 PM	-	67.21	43526
450	5:20 PM	-	67.19	43584
460	5:30 PM	-	67.17	43672
470	5:40 PM	-	67.15	43710
480	5:50 PM	-	67.17	43764
500	6:10 PM	-	67.17	43892
520	6:30 PM	-	67.19	44010; Sand Test: 0 ppm
540	6:50 PM	-	67.23	44138; End 60gpm
541	6:51 PM	-	62.62	
542	6:52 PM	-	61.35	
543	6:53 PM	-	60.16	
544	6:54 PM	-	59.16	
545	6:55 PM	-	58.31	
546	6:56 PM	-	57.87	
547	6:57 PM	-	57.32	

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21	9:50 AM
End Pumping:	2005-11-21	6:50 PM
Initial Volume (80gpm):	40059	x100 gal
Final Volume (80 gpm):	43037	x100 gal
Initial Volume (60gpm):	43038	x100 gal
Final Volume (60 gpm):	44138	x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
548	6:58 PM	-	56.82	
549	6:59 PM	-	56.30	
550	7:00 PM	-	55.88	
552	7:02 PM	-	55.27	
554	7:04 PM	-	54.67	
556	7:06 PM	-	54.20	
558	7:08 PM	-	53.74	
560	7:10 PM	-	53.36	
562	7:12 PM	-	52.80	
564	7:14 PM	-	52.57	
566	7:16 PM	-	52.31	
568	7:18 PM	-	52.05	
570	7:20 PM	-	51.80	
575	7:25 PM	-	51.27	
580	7:30 PM	-	50.80	
585	7:35 PM	-	50.27	
590	7:40 PM	-	49.92	
595	7:45 PM	-	49.60	
600	7:50 PM	-	49.25	
610	8:00 PM	-	48.70	
620	8:10 PM	-	48.15	
630	8:20 PM	-	47.75	
640	8:30 PM	-	47.37	
650	8:40 PM	-	47.01	
660	8:50 PM	-	46.71	
680	9:10 PM	-	46.16	
700	9:30 PM	-	45.71	
720	9:50 PM	-	45.34	

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
740	10:10 PM	-	44.98	
760	10:30 PM	-	44.67	
780	10:50 PM	-	44.38	

Water Sampling Notes

Sample at 10:50 AM (START)

Sample at 4:20 PM (MIDDLE)

Sample at 6:30 PM (END)

Figure B-13: Depth of Groundwater during W-SV Step-Drawdown Test

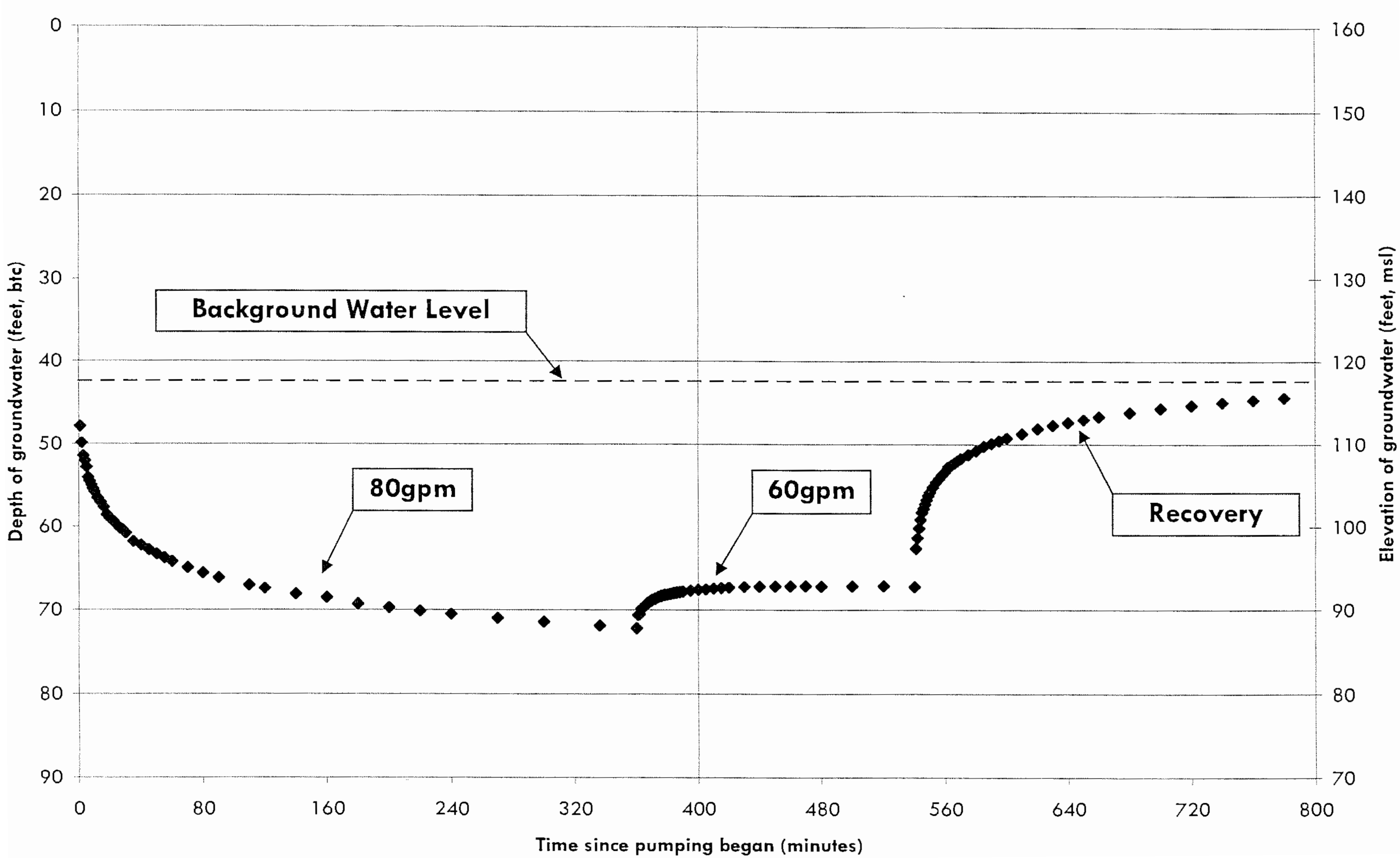
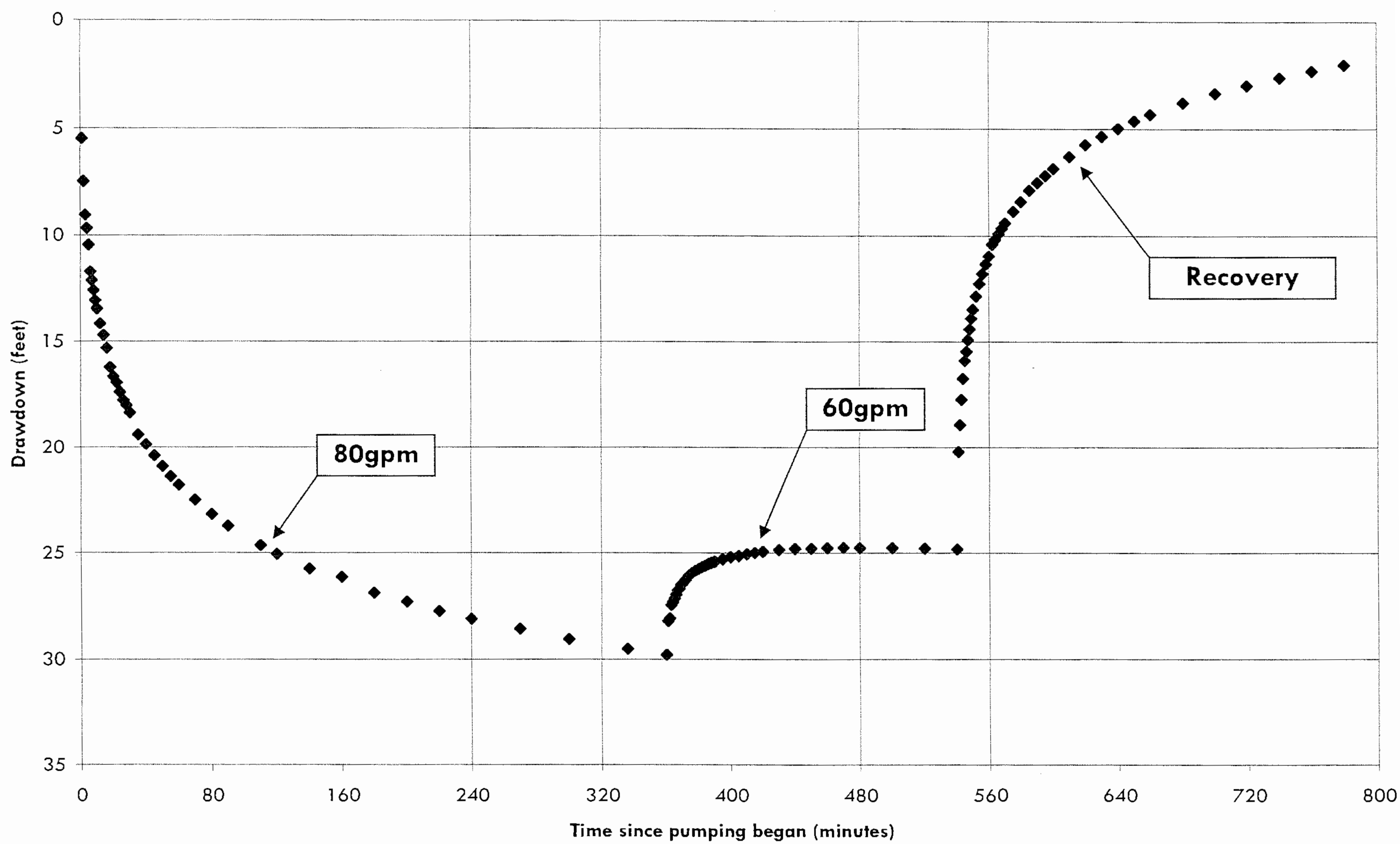


Figure B-14: Drawdown during W-SV Step-Drawdown Test



McCampbell Analytical, Inc.

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INVOICE for ANALYTICAL SERVICES

COPY

Invoice N°: 0507082

Project Name: #6486.2.005.01; Sutter
PO Number: N/A

Date Sampled: 07/05/05
Date Received: 07/07/05

INV DATE: *July 15, 2005*
Print DATE: *July 15, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
Hardness	5 days	Water	3	1	$28.00	$84.00
ICP-MS Metals (TTLC)	5 days	Water	3	1	$53.00	$159.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			3	1	$7.00	$21.00
					SubTotal:	$486.00

Invoice Total: $486.00

If paid by**08/13/05** Prompt Pay Invoice Total = $437.40

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 1.5% interest per month will be charged. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled:	07/05/05
		Date Received:	07/07/05
	Client Contact: Jeff Wisniewski	Date Reported:	07/15/05
	Client P.O.:	Date Completed:	07/15/05

WorkOrder: 0507082

July 15, 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05 Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/09/05-07/14/05

Metals*

Extraction method: E200.8 Analytical methods: E200.8 Work Order: 0507082

Lab ID	Client ID	Matrix	Extraction	Arsenic	Iron	Manganese	Silicon	DF	% SS
001B	Start	W	TTLC	9.9	320	1500	34,000	1	109
002B	Middle	W	TTLC	9.5	270	1500	33,000	1	104
003B	End	W	TTLC	9.4	270	1500	33,000	1	112

Reporting Limit for DF =1; ND means not detected at or above the reporting limit							
	W	TTLC	0.5	20	20	20	μg/L
	S	TTLC	NA	NA	NA	NA	NA

*water samples are reported in μg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
		Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/08/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0507082

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0507082-001A	Start	W	DISS.	110	18.5	N/A
0507082-002A	Middle	W	DISS.	110	18.5	N/A
0507082-003A	End	W	DISS.	110	18.5	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05 Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/07/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B Analytical methods: SM2320B Work Order: 0507082

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001A	Start	W	155	ND	155	ND	1
002A	Middle	W	151	ND	151	ND	1
003A	End	W	153	ND	153	ND	1
Reporting Limit for DF =1; ND means not detected at or above the reporting limit		W	1	1	1	1	mg CaCO3/L
		S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
		Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/07/05

pH*

Analytical Method: SM4500H+B

Work Order: 0507082

Lab ID	Client ID	Matrix	pH
0507082-001A	Start	W	7.22 @ 19.9°C
0507082-002A	Middle	W	7.23 @ 18.9°C
0507082-003A	End	W	7.25 @ 19.5°C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05 Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/07/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0507082

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0507082-001A	Start	W	334 @ 25.0°C	1
0507082-002A	Middle	W	327 @ 25.0°C	1
0507082-003A	End	W	332 @ 25.0°C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 µmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(µmhos/cm @ 25°C) per SSSA volume 5 part 3.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
		Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/08/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0507082

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0507082-001A	Start	W	240	1
0507082-002A	Middle	W	230	1
0507082-003A	End	W	228	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L	
	S	NA	

* water samples reported in mg/L.

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0507082

EPA Method: E200.8			Extraction: E200.8			BatchID: 16945			Spiked Sample ID: 0507048-001B	
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Arsenic	3.7	10	94.3	98.3	3.01	102	104	1.95	75 - 125	85 - 115
Iron	5600	100	NR	NR	NR	106	103	2.88	75 - 125	85 - 115
Manganese	1600	100	NR	NR	NR	103	104	0.968	75 - 125	85 - 115
%SS:	106	750	102	106	4.44	99	102	2.24	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001B	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-001B	7/05/05 11:00 AM	7/07/05	7/14/05 6:57 PM
0507082-002B	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM	0507082-002B	7/05/05 10:00 AM	7/07/05	7/14/05 7:03 PM
0507082-003B	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM	0507082-003B	7/05/05 9:00 AM	7/07/05	7/14/05 7:10 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0507082

EPA Method: E200.8 | **Extraction: E200.8** | **BatchID: 16945** | **Spiked Sample ID: N/A**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	N/A	10	N/A	N/A	N/A	103	109	5.95	N/A	85 - 115
%SS:	N/A	750	N/A	N/A	N/A	92	87.2	5.50	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001B	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-001B	7/05/05 11:00 AM	7/07/05	7/14/05 6:57 PM
0507082-002B	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM	0507082-002B	7/05/05 10:00 AM	7/07/05	7/14/05 7:03 PM
0507082-003B	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM	0507082-003B	7/05/05 9:00 AM	7/07/05	7/14/05 7:10 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water　　QC Matrix: Water　　WorkOrder: 0507082

EPA Method: SM2340B			Extraction: E200.8			BatchID: 16945		Spiked Sample ID: 0507048-001B		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	170	3.3	NR	NR	NR	90.9	93.9	3.28	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/08/05 1:36 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/08/05 1:51 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/08/05 2:07 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644　　QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2320B Units: mg CaCO3/L BatchID: 17039

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	155	1	154	1	0.647	<20
0507082-002A	151	1	151	1	0	<20
0507082-003A	153	1	154	1	0.651	<20

BATCH 17039 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 7:34 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 7:44 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 7:55 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0507082

Method Name: SM4500H+B Units: ±, pH units @ °C BatchID: 17006

SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0507082-001A	7.22 @ 19.9°C	1	7.21 @ 19.9°C	1	0.01	±0.02
0507082-002A	7.23 @ 18.9°C	1	7.22 @ 18.8°C	1	0.01	±0.02
0507082-003A	7.25 @ 19.5°C	1	7.25 @ 19.4°C	1	0	±0.02

BATCH 17006 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 8:04 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 8:14 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 8:24 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2510B Units: µmhos/cm @ 25°C BatchID: 17037

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	334 @ 25.0°C	1	333 @ 25.0°C	1	0.3	<2
0507082-002A	327 @ 25.0°C	1	327 @ 25.0°C	1	0	<2
0507082-003A	332 @ 25.0°C	1	333 @ 25.0°C	1	0.301	<2

BATCH 17037 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 8:58 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 9:08 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 9:18 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2540C Units: mg/L BatchID: 17038

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	240	1	260	10	8	<10
0507082-002A	230	1	240	10	4.26	<10
0507082-003A	228	1	240	10	5.13	<10

BATCH 17038 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/08/05 2:38 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/08/05 2:48 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/08/05 2:58 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

engm 0507082

McCAMPBELL ANALYTICAL, INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Jeff Wisniewski. Bill To:

Company: ENGEO Inc.

690 Walnut Ave. Suite220

Vallejo, CA 94592 E-Mail: jwisniewski@engeo.com

Tele: (707) 562-0030 Fax: (707) 562-0032

Project #: 6486.2.005.01 Project Name: SUTTER

Project Location: Santa Rosa, CA

Sampler Signature: Jeff B. W

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
② START	LBC	7/5/05	11 AM	3		X							(1)	
③ MIDDLE	LBC	7/5/05	10 PM	3		X							(1)	
④ END	LBC	7/6/05	9 AM	3		X							(1)	

Analysis Request

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~BTEX only (EPA 602/8020)~~ pH	~~(struck)~~ Total silica	Total Petroleum Oil & Grease (5520/1664 (EF/BF)	~~Total Petroleum Hydrocarbons (418.1)~~ electrical conductivity	EPA 601/8010/8021 (Halocarbons)	~~EPA 608 / 8081 (Cl Pesticides)~~ manganese	~~EPA 608 / 8082 PCB's ONLY~~ iron	~~EPA 8140 / 8141 (NP Pesticides)~~ arsenic	EPA 8150 / 8151 (Acidic Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525 / 625 / 8270 (SVOCs)	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020)	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Other: Total hardness as $CaCO_3$	Other: TDS (total dissolved solids)	Other: Total alkalinity as $CaCO_3$	Comments: Filter Samples for Metals analysis: Yes / No
START		X	X		X		X	X	X								X	X	X	
MIDDLE		X	X		X		X	X	X								X	X	X	
END		X	X		X		X	X	X								X	X	X	

Relinquished By:	Date:	Time:	Received By:
Jeff B. W	7/7/05	4:10P	[signature]
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB ____

PRESERVATION VOAS | O&G | METALS ✓ pH<2 | OTHER

COMMENTS:

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0507082 ClientID: ENGM

Report to:
Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

TEL: (707) 562-0030
FAX: (707) 562-0032
ProjectNo: #6486.2.005.01; Sutter
PO:

Bill to:
Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Requested TAT: 5 days

Date Received: 07/07/2005
Date Printed: 07/07/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
					Requested Tests (See legend below)														
0507082-001	Start	Water	7/5/05 11:00:00 AM	☐	A	A	B	A	A	A	A								
0507082-002	Middle	Water	7/5/05 10:00:00 AM	☐	A	A	B	A	A	A	A								
0507082-003	End	Water	7/5/05 9:00:00 AM	☐	A	A	B	A	A	A	A								

Test Legend:

1	Alka(spe)_W	2	HARDMS_DISS	3	METALSMS_W	4	PH_W	5	PRDISSOLVED
6	SC_W	7	TDS_W	8		9		10	
11		12		13		14		15	

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
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Website: www.mccampbell.com E-mail: main@mccampbell.com

INVOICE for ANALYTICAL SERVICES

COPY

Invoice N°: 0507082 A

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 7/5/05
Date Received: 08/31/05

INV DATE: *September 07, 2005*
Print DATE: *August 31, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
CAM 17 Metals (TTLC)	5 days	Water	3	1	$123.00	$369.00
					SubTotal:	$369.00

Invoice Total: $369.00

If paid by **10/07/05** Prompt Pay Invoice Total = $332.10

RECEIVED
SEP 06 2005

PROJECT # ____________
APPROVED BY: ____________
REASON # ____________
ACCOUNT # ____________
VOUCHER # ____________

* ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 1.5% interest per month will be charged. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled:	07/05/05
		Date Received:	07/07/05
	Client Contact: Jeff Wisniewski	Date Reported:	07/15/05
	Client P.O.:	Date Completed:	08/31/05

WorkOrder: 0507082

August 31, 2005

Dear Jeff:

Enclosed are:

1). the results of **3** analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05 Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/09/05

CAM / CCR 17 Metals*

Lab ID	0507082-001A	0507082-002A	0507082-003A		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	Start	Middle	End			
Matrix	W	W	W		S	W
Extraction Type	TTLC	TTLC	TTLC		mg/kg	µg/L

ICP-MS Metals, Concentration*

Analytical Method: E200.8 Extraction Method: E200.8 Work Order: 0507082

Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	9.9	9.5	9.4		NA	0.5
Barium	130	130	130		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	1.3	1.2	0.67		NA	0.5
Lead	6.4	4.8	3.3		NA	0.5
Mercury	ND	ND	ND		NA	0.05
Molybdenum	1.1	1.0	1.0		NA	0.5
Nickel	ND	ND	0.53		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.5
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.1	1.2	1.2		NA	0.5
Zinc	41	32	30		NA	5.0
%SS:	109	104	112			
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0507082

EPA Method: E200.8 Extraction: E200.8 BatchID: 16945 Spiked Sample ID: 0507048-001B

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	1.4	10	83	84.6	1.63	105	106	1.14	75 - 125	85 - 115
Arsenic	3.7	10	94.3	98.3	3.01	102	104	1.95	75 - 125	85 - 115
Barium	93	100	98.4	106	3.63	102	104	1.65	75 - 125	85 - 115
Beryllium	ND	10	82.2	81	1.47	108	109	0.277	75 - 125	85 - 115
Cadmium	1.3	10	95.2	97.3	1.92	100	102	1.59	75 - 125	85 - 115
Chromium	3300	10	NR	NR	NR	99.3	101	1.40	75 - 125	85 - 115
Cobalt	10	10	90	99.6	4.85	98.7	99.6	0.908	75 - 125	85 - 115
Copper	13	10	90.8	99.7	4.03	99.5	100	0.900	75 - 125	85 - 115
Lead	16	10	96.8	107	3.99	101	103	1.47	75 - 125	85 - 115
Mercury	0.11	0.50	102	104	1.60	104	106	1.90	75 - 125	85 - 115
Molybdenum	5.1	10	87.6	91.5	2.78	96.5	98.6	2.15	75 - 125	85 - 115
Nickel	54	10	NR	NR	NR	102	103	0.973	75 - 125	85 - 115
Selenium	1.2	10	99.1	100	0.983	101	100	1.29	75 - 125	85 - 115
Silver	0.72	10	91.1	91.8	0.710	105	105	0	75 - 125	85 - 115
Thallium	ND	10	93	95.4	2.55	102	103	0.881	75 - 125	85 - 115
Vanadium	11	10	97.5	111	6.32	99.1	100	1.00	75 - 125	85 - 115
Zinc	49	100	95.2	94.2	0.693	101	103	1.96	75 - 125	85 - 115
%SS:	106	750	102	106	4.44	99	102	2.24	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

INVOICE for ANALYTICAL SERVICES

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 11/14/05
Date Received: 11/16/05

RECEIVED
DEC 12 2005

Invoice N°: 0511324

INV DATE: *November 23, 2005*
Print DATE: *November 23, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
CAM 17 Metals + Misc. Elements (TTLC)	5 days	Water	3	1	$147.00	$441.00
Hardness	5 days	Water	3	1	$28.00	$84.00
Metals (Dissolved)	5 days	Water	1	1	$17.00	$17.00
Metals (Dissolved)	5 days	Water	2	1	$12.00	$24.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			3	1	$7.00	$21.00
					SubTotal:	$809.00

Invoice Total: $809.00

If paid by**12/23/05** Prompt Pay Invoice Total = $728.10

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 10% interest will be charged annually. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05
		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Reported: 11/23/05
	Client P.O.:	Date Completed: 11/23/05

WorkOrder: 0511324

November 23, 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B   Analytical methods: SM2320B   Work Order: 0511324

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001B	@ Start	W	160	ND	160	ND	1
002B	@ Middle	W	158	ND	158	ND	1
003B	@ End	W	156	ND	156	ND	1

Reporting Limit for DF =1; ND means not detected at or above the reporting limit						
	W	1.0	1.0	1.0	1.0	mg CaCO3/L
	S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

pH*

Analytical Method: SM4500H+B

Work Order: 0511324

Lab ID	Client ID	Matrix	pH
0511324-001A	@ Start	W	7.36 @ 21.6 °C
0511324-002A	@ Middle	W	7.37 @ 20.9 °C
0511324-003A	@ End	W	7.38 @ 21.5 °C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0511324

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0511324-001A	@ Start	W	381 @ 25.0 °C	1
0511324-002A	@ Middle	W	372 @ 25.0 °C	1
0511324-003A	@ End	W	376 @ 25.0 °C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 µmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(µmhos/cm @ 25°C) per SSSA volume 5 part 3.

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	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/18/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0511324

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0511324-001A	@ Start	W	224	1
0511324-002A	@ Middle	W	232	1
0511324-003A	@ End	W	218	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L
	S	NA

* water samples reported in mg/L.

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	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/17/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0511324

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0511324-001C	@ Start	W	DISS.	130	23	N/A
0511324-002C	@ Middle	W	DISS.	120	23	N/A
0511324-003C	@ End	W	DISS.	120	23	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/18/05

Silica as SiO_2*

Extraction method: E200.7/E200.8 Analytical methods: E200.7 Work Order: 0511324

Lab ID	Client ID	Matrix	Extraction	Silica as SiO2	DF	% SS
0511324-001C	@ Start	W	DISS.	70,000	1	N/A
0511324-002C	@ Middle	W	DISS.	74,000	1	N/A
0511324-003C	@ End	W	DISS.	72,000	1	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	50	µg/L
	S	TTLC	NA	mg/kg

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

\# means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

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ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05
690 Walnut Avenue, Suite 220		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
Mare Island, CA 94592	Client P.O.:	Date Analyzed: 11/17/05-11/22/05

CAM / CCR 17 Metals + Misc. Elements*

ICP-MS Metals, Concentration*

Analytical Method: E200.8 Extraction Method: E200.8 Work Order: 0511324

Lab ID	0511324-001C	0511324-002C	0511324-003C		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	@ Start	@ Middle	@ End			
Matrix	W	W	W		S	W
Extraction Type	DISS.	DISS.	DISS.		mg/kg	µg/L
Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	7.1	8.3	8.8		NA	0.5
Barium	100	110	110		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	0.83	0.57	0.72		NA	0.5
Iron	72	170	200		NA	20
Lead	ND	0.59	0.69		NA	0.5
Manganese	1300	1300	1300		NA	20
Mercury	0.073	0.064	0.051		NA	0.012
Molybdenum	1.0	0.99	1.0		NA	0.5
Nickel	1.0	0.62	1.7		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.19
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.0	1.2	1.3		NA	0.5
Zinc	42	46	39		NA	5.0
%SS:	N/A	N/A	N/A			
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

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QC SUMMARY REPORT FOR E200.7

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511324

EPA Method: E200.7		Extraction: E200.7/E200.8			BatchID: 19055		Spiked Sample ID: 0511324-001C			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	33,000	100	NR	NR	NR	87.1	95.7	9.41	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19055 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/18/05 11:35 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/18/05 11:36 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/18/05 11:38 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content

DHS Certification No. 1644

SH QA/QC Officer

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511324

EPA Method: E200.8		Extraction: E200.8			BatchID: 19046		Spiked Sample ID: 0511319-003A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	ND	10	108	108	0	102	101	0.889	75 - 125	85 - 115
Arsenic	0.73	10	105	102	2.62	98.5	103	4.81	75 - 125	85 - 115
Barium	ND	100	111	111	0	98.8	99.2	0.434	75 - 125	85 - 115
Beryllium	ND	10	92.8	92.5	0.313	91.8	92.7	0.997	75 - 125	85 - 115
Cadmium	ND	10	103	103	0	99.1	99.7	0.654	75 - 125	85 - 115
Chromium	ND	10	111	107	3.40	96.8	101	4.30	75 - 125	85 - 115
Cobalt	ND	10	102	103	0.195	97.6	98.9	1.34	75 - 125	85 - 115
Copper	8.9	10	104	96.9	3.28	107	113	5.64	75 - 125	85 - 115
Iron	260	100	NR	NR	NR	113	112	0.981	75 - 125	85 - 115
Lead	0.5	10	102	102	0	98.7	98.5	0.213	75 - 125	85 - 115
Manganese	21	100	116	115	0.657	103	104	1.07	75 - 125	85 - 115
Mercury	0.018	0.50	106	107	0.619	105	106	0.398	75 - 125	85 - 115
Molybdenum	ND	10	103	103	0	96.5	97.2	0.723	75 - 125	85 - 115
Nickel	ND	10	106	106	0	98.7	102	2.87	75 - 125	85 - 115
Selenium	ND	10	102	101	1.38	97.9	98.2	0.337	75 - 125	85 - 115
Silver	ND	10	103	103	0	93.4	94.8	1.38	75 - 125	85 - 115
Thallium	ND	10	96.7	97.4	0.659	97.4	97	0.412	75 - 125	85 - 115
Vanadium	ND	10	112	109	2.71	99	103	3.73	75 - 125	85 - 115
Zinc	ND	100	103	104	0.963	99.3	99.7	0.432	75 - 125	85 - 115
%SS:	111	750	111	111	0	96	96	0	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons. a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR E200.8

BATCH 19046 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/17/05 1:26 AM	0511324-001C	11/14/05 11:00 AM	11/16/05	11/22/05 11:41 AM
0511324-002C	11/14/05 10:00 PM	11/16/05	11/17/05 2:05 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/22/05 11:49 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/17/05 2:18 AM	0511324-003C	11/15/05 9:00 AM	11/16/05	11/22/05 11:58 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0511324

EPA Method: SM2340B	Extraction: E200.8			BatchID: 19046			Spiked Sample ID: 0511319-003A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	11	2.91	NR	NR	NR	99.7	103	3.39	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19046 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/17/05 1:58 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/17/05 2:12 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/17/05 2:25 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity Matrix: W WorkOrder: 0511324

Method Name: SM2320B Units: mg CaCO3/L BatchID: 18979

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001B	160	1	160	1	0	<20
0511324-002B	158	1	155	1	1.92	<20
0511324-003B	156	1	155	1	0.643	<20

BATCH 18979 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001B	11/14/05 11:00 AM	11/16/05	11/16/05 5:56 PM	0511324-002B	11/14/05 10:00 PM	11/16/05	11/16/05 6:05 PM
0511324-003B	11/15/05 9:00 AM	11/16/05	11/16/05 6:12 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0511324

Method Name: SM4500H+B Units: ±, pH units @ °C BatchID: 18989

SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0511324-001A	7.36 @ 21.6 °C	1	7.35 @ 21.6 °C	1	0.01	±0.02
0511324-002A	7.37 @ 20.9 °C	1	7.36 @ 20.9 °C	1	0.01	±0.02
0511324-003A	7.38 @ 21.5 °C	1	7.39 @ 21.5 °C	1	0.01	±0.02

BATCH 18989 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/16/05 7:40 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/16/05 7:50 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/16/05 8:00 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0511324

Method Name: SM2510B Units: µmhos/cm @ 25°C BatchID: 19008

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001A	381 @ 25.0 °C	1	381 @ 25.0 °C	1	0	<2
0511324-002A	372 @ 25.0 °C	1	372 @ 25.0 °C	1	0	<2
0511324-003A	376 @ 25.0 °C	1	376 @ 25.0 °C	1	0	<2

BATCH 19008 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/16/05 7:10 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/16/05 7:20 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/16/05 7:30 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0511324

Method Name: SM2540C Units: mg/L BatchID: 19034

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001A	224	1	240	10	6.9	<10
0511324-002A	232	1	240	10	3.39	<10
0511324-003A	218	1	220	10	0.913	<10

BATCH 19034 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/18/05 2:58 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/18/05 3:08 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/18/05 3:18 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

engm 051132A

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CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: JEFF WISNIEWSKI Bill To: JEFF WISNIEWSKI
Company: ENGEO INC
690 WALNUT AVE # 220
VALLEJO, CA 94592 E-Mail:
Tele: () 707-562-0030 Fax: () 707-562-0032
Project #: 6486.2.005.01 Project Name: SUTTER
Project Location: SANTA ROSA, CALIF.
Sampler Signature:

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
@ START	W-LBC	11/14	11AM	4		X								
@ MIDDLE	↓	11/14	10PM	4		X								
@ END	↓	11/15	9AM	4		X								

Analysis Request:

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~TPH as Diesel~~ (8015) DH	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	~~EPA 601 / 8010~~ TOTAL SILICA	~~BTEX ONLY (EPA 602 / 8020)~~ EC	~~EPA 608 / 8080~~ MANGANESE	EPA 608 / 8080 PCB's ONLY IRON	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI
@ START		X			X	X	X	X				X			
@ MIDDLE		X			X	X	X	X				↓			
@ END		X			X	X	X	X				↓			

SAMPLE ID	Other: TOTAL HARDNESS	Other: TDS	Other: TOTAL ALKALINITY	Comments
@ START	X	X	X	filtered per J.W.
@ MIDDLE	↓	↓	↓	
@ END	↓	↓	↓	

Relinquished By:	Date:	Time:	Received By:
	11/16	3PM	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ____
GOOD CONDITION ✓
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____

PRESERVATION	VOAS	O&G	METALS	OTHER

APPROPRIATE CONTAINERS ✓
PERSERVED IN LAB ____

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0511324 ClientID: ENGM EDF: NO

Report to:
Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

TEL: (707) 562-0030
FAX: (707) 562-0032
ProjectNo: #6486.2.005.01; Sutter
PO:

Bill to:
Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Requested TAT: 5 days

Date Received: 11/16/2005
Date Printed: 11/16/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0511324-001	@ Start	Water	11/14/05 11:00:00	☐	B	C	C	C	A	C	A	A				
0511324-002	@ Middle	Water	11/14/05 10:00:00	☐	B	C	C	C	A	C	A	A				
0511324-003	@ End	Water	11/15/05 9:00:00	☐	B	C	C	C	A	C	A	A				

Test Legend:

1	Alka(spe)_W	2	CAMMET(D)MS_W	3	HARDMS_DISS	4	METALS_DISS	5	PH_W
6	PRDISSOLVED	7	SC_W	8	TDS_W	9		10	
11		12							

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.

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INVOICE for ANALYTICAL SERVICES

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 11/21/05
Date Received: 11/22/05

RECEIVED
DEC 0 2 2005

Invoice N°: 0511426

INV DATE: ***November 30, 2005***
Print DATE: *November 30, 2005*

Report To: Jeff Wisnienski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
CAM 17 Metals + Misc. Elements (TTLC)	5 days	Water	3	1	$123.00	$369.00
Hardness	5 days	Water	3	1	$28.00	$84.00
Metals (Dissolved)	5 days	Water	3	1	$41.00	$123.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			6	1	$7.00	$42.00
					SubTotal:	$840.00

Invoice Total: $840.00

If paid by **12/29/05** Prompt Pay Invoice Total = $756.00

PROJECT # ______
APPROVED BY: ______
REASON # ______
ACCOUNT # ______
VOUCHER # ______

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 10% interest will be charged annually. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Reported: 11/30/05
	Client P.O.:	Date Completed: 11/30/05

WorkOrder: 0511426

November 30, 2005

RECEIVED
DEC 02 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Marc Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05
		Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/30/05

Silica, Si02*

Extraction method: E200.7/E200.8 Analytical methods: E200.7 Work Order: 0511426

Lab ID	Client ID	Matrix	Extraction	Silica	DF	% SS
0511426-001D	W-SV @ START	W	DISS.	73,000	1	N/A
0511426-002D	W-SV @ MIDDLE	W	DISS.	69,000	1	N/A
0511426-003D	W-SV @ END	W	DISS.	72,000	1	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	50	μg/L
	S	TTLC	NA	mg/kg

*water samples are reported in μg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/28/05

CAM / CCR 17 Metals + Misc. Elements*

Lab ID	0511426-001D	0511426-002D	0511426-003D		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	W-SV @ START	W-SV @ MIDDLE	W-SV @ END			
Matrix	W	W	W		S	W
Extraction Type	DISS.	DISS.	DISS.		mg/kg	µg/L

ICP-MS Metals, Concentration*

Analytical Method: E200.8 Extraction Method: E200.8 Work Order: 0511426

Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	14	14	14		NA	0.5
Barium	82	83	84		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	ND	ND	ND		NA	0.5
Iron	140	120	120		NA	20
Lead	0.72	ND	ND		NA	0.5
Manganese	860	830	850		NA	20
Mercury	0.022	0.026	0.015		NA	0.012
Molybdenum	2.1	2.0	2.0		NA	0.5
Nickel	0.65	0.54	0.54		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.19
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.9	1.8	1.9		NA	0.5
Zinc	51	32	27		NA	5.0
%SS:	N/A	N/A	N/A			

Comments

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

APPENDIX C

McCampbell Analytical, Inc.
Water Quality Test Results

W-LBC Pumping Test @ 100gpm
W-LBC Pumping Test @ 100gpm Supplemental
W-LBC Pumping Test @ 80gpm
W-SV Step-Drawdown Test
Table 3 – Water Quality Results

McCampbell Analytical, Inc.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05
		Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/24/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0511426

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0511426-001C	W-SV @ START	W	DISS.	98.0	19	N/A
0511426-002C	W-SV @ MIDDLE	W	DISS.	100	19	N/A
0511426-003C	W-SV @ END	W	DISS.	95.0	17	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

O.C. [signature] Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B   Analytical methods: SM2320B   Work Order: 0511426

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001B	W-SV @ START	W	148	ND	148	ND	1
002B	W-SV @ MIDDLE	W	148	ND	148	ND	1
003B	W-SV @ END	W	148	ND	148	ND	1

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	1.0	1.0	1.0	1.0	mg CaCO3/L
	S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

pH*

Analytical Method: SM4500H+B

Work Order: 0511426

Lab ID	Client ID	Matrix	pH
0511426-001A	W-SV @ START	W	7.68 @ 16.0 °C
0511426-002A	W-SV @ MIDDLE	W	7.71 @ 13.8 °C
0511426-003A	W-SV @ END	W	7.66 @ 13.9 °C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0511426

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0511426-001A	W-SV @ START	W	310 @ 25.0°C	1
0511426-002A	W-SV @ MIDDLE	W	308 @ 25.0°C	1
0511426-003A	W-SV @ END	W	311 @ 25.0°C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 µmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(µmhos/cm @ 25°C) per SSSA volume 5 part 3.

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05
		Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/23/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0511426

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0511426-001A	W-SV @ START	W	226	1
0511426-002A	W-SV @ MIDDLE	W	244	1
0511426-003A	W-SV @ END	W	210	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L	
	S	NA	

* water samples reported in mg/L.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.7

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511426

EPA Method: E200.7 **Extraction: E200.7/E200.8** **BatchID: 19055** **Spiked Sample ID: 0511324-001C**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	33,000	100	NR	NR	NR	87.1	95.7	9.41	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19055 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001D	11/21/05 11:00 AM	11/22/05	11/30/05 2:56 PM	0511426-002D	11/21/05 4:00 PM	11/22/05	11/30/05 2:58 PM
0511426-003D	11/21/05 6:00 PM	11/22/05	11/30/05 3:00 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

McCampbell Analytical, Inc.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511426

EPA Method: E200.8 Extraction: E200.8 BatchID: 19150 Spiked Sample ID: 0511424-002D

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	0.59	10	87.7	88.5	0.872	94.6	91.7	3.11	75 - 125	85 - 115
Arsenic	ND	10	95.8	98	2.22	91.2	91	0.143	75 - 125	85 - 115
Barium	7.8	100	89.1	91	1.89	94.4	92.5	2.12	75 - 125	85 - 115
Beryllium	ND	10	100	103	1.97	99.9	96.9	3.02	75 - 125	85 - 115
Cadmium	ND	10	90.8	92.1	1.49	95.2	92.6	2.85	75 - 125	85 - 115
Chromium	0.66	10	86.2	89.5	3.50	89.8	88.5	1.45	75 - 125	85 - 115
Cobalt	ND	10	92.2	93.5	1.34	94.5	92.9	1.73	75 - 125	85 - 115
Copper	7.2	10	95.1	93	1.83	92.4	89.4	3.36	75 - 125	85 - 115
Iron	55	100	80.1	95.7	10.9	97.7	96.2	1.56	75 - 125	85 - 115
Lead	2.8	10	76.6	85.8	8.43	92.9	90.6	2.50	75 - 125	85 - 115
Manganese	ND	100	95.2	98.1	2.97	97.5	97.1	0.483	75 - 125	85 - 115
Mercury	ND	0.50	107	107	0	104	104	0	75 - 125	85 - 115
Molybdenum	ND	10	90.8	93.3	2.75	89.9	86.6	3.74	75 - 125	85 - 115
Nickel	0.55	10	92.4	92	0.409	93.1	90.8	2.48	75 - 125	85 - 115
Selenium	ND	10	95.8	98.3	2.48	89.1	89.4	0.336	75 - 125	85 - 115
Silver	ND	10	92.8	94.8	2.16	87.1	85.1	2.32	75 - 125	85 - 115
Thallium	ND	10	90.2	93	3.11	93	91.5	1.64	75 - 125	85 - 115
Vanadium	0.59	10	90.9	94.3	3.48	94.2	92.5	1.83	75 - 125	85 - 115
Zinc	23	100	83.9	83.6	0.282	96.4	93.4	3.13	75 - 125	85 - 115
%SS:	92	750	94	95	1.67	98	97	0.819	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

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Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.8

BATCH 19150 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001D	11/21/05 11:00 AM	11/22/05	11/28/05 7:21 PM	0511426-002D	11/21/05 4:00 PM	11/22/05	11/28/05 8:05 PM
0511426-003D	11/21/05 6:00 PM	11/22/05	11/28/05 8:22 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SW QA/QC Officer

McCampbell Analytical, Inc.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0511426

EPA Method: SM2340B	Extraction: E200.8			BatchID: 19150		Spiked Sample ID: 0511424-002D				
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	21	2.91	NR	NR	NR	92.8	92.8	0	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19150 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001C	11/21/05 11:00 AM	11/22/05	11/24/05 9:11 AM	0511426-002C	11/21/05 4:00 PM	11/22/05	11/24/05 9:24 AM
0511426-003C	11/21/05 6:00 PM	11/22/05	11/24/05 10:20 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2320B			Units: mg CaCO3/L			BatchID: 19136
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001B	148	1	148	1	0	<20
0511426-002B	148	1	147	1	0.678	<20
0511426-003B	148	1	148	1	0	<20

BATCH 19136 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001B	11/21/05 11:00 AM	11/22/05	11/22/05 9:50 PM	0511426-002B	11/21/05 4:00 PM	11/22/05	11/22/05 10:02 PM
0511426-003B	11/21/05 6:00 PM	11/22/05	11/22/05 10:14 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0511426

Method Name: SM4500H+B Units: ±, pH units @ °C BatchID: 19149

SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0511426-001A	7.68 @ 16.0 °C	1	7.67 @ 15.9 °C	1	0.01	±0.02
0511426-002A	7.71 @ 13.8 °C	1	7.72 @ 13.8 °C	1	0.01	±0.02
0511426-003A	7.66 @ 13.9 °C	1	7.65 @ 13.9 °C	1	0.01	±0.02

BATCH 19149 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/22/05 8:50 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/22/05 9:00 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/22/05 9:10 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2510B Units: µmhos/cm @ 25°C BatchID: 19124

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001A	310 @ 25.0°C	1	310 @ 25.0°C	1	0	<2
0511426-002A	308 @ 25.0°C	1	308 @ 25.0°C	1	0	<2
0511426-003A	311 @ 25.0°C	1	311 @ 25.0°C	1	0	<2

BATCH 19124 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/22/05 8:20 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/22/05 8:30 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/22/05 8:40 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2540C Units: mg/L BatchID: 19034

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001A	226	1	240	10	6.01	<10
0511426-002A	244	1	260	10	6.35	<10
0511426-003A	210	1	220	10	4.65	<10

BATCH 19034 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/23/05 2:40 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/23/05 2:50 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/23/05 3:00 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

enge 0511426

McCAMPBELL ANALYTICAL INC.
110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: JEFF WISNIEWSKI Bill To: (SAME)
Company: ENGEO
690 WALNUT AVE SUITE 220
VALLEJO, CA 94592 E-Mail:
Tele: () 707-562-0030 Fax: () 707-562-0032
Project #: 6486-2.005.01 Project Name: SUTTER
Project Location: SANTA ROSA, CA
Sampler Signature: [signature]

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	Soil	Air	Sludge	Other	METHOD PRESERVED Ice	HCl	HNO_3	Other	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~TPH as Diesel (8015)~~ PH	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	~~EPA 601 / 8010~~ TOTAL SILICA	~~BTEX ONLY (EPA 602 / 8020)~~ EC	~~EPA 608 / 8080~~ MANGANESE	~~EPA 608 / 8080 PCB's ONLY~~ IRON	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	TOTAL HARDNESS	TDS	TOTAL ALKALINITY		Comments
@ START	W-SU	11/21	11:00A	4		X										X			X	X	X	X				X				X	X	X		
@ MIDDLE	W-SU	11/21	4:00P	4		X										X			X	X	X	X				X				X	X	X		
@ END	W-SU	11/21	6:00P	4		X										X			X	X	X	X				X				X	X	X		

Relinquished By:	Date:	Time:	Received By:
[signature]	11/22/05	1:00PM	[signature]
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____

	VOAS	O&G	METALS	OTHER
PRESERVATION				

APPROPRIATE CONTAINERS ✓
PERSERVED IN LAB ____

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0511426 ClientID: ENGM EDF: NO

Report to:
Jeff Wisnienski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

TEL: (707) 562-0030
FAX: (707) 562-0032
ProjectNo: #6486.2.005.01; Sutter
PO:

Bill to:
Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Requested TAT: 5 days
Date Received: 11/22/2005
Date Printed: 11/22/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0511426-001	W-SV @ START	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				
0511426-002	W-SV @ MIDDLE	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				
0511426-003	W-SV @ END	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				

Test Legend:

1	Alka(spe)_W	2	CAMMET(D)MS_W	3	HARDMS_DISS	4	METALS_DISS	5	PH_W
6	PRDISSOLVED	7	SC_W	8	TDS_W	9		10	
11		12							

Prepared by: Rosa Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

TABLE 3
Water Quality Results
Wells W-LBC and W-SV, Sutter Medical Center of Santa Rosa, California

			Total Alkalinity	Bicarbonate as CaCO3	Carbonate as CaCO3	Hydroxide as CaCO3	Hardness	pH	Electrical Conductivity	Total Dissolved Solids	Antimony (EPA 200)	Arsenic (EPA 200)	Barium (EPA 200)	Beryllium (EPA 200)	Cadmium (EPA 200)	Chromium (EPA 200)	Cobalt (EPA 200)	Copper (EPA 200)	Iron (EPA 200)	Lead (EPA 200)	Manganese (EPA 200)	Mercury (EPA 200)	Molybdenum (EPA 200)	Nickel (EPA 200)	Selenium (EPA 200)	Silver (EPA 200)	Thallium (EPA 200)	Vanadium (EPA 200)	Zinc (EPA 200)	Silica (EPA E200.7)
Well I.D.	Sample Date	Phase	mg/L	mg/L	mg/L	mg/L	mg/L	Units	mhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		Start Time	155	155	<1.0	<1.0	110	7.22	334	240	NA	0.0099	NA	NA	NA	NA	NA	NA	0.320	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	34
W-LBC	7/5/2005	Middle Time	151	151	<1.0	<1.0	110	7.23	327	230	NA	0.0095	NA	NA	NA	NA	NA	NA	0.270	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	33
		End Time	153	153	<1.0	<1.0	110	7.25	332	228	NA	0.0094	NA	NA	NA	NA	NA	NA	0.270	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	33
		Start Time	160	160	<1.0	<1.0	130	7.36	381	224	<0.0005	0.0071	0.100	<0.0005	<0.00025	<0.0005	<0.0005	0.00083	0.072	<0.0005	*1.3*	0.000073	0.0010	0.00100	<0.0005	<0.00019	<0.0005	0.0010	0.0420	70
W-LBC	11/14/2005	Middle Time	158	158	<1.0	<1.0	120	7.37	372	232	<0.0005	0.0083	0.110	<0.0005	<0.00025	<0.0005	<0.0005	0.00057	0.170	0.00059	*1.3*	0.000064	0.0010	0.00006	<0.0005	<0.00019	<0.0005	0.0012	0.0460	74
		End Time	156	156	<1.0	<1.0	120	7.38	376	218	<0.0005	0.0088	0.110	<0.0005	<0.00025	<0.0005	<0.0005	0.00072	0.200	0.00069	*1.3*	0.000051	0.0010	0.00170	<0.0005	<0.00019	<0.0005	0.0013	0.0390	72
		Start Time	148	148	<1.0	<1.0	98	7.68	310	226	<0.0005	0.0140	0.082	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.140	0.00072	*0.860*	0.000022	0.0021	0.00065	<0.0005	<0.00019	<0.0005	0.0019	0.0510	73
W-SV	11/21/2005	Middle Time	148	148	<1.0	<1.0	100	7.71	308	244	<0.0005	0.0140	0.083	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.120	<0.0005	*0.830*	0.000026	0.0020	0.00054	<0.0005	<0.00019	<0.0005	0.0018	0.0320	69
		End Time	148	148	<1.0	<1.0	95	7.66	311	210	<0.0005	0.0140	0.084	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.120	<0.0005	*0.850*	0.000015	0.0020	0.00054	<0.0005	<0.00019	<0.0005	0.0019	0.0270	72
California Department of Health Services Drinking Water Standard and Secondary Standard MCLs			**n/a**	**n/a**	**n/a**	**n/a**	**n/a**	**6.5-8.5**	**n/a**	**500**	**0.006**	**0.05**	**2**	**0.004**	**0.005**	**0.1**	**n/a**	**1.3**	**0.3**	**0.015**	**0.05**	**0.002**	**n/a**	**0.1**	**0.05**	**0.1**	**0.0017**	**0.0500**	**5**	**n/a**
Type								Secondary		Secondary	Primary	Primary	Primary	Primary	Primary	Primary		Primary	Secondary	Primary	Secondary	Primary		Primary	Primary	Secondary		Action Level	Secondary	

Notes:

mg/L = milligrams per liter

µmhos/cm = mircosiemens per centimeter

Less than value "<" indicates that parameter was not detected at the laboratory reporting limit

Italicized Numbers indicate a MCL exceedence

n/a = not available

NA = Not analyzed

APPENDIX D

State of California Well Completion Report
Pump Curve and Specifications

WELL COMPLETION REPORT - STATE OF CALIFORNIA

1 of 1 No# 761332

Owner's Well No. 1

Permit Date: 08/29/00 Permit # WEL00--0343

Date Work Began 8/3/00 Ended 8/11/00

Permit Agency Dept of Permits & Resource Management

State Well No./Station No.

APN/TRS/Other

GEOLOGIC LOG

ORIENTATION: Vertical

DRILLING METHOD: Rotary

FLUID: Mud

Ft	to Ft	DESCRIPTION
0	4	Top soil
4	40	Brown clay
40	64	Gravel and rock
64	84	Brown clay
84	100	Sandy blue clay
100	104	Gravel with clay
104	120	Gravel with rock
120	123	Hard black rock
123	129	Gravel
129	132	Blue clay
132	142	Gravel
142	154	Blue clay
154	160	Gravel
160	164	Blue clay
164	174	Brown clay
174	184	Blue clay
184	208	Gravel
208	212	Clay with gravel
212	218	Gravel
218	224	Blue clay
224	230	Blue clay
230	244	Gravel with brown clay
244	254	Gravel
254	284	Blue clay
284	288	Gravel
288	294	Blue clay with gravel
294	310	Brown clay
310	314	Gravel
214	320	Brown clay
320	328	Gravel
328	384	Blue clay
384	388	Gravel and rock
388	388	Brown clay
388	394	Gravel
394	404	Blue clay

TOTAL DEPTH OF BORING (FT): 404

TOTAL DEPTH OF COMPLETED WELL (FT): 400

WELL OWNER

Name: Luther Burbank Center

Mailing Address: 50 Mark West Springs Rd

Santa Rosa, CA 95403

WELL LOCATION

Address: 50 Mark West Springs Rd

City: Santa Rosa

County: Sonoma

APN Book 057 - 040 - 045

Latitude Longitude

LOCATION SKETCH

attn: Jason

584-9198 (Fax)

ACTIVITY

XXX New Well

Modification/Repair

Deepen

Other (Specify)

DESTROY (Describe) Procedures and Materials Under "Geologic Log")

PLANNED USES:

Monitoring

Test well

Cathodic Protection

Heat Exchange

Direct Push

Injection

Vapor Extraction

Sparging

Remediation

Other (specify)

PLANNED USES

Water Supply

XX Domestic XX Public

Irrigation Industrial

WATER LEVEL & YIELD OF COMPLETED WELL

Depth to First Water (ft.) BELOW SURFACE

Depth of Static Water Level (Ft) 25 Date Measured: 08/11/00

Estimate Yield (GPM)* 100+ Test Length/Test type: 2 hr / Air lift

Total drawdown (ft) 400

*May not be representative of a well's long-term yield

Depth from surface Ft	to Ft	Bore-hole diameter Inches	Type Blank	Type Screen	Material Grade	Diameter	Gauge	Slot Size	Depth From Surface Ft	to Ft	Annular Material Seal Material
0	100	14	XX		PVC	10	200		0	60	Bentonite
100	160	14		XX	PVC	10	200	0.032	60	404	12 x 20 / 8 x 16
160	180	14	XX		PVC	10	200				
180	320	14		XX	PVC	10	200	0.032			
320	380	14	XX		PVC	10	200				
380	400	14		XX	PVC	10	200	0.032			

ATTACHMENTS

No Geologic Log

No Well Construct Diagram

No Geophysical Log(s)

No Soil/Water Chemical Analyses

No Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

NAME: LES PETERSEN DRILLING AND PUMP, INC

ADDRESS 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403

SIGNED: Ray Petersen/ 08/11/00 26108

Well Driller/Authorized Representative Date C-57 License

DWR Driller Owner Local

9/26/00 2 day 16 ± hour pump test by Berkeley

200-220 gpm

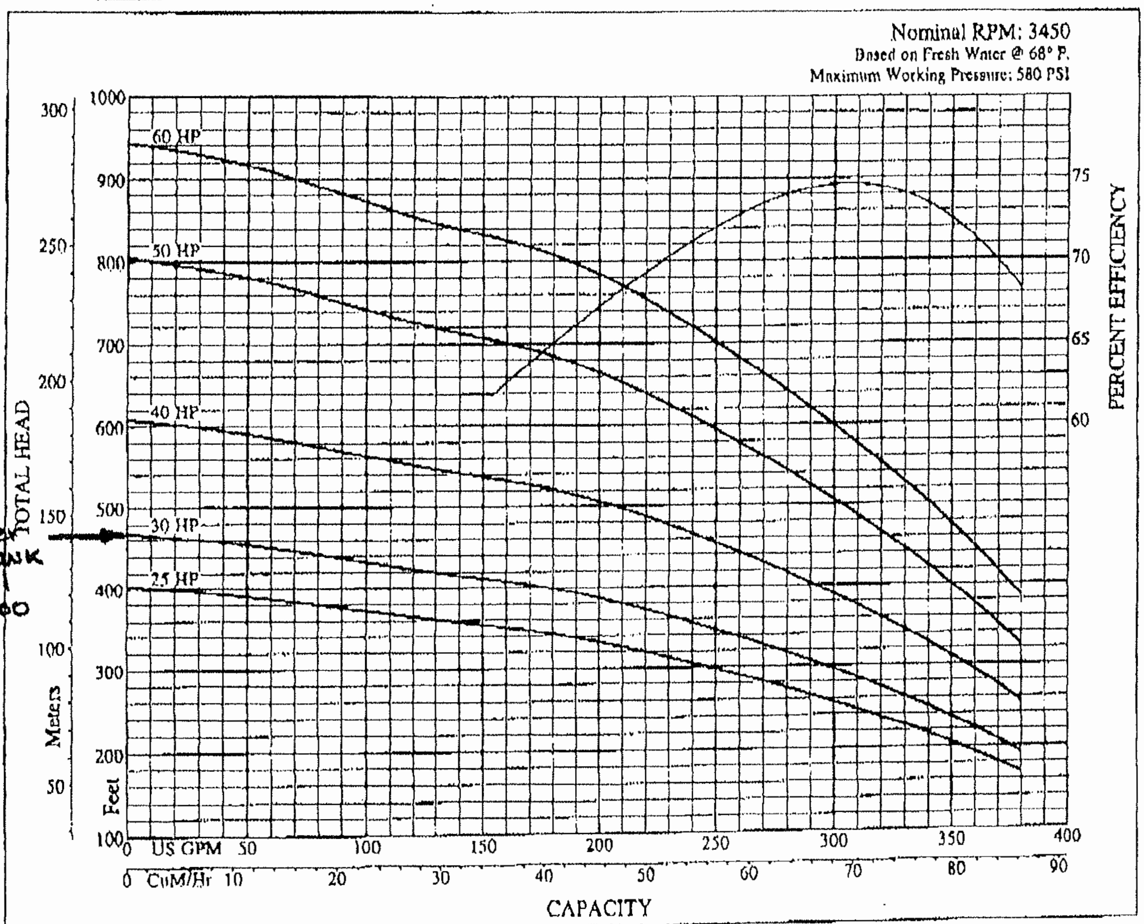
Pump: Berkeley 6T275 w/ 30 HP motor

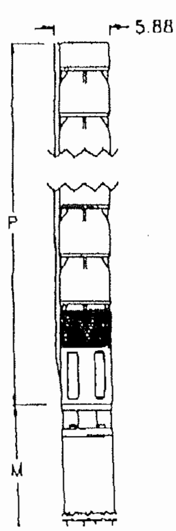
Post-it® Fax Note 7671	Date 6/3/05 # of pages ▸ 1
To NADINE	From DON KAMINSKI
Co./Dept.	Co. BARTLEY PUMP
Phone # 542-2668	Phone # 584-9191
Fax # 527-0901	Fax # 584-9198

BERKELEY®

TURBINE

6T-275





OUTLINE DIMENSIONS / WEIGHTS

HP	stages	Motor size	P length	M* length	MD* dia.	Mtr. wt.	Pump wt.
25	6	6"	43.98	33.13	5.38	148	153
30	7	6"	48.98	35.69	5.38	162	172
40	9	6"	58.98	40.81	5.38	195	211
50	12	6"	73.98	57.83	5.38	310	269
60	14	6"	83.98	63.83	5.38	340	308

Note: dimensions = inches; weight = U.S. lbs.

M* Maximum length (Franklin Electric Motor)
MD* Motor diameter (Franklin Electric Motor)

SPECIFICATIONS

Minimum Well I.D.	6.0 Inches
Minimum Submergence @ BEP (above inlet)	10.0 Feet
Capacity Range	125 - 380 GPM
Discharge	4" F NPT
See manufacturer's data for motor cooling requirements	

SUPERSEDES
All Previous

Date 04/15/96

engm 0507082

McCAMPBELL ANALYTICAL, INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME: ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Jeff Wisniewski Bill To:
Company: ENGEO Inc.
690 Walnut Ave. Suite220
Vallejo, CA 94592 E-Mail: jwisniewski@engeo.com
Tele: (707) 562-0030 Fax: (707) 562-0032
Project #: 6486.2.005.01 Project Name: SUTTER
Project Location: Santa Rosa, CA
Sampler Signature: Jeff B. W

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
@ START	LBC	7/5/05	11 AM	3		X							(1)	
@ MIDDLE	LBC	7/5/05	10 PM	3		X							(1)	
@ END	LBC	7/6/05	9AM	3		X							(1)	

Analysis Request:

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~BTEX only (EPA 602/8020)~~ pH	~~MTBE (8015)~~ total silica	Total Petroleum Oil & Grease (5520/1664 (EF/BF)	~~Total Petroleum Hydrocarbons (418.1)~~ electrical conductivity	EPA 601/8010/8021 (Halocarbons)	~~EPA 608 / 8081 (Cl Pesticides)~~ manganese	~~EPA 608 / 8082 PCB's ONLY~~ iron	~~EPA 8140 / 8141 (NP Pesticides)~~ arsenic	EPA 8150 / 8151 (Acidic Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525 / 625 / 8270 (SVOCs)	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020) added 8/30/05 JB	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Other: Total hardness as $CaCO_3$	Other: TDS (total dissolved solids)	Other: Total alkalinity as $CaCO_3$	Comments: Filter Samples for Metals analysis: Yes / No
@ START		X	X		X		X	X	X					X			X	X	X	
@ MIDDLE		X	X		X		X	X	X					X			X	X	X	
@ END		X	X		X		X	X	X					X			X	X	X	

Relinquished By:	Date:	Time:	Received By:
Jeff B. W	7/7/05	4:10P	[signature]
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

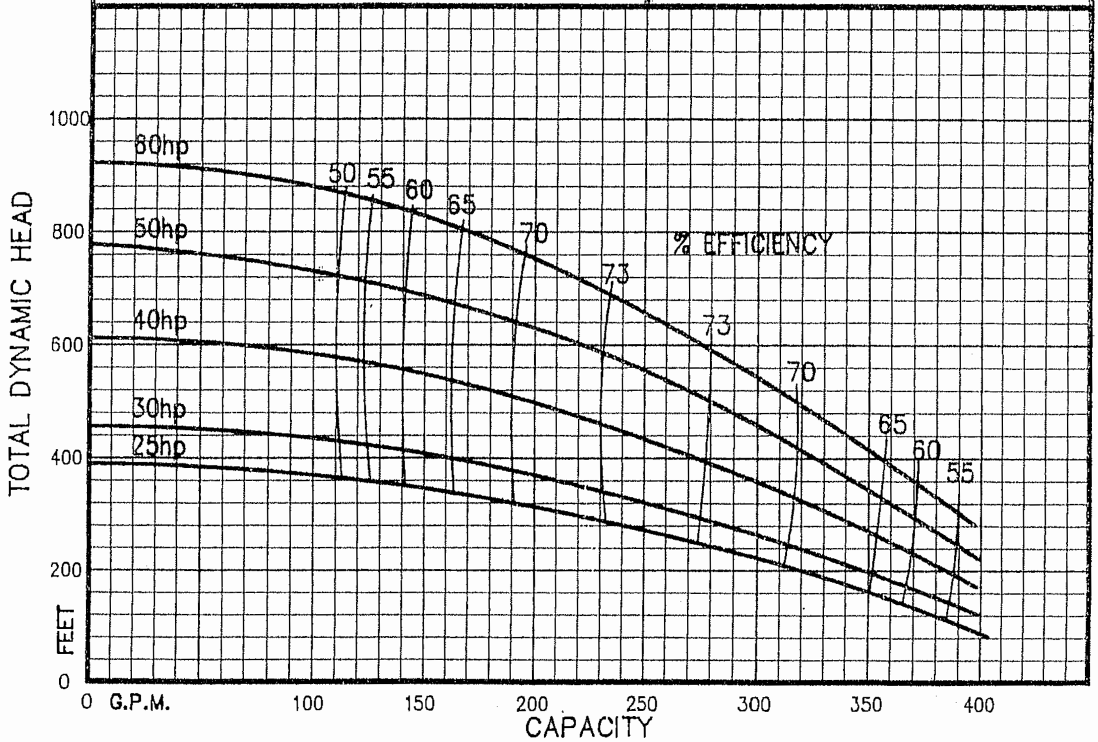
PRESERVATION VOAS | O&G | METALS ✓ pH<2 | OTHER

COMMENTS:

Submersible Turbine Model 6T-275

FAMILY CURVE — SIZE: 6"
DESIGN SERIES: 6T-275
SPEED: 3450 — HZ: 60
CURVE NO.: ST2375B — DATE: 5 DEC 89

BERKELEY PUMPS



Specifications

CURVE No. ST2375B

LIQUID END WEIGHTS

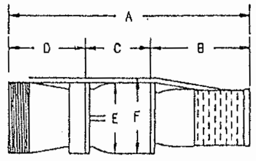
DESCRIPTION	WEIGHT LBS.	HP RATING	MOTOR FLANGE
ONE STAGE L.E.	55.8	25-60	6"
ONE STAGE L.E.			
ONE STAGE L.E.			
EACH ADDED STAGE	19.4	ALL	ALL

IMPELLER DATA

TYPE: ENCLOSED EYE AREA 5.76 Sq. In.
THRUST CONSTANT K 1.83 Lbs./Ft of HEAD.

HP	IMPELLER No.	STAGES	IMPELLER Dia.
60	S39553	14	4.47" @ 32° (3.81")
50	S39552	12	4.44" @ 32° (3.78")
40	S39551	10	4.41" @ 30° (3.75")
30	S39553	7	4.47" @ 32° (3.81")
25	S39552	6	4.44" @ 32° (3.78")

OUTLINE DIMENSIONS



A– ONE STAGE LIQUID END LENGTH
B– SUCTION CONNECTION LENGTH
C– STAGE LENGTH
D– DISCHARGE CONNECTION LENGTH
E– BOWL DIAMETER
F– DIAMETER ACROSS LEAD GUARD

BOWL DATA

BOWL No. M04461 PUMP SHAFT Dia. 1"
TYPE: THREADED DISCHARGE SIZE 3" NPT (Female) 4" NPT (Male)

NOTE: For each additional stage add 'C'

A	B	C	D	E	F	HP RATING	MOTOR FLANGE
19.63	11.00	5.00	3.63	5.38	5.81	25-60	6"

REVISED 15 May 90

APPENDIX E

Welenco

Wellbore Video Report
Plumbness and Alignment Interpretation Package
Wellbore Drift Interpretation Package
VHS Video

6486.2.005.01
February 21, 2006

Vid-Pac

Wellbore Video Report

welenco

Company	ENGEO	**Job Ticket**	5211
		Run No.	1
Address	690 Walnut Ave, Ste. 200	**Well No**	W-LBC
City	Mare Island, Vallejo	**State**	CA
Zip	94592	**Survey Date**	November 19, 2005
Requested by	Jeff Wisniewski	**P.O.**	
Well Owner	Sutter Medical		
Copy To	Carla Nelson (Geomatrix)	**Camera**	CCV SideScan Color Camera
Reason For Survey	General Inspection	**Zero Datum**	Ground Level
Operator	Dan Ihde	**Well Depth**	
Video Vai	L-22		

Location 50 West Mark Springs Rd, Santa Rosa, CA

Casing I.D. at Surface 9.25" **I.D. Reference** Well Records **Build-Up** Moderate increases with depth

SELECTED WELLBORE SNAPSHOTS

0043'

0098' (See Other Side)

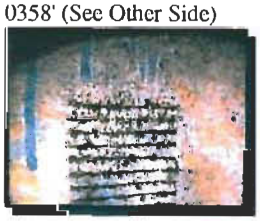
0158'

0178' (See Other Side)

0275'

0317'

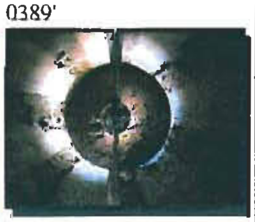
0358' (See Other Side)



0366'

0378' (See Other Side)

0389'



TRUE DEPTHS	WELLBORE/CASING INFORMATION
	Downview Depths are 2' deeper than displayed
0'	Recording Starts - Zeroed on Sideview Lens at Ground Level
43'	Static Water Level - Poor visibility
94'	Visibility improves rapidly
98'	Sideview - Top of Horizontal slots
158'	Sideview - Bottom of 1st section of slots
178'	Sideview - Top of 2nd section of slots
275'	Sideview - Slots with increased build-up
317'	Sideview - Bottom of 2nd slot section
358'	Sideview - Top of 3rd slot section - increased build-up
366'	Sideview - Roots
378'	Sideview - Growths on slots
389'	Downview - Fill - Bottom of survey at 391'
389'	Begin Sideview inspection to top of slots

welenco, inc.
5201 Woodmere Dr.
Bakersfield, CA 93313

www.welenco.com
e-mail: welenco@welenco.com
Phone: 1-(800) 445-9914
Fax: 1-(661) 834-2550

Notes:

0098'

0178'

0358'

0378'

welenco, inc.
5201 Woodmere Dr.
Bakersfield, CA 93313

www.welenco.com
e-mail: welenco@welenco.com
Phone: 1-(800) 445-9914
Fax: 1-(661) 834-2550

Notes:

Drift-Pac™

Plumbness and Alignment Interpretation Package

Prepared Especially For

ENGEO

W-LBC

November 19, 2005

This Plumbness and Alignment Interpretation Package represents our best efforts to provide a correct interpretation. This package is prepared for informational purposes only and is based on our best interpretation of The American Water Works Association, ANSI/AWWA A100-97, Appendix D - "Plumbness and Alignment - Procedure Testing", Dated February 1, 1998. According to the Standard, this procedure is for informational purposes only and is not a part of AWWA A-100. Therefore, Welenco does not guarantee the reliability of this procedure and cannot be held responsible for any errors in this procedure. The data used in our interpretation was not obtained using the AWWA "Apparatus Required For Plumbness and Alignment Tests". Since all interpretations are opinions based on mathematical calculations, and inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. Welenco does not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and Welenco will not be responsible for accidental or intentional interception of such data by third parties. Welenco employees are not empowered to change or otherwise modify the attached interpretation. By accepting this Plumbness and Alignment Interpretation Package, the Customer agrees to the foregoing, and to the General Terms and Conditions of Welenco.

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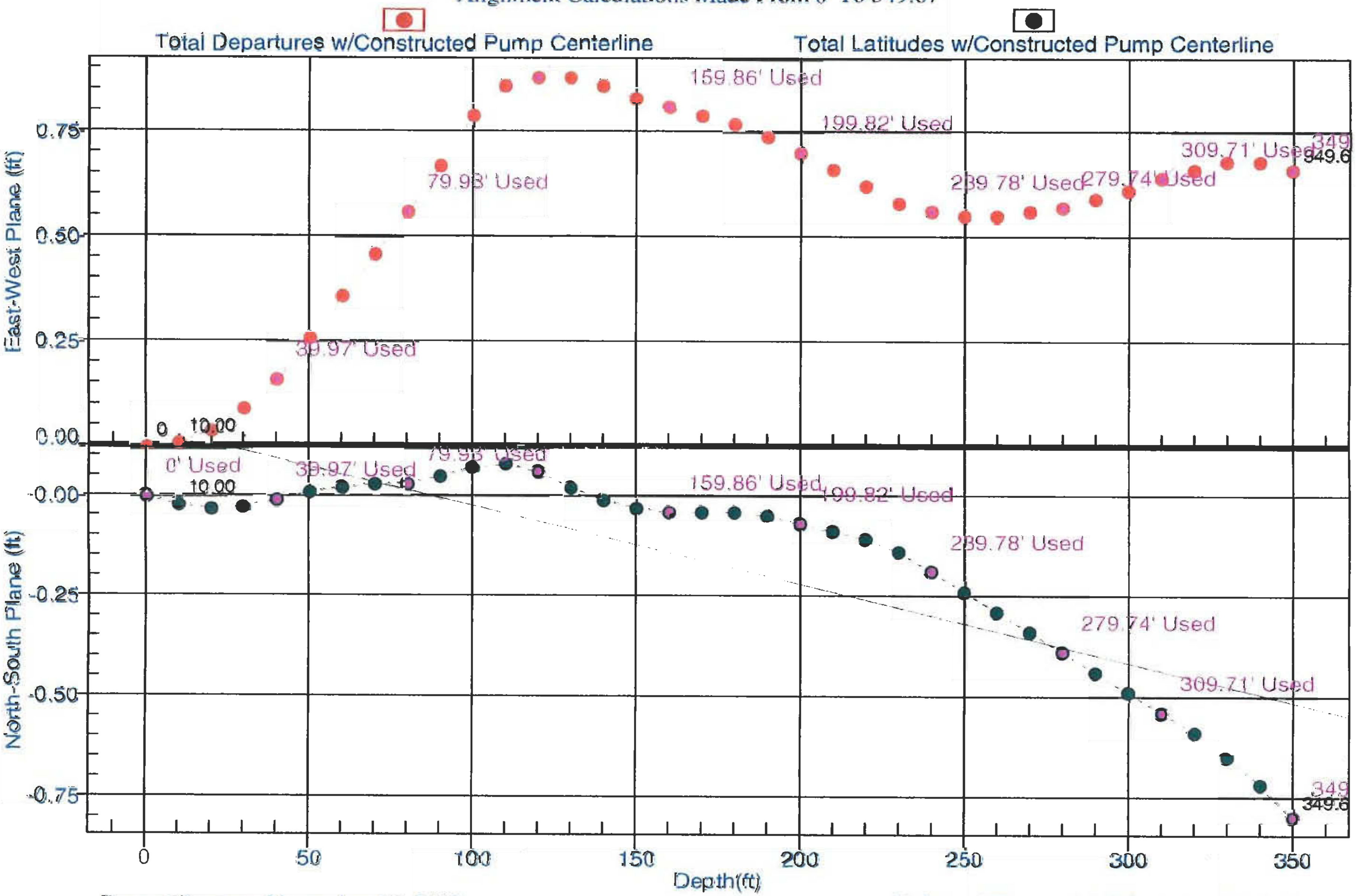
DRIFT-PAC Straightness/Alignment Calculations

Constructed Pump Centerline (Well Centerline/Straightness) View Used To Calculate Actual Drift and Effective Diameter

Alignment Calculations Made From 0' To 349.67'

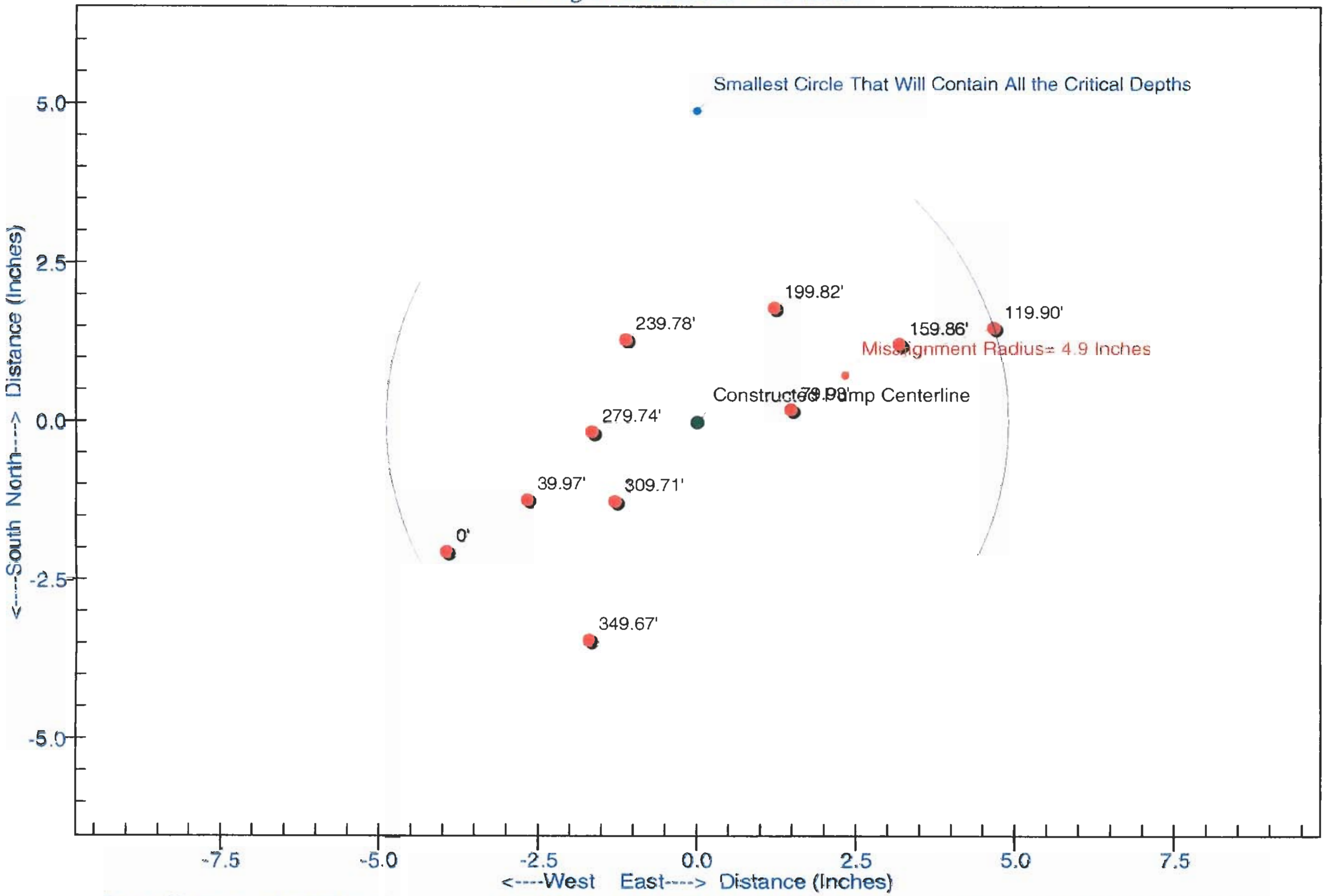


Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

ENGEO
W-LBC
Drift-Pac Straightness/Alignment View
Misalignment Diameter = 9.8 Inches



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

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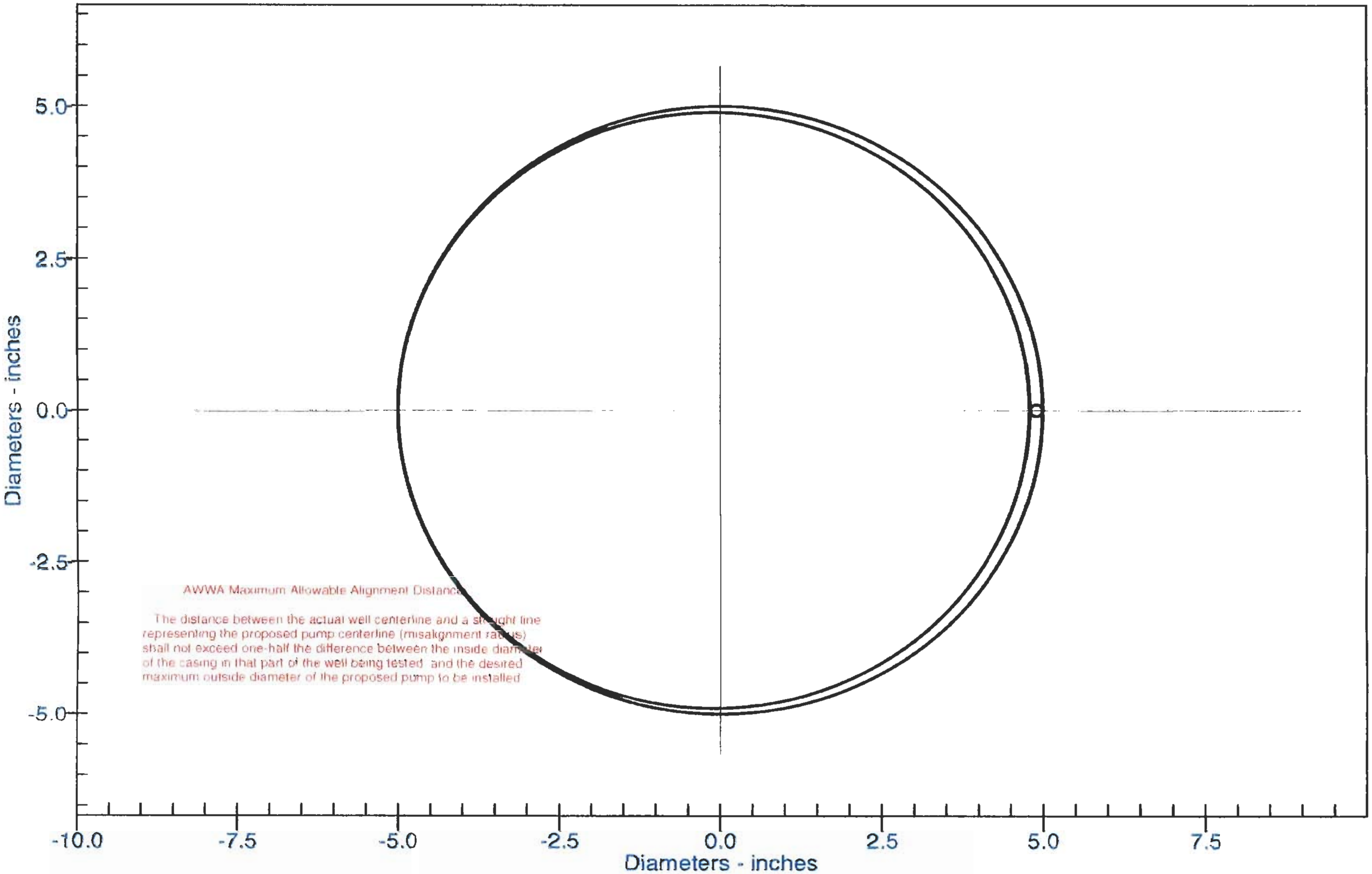
Drift-Pac Misalignment/Effective Diameter Relationship

Green circle = Desired Casing Size of 10 Inches
Blue circle = Misalignment diameter of 9.8 Inches (See Note Below)
Red circle = Effective Diameter of 0.2 Inches From 0' To 349.67'



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

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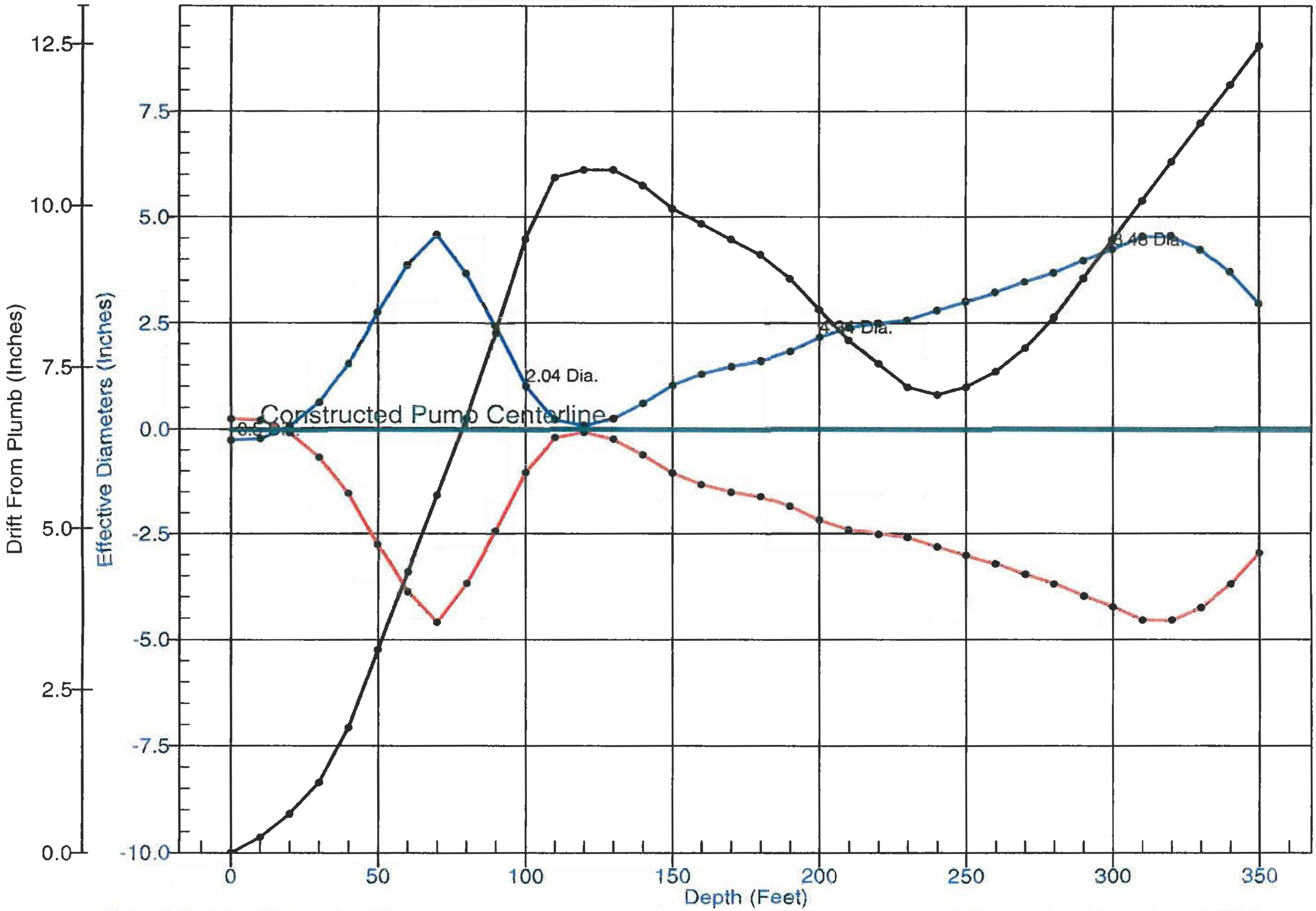
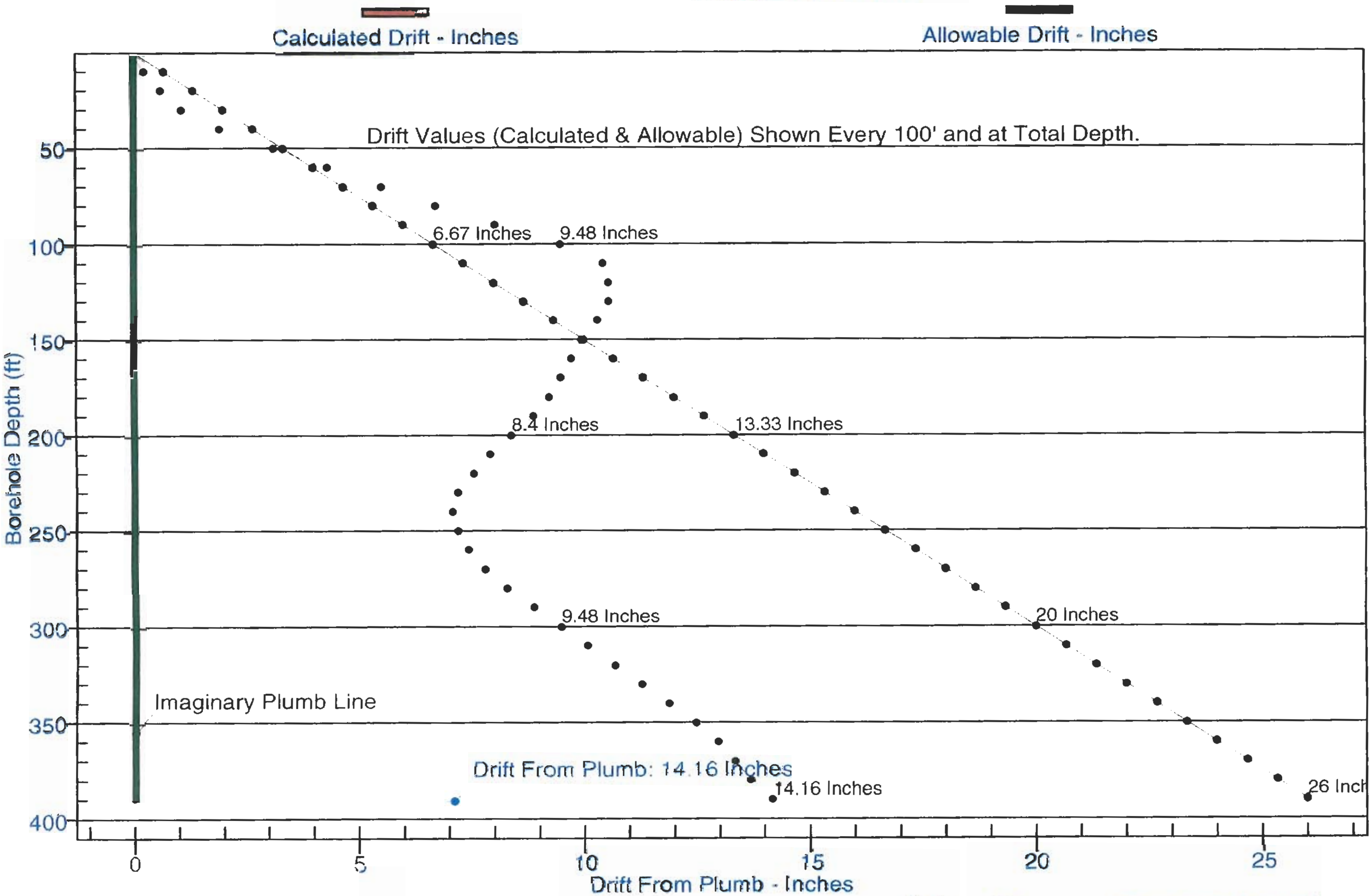
Drift-Pac Vertical Plane of Effective Diameters vs. Drift From Plumb



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

ENGEO
W-LBC
Drift-Pac Plumbness and AWWA Standard A-100 Plot
Maximum AWWA Allowable Drift = 26 Inches for 10 Inch Casing
Maximum Calculated Drift = 14.16 Inches



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

Drift-Pac ™

Wellbore DRIFT Interpretation Package

Prepared Especially For

ENGEO

W-LBC

November 19, 2005

This Deviation and Directional Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. Welenco does not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and Welenco will not be responsible for accidental or intentional interception of such data by third parties. Welenco employees are not empowered to change or otherwise modify the attached interpretation. By accepting this Deviation and Directional Interpretation Package, the Customer agrees to the foregoing, and to the General Terms and Conditions of Welenco.

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Drift-Pac | **Wellbore Deviation and Directional Interpretation** | **welenco**

Company	ENGEO	**County**	Sonoma	**State**	CA
Well Number	W-LBC	**Date of Survey**	November 19, 2005	**Magnetic Declination Used**	
Field	Santa Rosa	**Recorded By**	Dan Ihde		
Equipment No.	L-22 **Job Number** 5211	**welenco Office**	Bakersfield	**Witness**	Carla Nelson
Location	50 Mark West Springs Rd.				
Remarks		**Tool Type**	Compass	**Tool Number**	3533
Directional Calculation Method	Balanced Tangential Method	**Dogleg Calculation Method**	Lubinski Method		

Measured Information			Closure Calculations				Rectangular Coordinates				Dogleg Severity	
Measured Depth, Feet	Inclination, Degrees From Vertical	Azimuth, Degrees, True	Course Deviation, Feet	True Vertical Depth, Feet	Closure Distance, Feet	Closure Bearing Degrees, True	Latitude, Feet	Departure, Feet	Total Latitude, Feet	Total Departure, Feet	Dogleg Severity, Degs/20 Feet	Dogleg Severity, Degs/100 Feet
0.00	0.13	131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10.00	0.10	153	0.02	10.00	0.02	140.50	-0.02	0.01	-0.02	0.01		
20.00	0.25	108	0.03	19.99	0.05	128.10	-0.02	0.03	-0.03	0.04		
30.00	0.31	75	0.05	29.98	0.09	109.30	0.00	0.05	-0.03	0.09		
40.00	0.55	76	0.08	39.97	0.16	94.10	0.02	0.07	-0.01	0.16		
50.00	0.62	79	0.10	49.96	0.26	87.60	0.02	0.10	0.01	0.26		
60.00	0.55	89	0.10	59.95	0.36	86.50	0.01	0.10	0.02	0.36		
70.00	0.55	88	0.10	69.94	0.46	86.90	0.00	0.10	0.03	0.46		
80.00	0.62	83	0.10	79.93	0.56	86.60	0.01	0.10	0.03	0.56		
90.00	0.70	80	0.12	89.92	0.67	85.70	0.02	0.11	0.05	0.67		
100.00	0.70	78	0.12	99.92	0.79	84.70	0.02	0.12	0.07	0.79		
110.00	0.16	104	0.07	109.91	0.87	84.60	0.01	0.07	0.08	0.86		
120.00	0.22	175	0.03	119.90	0.88	86.10	-0.02	0.02	0.06	0.88		
130.00	0.22	193	0.04	129.89	0.88	88.60	-0.04	0.00	0.02	0.88		
140.00	0.24	219	0.04	139.88	0.86	90.90	-0.04	-0.02	-0.01	0.86		
150.00	0.15	252	0.03	149.87	0.83	92.40	-0.02	-0.03	-0.03	0.83		
160.00	0.12	265	0.02	159.86	0.81	92.80	-0.01	-0.02	-0.04	0.81		
170.00	0.10	266	0.02	169.85	0.79	92.90	0.00	-0.02	-0.04	0.79		
180.00	0.12	270	0.02	179.84	0.77	93.10	0.00	-0.02	-0.04	0.77		
190.00	0.25	245	0.03	189.83	0.74	94.00	-0.01	-0.03	-0.05	0.74		
200.00	0.26	246	0.04	199.82	0.70	95.70	-0.02	-0.04	-0.07	0.70		
210.00	0.28	243	0.05	209.81	0.66	97.70	-0.02	-0.04	-0.09	0.66		
220.00	0.28	243	0.05	219.80	0.63	100.20	-0.02	-0.04	-0.11	0.62		
230.00	0.29	215	0.05	229.79	0.60	103.90	-0.03	-0.04	-0.14	0.58		
240.00	0.29	200	0.05	239.78	0.59	108.60	-0.05	-0.02	-0.19	0.56		
250.00	0.29	180	0.05	249.77	0.60	113.40	-0.05	-0.01	-0.24	0.55		
260.00	0.30	171	0.05	259.76	0.62	117.60	-0.05	0.00	-0.29	0.55		
270.00	0.30	172	0.05	269.75	0.65	121.30	-0.05	0.01	-0.34	0.56		

TVD in Feet 389.63 **Final Closure Distance in Feet** 1.18 **Final Closure Bearing in Degrees** 155.40

Measured Information			Closure Calculations				Rectangular Coordinates				Dogleg Severity	
Measured Depth, Feet	Inclination, Degrees From Vertical	Azimuth, Degrees, True	Course Deviation, Feet	True Vertical Depth, Feet	Closure Distance, Feet	Closure Bearing Degrees, True	Latitude, Feet	Departure, Feet	Total Latitude, Feet	Total Departure, Feet	Dogleg Severity, Degs/20 Feet	Dogleg Severity, Degs/100 Feet
280.00	0.31	167	0.05	279.74	0.69	124.60	-0.05	0.01	-0.39	0.57		
290.00	0.32	150	0.05	289.73	0.74	126.90	-0.05	0.02	-0.44	0.59		
300.00	0.31	158	0.05	299.72	0.79	128.80	-0.05	0.02	-0.49	0.61		
310.00	0.32	155	0.05	309.71	0.84	130.50	-0.05	0.02	-0.54	0.64		
320.00	0.33	160	0.06	319.70	0.89	132.20	-0.05	0.02	-0.59	0.66		
330.00	0.34	165	0.06	329.69	0.94	133.90	-0.06	0.02	-0.65	0.68		
340.00	0.44	186	0.07	339.68	0.99	136.60	-0.07	0.00	-0.72	0.68		
350.00	0.48	197	0.08	349.67	1.04	140.20	-0.08	-0.02	-0.80	0.66		
360.00	0.54	208	0.09	359.66	1.08	144.40	-0.08	-0.03	-0.88	0.63		
370.00	0.40	217	0.08	369.65	1.11	148.20	-0.07	-0.04	-0.95	0.59		
380.00	0.41	217	0.07	379.64	1.14	151.50	-0.06	-0.04	-1.00	0.54		
390.00	0.58	219	0.09	389.63	1.18	155.40	-0.07	-0.05	-1.07	0.49		

TVD in Feet 389.63 **Final Closure Distance in Feet** 1.18 **Final Closure Bearing in Degrees** 155.40

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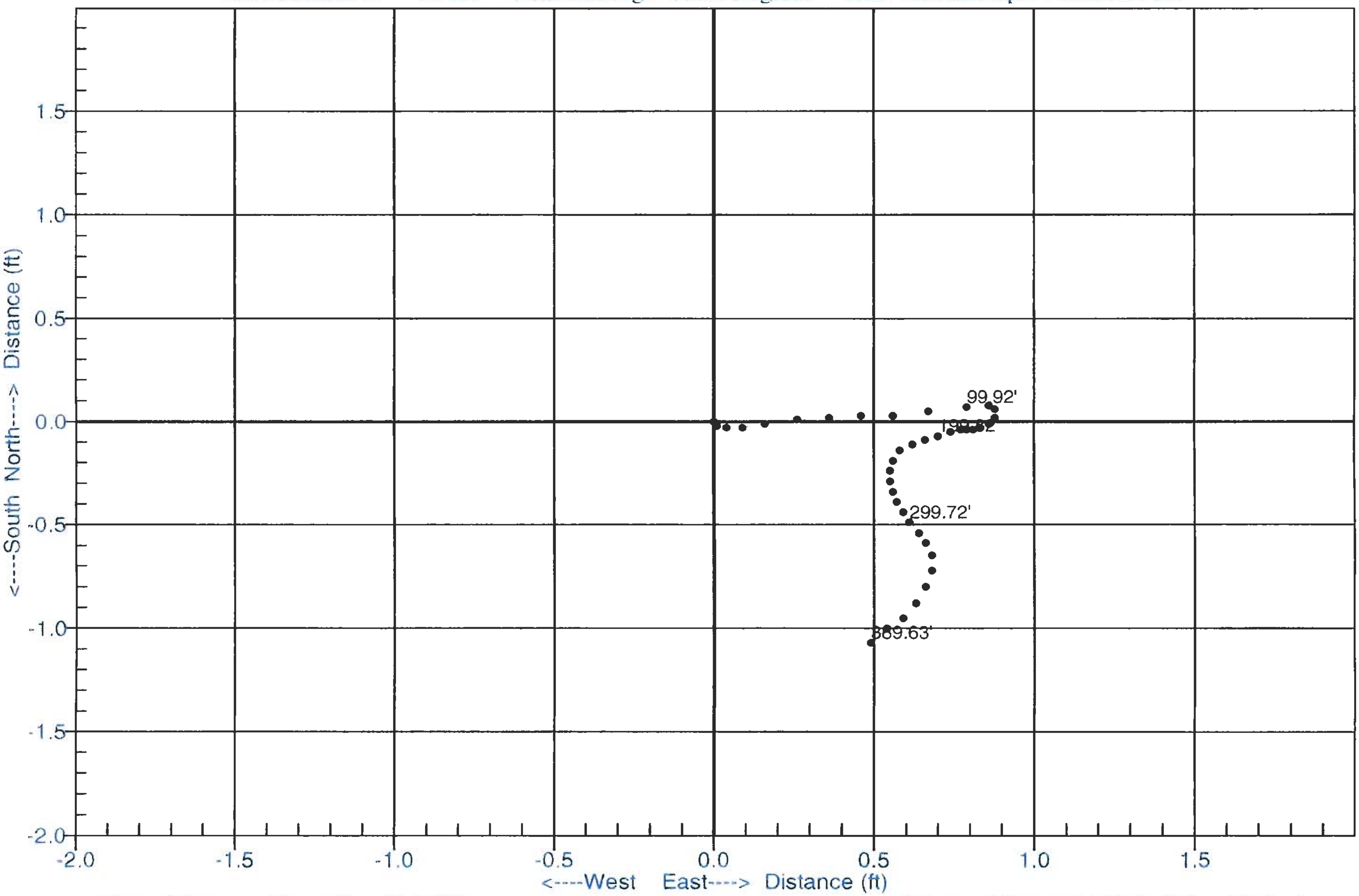
W-LBC

Drift-Pac Plan View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

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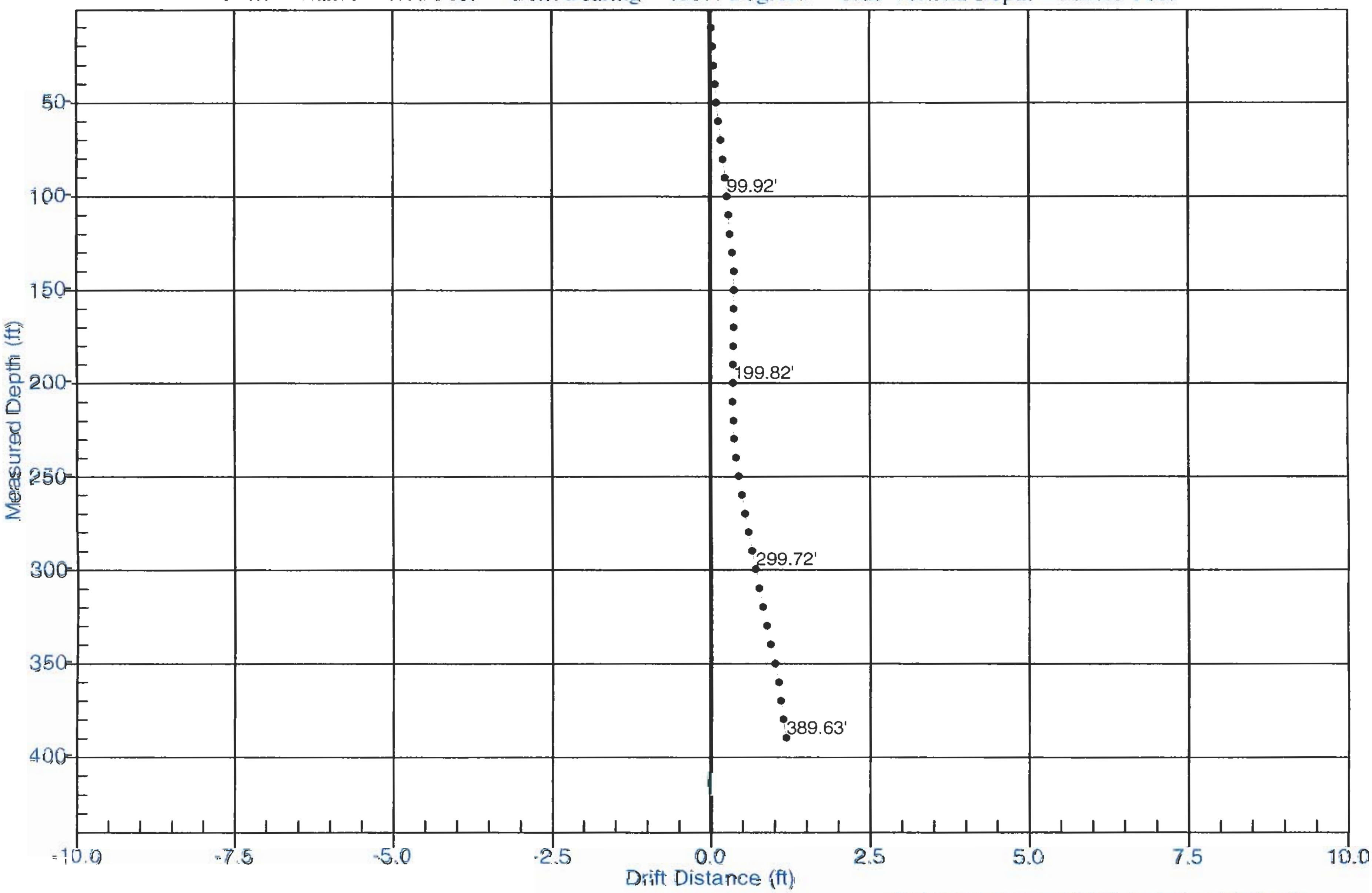
W-LBC

Drift-Pac Plane of Drift View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet



Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

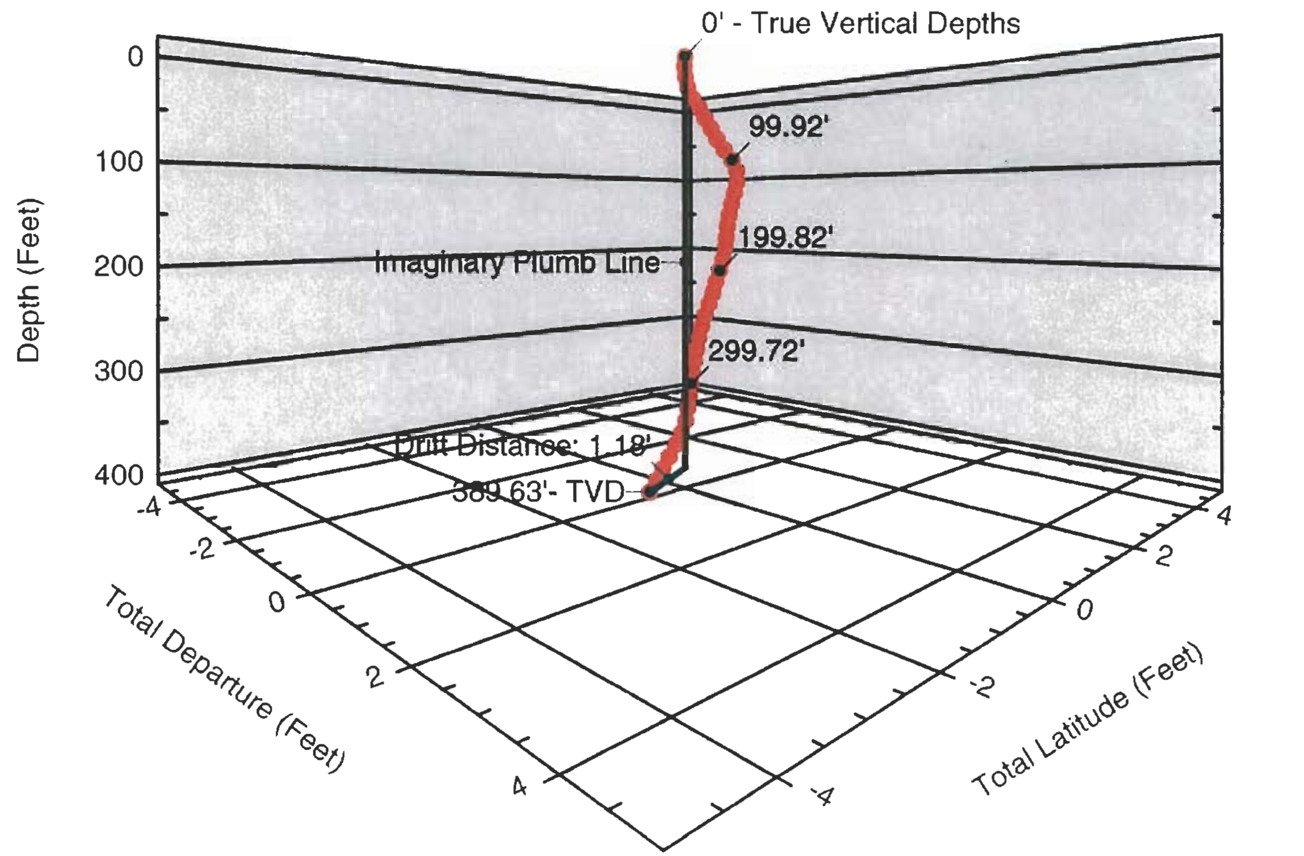
ENGEO

W-LBC

Drift-Pac 3D Projection View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet

226.0



Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

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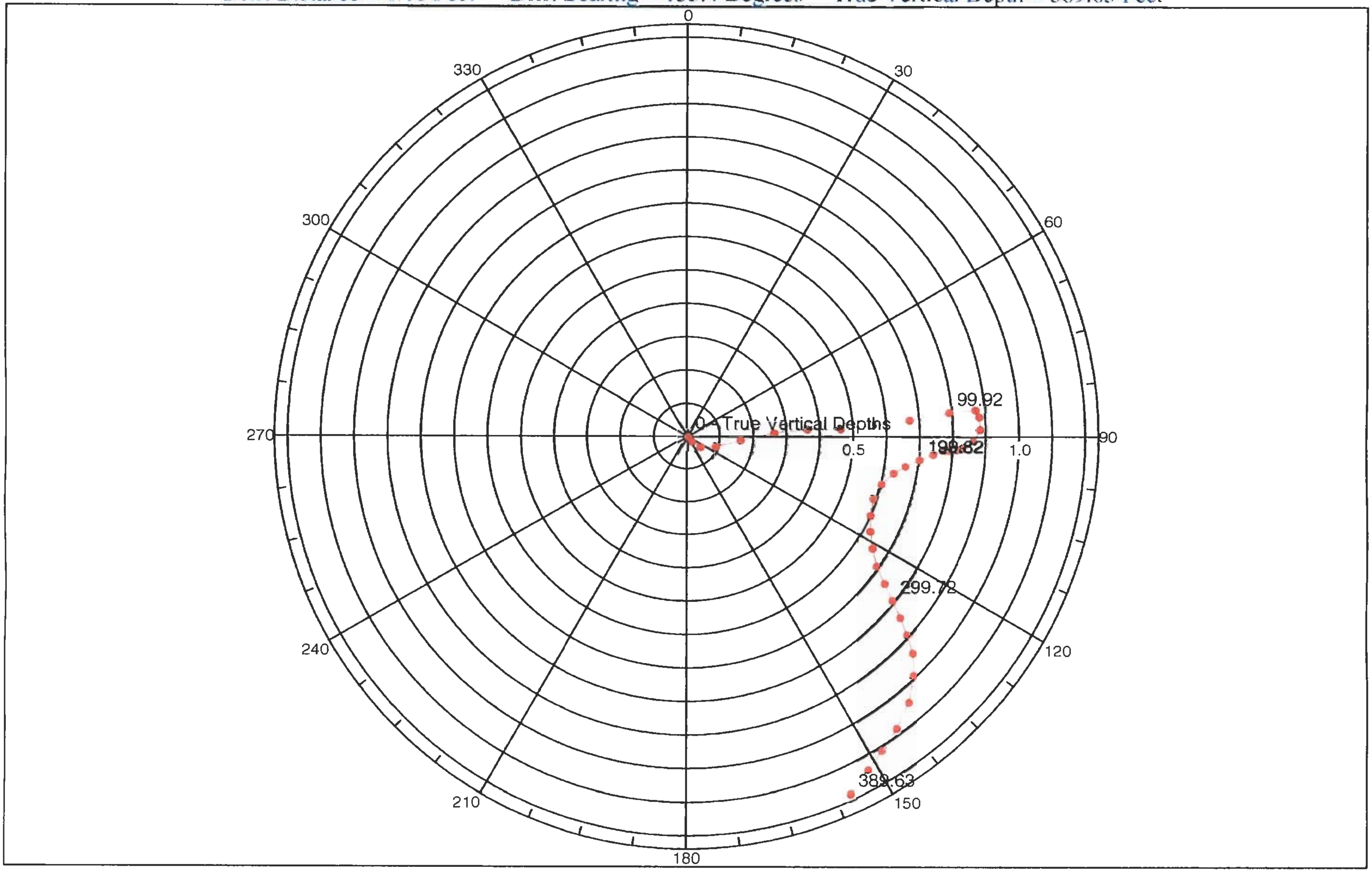
W-LBC

Drift-Pac Polar View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet

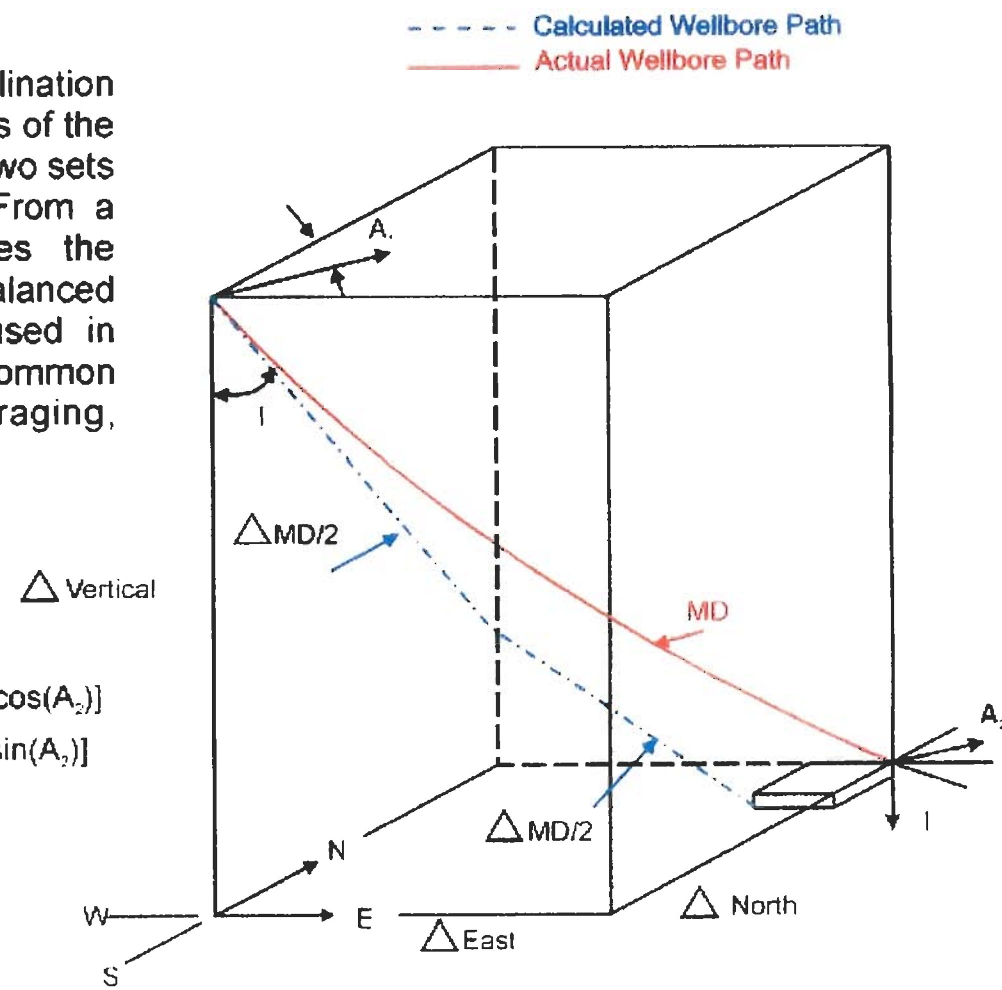


Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

Balanced Tangential Method

The Balanced Tangential Method uses the inclination and direction angles at the upper and lower ends of the course length in a manner so as to balance the two sets of measured angles over a course length. From a theoretical standpoint, this method combines the trigonometric functions to provide the average balanced inclination and direction angles, which are used in standard computational procedures. Other common names for this method are Vector Averaging, Acceleration, and Trapezoidal.



Δ North = [ΔMD/2] x [sin(I_1) x cos(A_1) + sin(I_2) x cos(A_2)]

Δ East = [ΔMD/2] x [sin(I_1) x sin(A_1) + sin(I_2) x sin(A_2)]

Δ Vertical = [ΔMD/2] x [cos(I_2) + cos(I_1)]

Appendix H2

Groundwater Study: Proposed Sutter Water Well Supply System, Sutter Medical Center

GROUNDWATER STUDY

PROPOSED SUTTER WATER WELL SUPPLY SYSTEM
SUTTER MEDICAL CENTER
SANTA ROSA, CALIFORNIA

NOVEMBER 17, 2009
6486.200.502

ENGEO
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GROUNDWATER STUDY

PROPOSED SUTTER WATER WELL SUPPLY SYSTEM
SUTTER MEDICAL CENTER
SANTA ROSA, CALIFORNIA

Submitted to:

P.R.I.S.M. LLC dba Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, CA 95405

Prepared by:
ENGEO Incorporated

July 31, 2009
Latest Revision November 17, 2009
Project No. 6486.200.502

- Expect Excellence -

ENGEO INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
6486.200.502

July 31, 2009
Latest Revision November 17, 2009

Ms. Nadin Sponamore
Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, CA 95405

Subject: Proposed Water Well Supply System
Sutter Medical Center of Santa Rosa
Sonoma County, California

GROUNDWATER STUDY

Dear Ms. Sponamore:

With your authorization, we completed this groundwater study for the proposed Sutter Medical Center of Santa Rosa, located in Sonoma County, California. The accompanying report presents our findings together with our conclusions regarding the potential cumulative impacts on the local groundwater resources related to increased water use by the proposed medical facility. We would like to thank Todd Engineers for providing third-party peer review of the report and our findings. We would also like to thank Sonoma County officials for their guidance in developing this study.

Sincerely,

ENGEO Incorporated

Kyle Delwiche

Kyle Delwiche, EIT

Jonathan Buck, PE

PROFESSIONAL GEOLOGIST
J. BROOKS RAMSDELL
No. 2356
Exp. 10/31/2009
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

J. Brooks Ramsdell, CEG

Shawn Munger, CHG

CERTIFIED HYDROGEOLOGIST
SHAWN MUNGER
No. HG 413
CERTIFIED HYDROGEOLOGIST
Exp. 3/31/2011
STATE OF CALIFORNIA

kd/jb/br/sm/jf:gw

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1.0 EXECUTIVE SUMMARY

1.1 BACKGROUND AND PURPOSE

The proposed Sutter Medical Center (SMC) site is located at 50 Mark West Springs Road in an unincorporated area of Sonoma County, California (Figure 1). As part of the development plans for the medical facility, two new water supply wells are planned at the site. The water supply wells are intended to meet the water demand for the proposed medical facility and irrigation needs of the SMC property. The wells are to be operated as an independent water supply well system with on-site water treatment facilities maintained by SMC. It is our understanding that one of the wells will serve as the primary well to provide the estimated water demand for the proposed medical center and the second well will serve as a backup well in cases where maintenance is required for the primary water supply well. It is also our understanding that the estimated water demand from the proposed primary water supply well will be approximately 58 AFY (acre-feet per year) which equates to a pump rate of around 60 gallons per minute for a little over 14 hours per day.

This report has been prepared in support of the Environmental Impact Report (EIR) for the proposed medical center in an effort to assess the potential use of groundwater to supply estimated water demand for the medical centers and to evaluate the potential impacts of a new water supply well at the site. Additionally, we have also considered potential long-term build out affects on the groundwater basin through 2030.

This report addresses the following issues:

- The hydrogeologic setting of the proposed well.
- Potential impacts to local surrounding wells, local surface waters, and aquatic habitat.
- Potential impacts on the groundwater in the surrounding developments.
- Current state of equilibrium within the water balance.
- Potential growth impacts on the water balance through 2030.

1.2 PROPOSED SUTTER MEDICAL CENTER MUNICIPAL WELL

The proposed Sutter Medical Center is located within the Larkfield District water system (Figure 2), which is currently owned and operated by the Cal-American Water Company (Cal-Am). Cal-Am currently pumps groundwater from four wells in the Larkfield district (Larkfield 1A, 3A, 4A and 5). It is our understanding that to provide for the additional water demand for the proposed Sutter Medical Center, a private water supply well is proposed at the project site. The projected water demand for the proposed medical center is approximately 58 AFY.

1.3 STUDY AREA

The selected study area encompasses a roughly 5,840-acre portion of the Mark West Creek watershed. This area extends from the Mark West development to the east towards Laguna de Santa Rosa (Laguna) Creek to the west. The study area was based on topographic contours in the vicinity of the creek and watershed boundaries and contains a substantial amount of agricultural acreage, in addition to the communities of Larkfield-Wikiup and Fulton.

Groundwater is an important source of water for both domestic and agriculture uses within the study area. Cal-Am distributions are the primary water source for the urbanized portion of the study area (Mark West and Fulton). Cal-Am distributes water pumped from its wells and imported water deliveries that it receives from the Sonoma County Water Agency (SCWA). The majority of the study area that is located west of Highway 101 is not within the Larkfield district water system. This area is predominantly agricultural and relies on privately owned wells for irrigation and rural domestic water use. In addition, some reclaimed water is imported to the western portion of the study area for agricultural uses from both the City of Santa Rosa and the Airport-Larkfield-Wikiup treatment plant.

The primary aquifers within the study area comprise the Pleistocene and Holocene alluvial fan and fluvial terrace deposits, the Plio-Pleistocene Glen Ellen Formation and the Pliocene and late Miocene Wilson Grove Formation (Merced Formation, Cardwell, 1958). The Glen Ellen formation will be the primary source of groundwater for the proposed SMC Well.

1.4 WATER BALANCE

We conducted a month-by-month soil moisture water balance for the study area to determine the approximate balance between water inflows and outflows. We used evapotranspiration data available from the California Irrigation Management Information System (CIMIS) station in Windsor to determine agricultural water demands for the study area. We used National Oceanic and Atmospheric Administration rainfall data to determine total precipitation and net recharge to the groundwater basin. We incorporated interception values, surface water runoff rates, and residential water demand to develop a comprehensive water balance.

1.5 FUTURE BUILD-OUT SCENARIO

In addition to analyzing the existing conditions water balance, we studied the potential impacts of the future build-out scenario in 2030. Sonoma County provided build-out information showing that in 2030 there will be approximately 467 residences within the study area. We quantified the potential impacts of these additional residences on future water demands. We also considered water conservation measures that may be used in the future. We assumed that increases in agricultural lands will be negligible.

1.6 CONCLUSIONS

Based on the results of the analysis, and the review of existing policy documents that create a management framework for groundwater extraction in the study, we conclude the following for the existing conditions.

- Groundwater is a potential potable water source for the proposed Sutter Medical Center development. In that particular portion of Sonoma County, groundwater serves the needs of many residents and a variety of land uses.

- A water balance for the current conditions covering a study period between 1987 and 2007 indicates that inflows and outflows within the study area are at a near balance with estimated inflows of around 2,830 acre-feet per year (AFY) and estimated outflows of 2,840 AFY. This appears to indicate a small net negative change in storage around 10 AFY. It should be noted that very often data and measurements in hydrology are imperfect and have margins of error of 5% or more. Recognizing that this total contains a margin of error and is derived from imperfect data, we conclude that the total is well within the margin of error typical for a study of this type and indicative of a net balance. This is further supported by hydrograph data within the study area that indicates relatively stable to slightly increasing water levels during the study period.

- The existing groundwater basin below the proposed hospital is in an equilibrium state with regard to inflows and outflows. Minor changes to the groundwater balance caused by the proposed well pumping will likely include a small decline in storage around the pumping wells and interception of subsurface outflows.

- The Sonoma County Water Agency and the City of Santa Rosa recognize the importance of groundwater as a resource and have prepared several policy level documents to manage future water resources in the region. Future groundwater development will be guided by City and County policy.

- In general, water quality within the Santa Rosa Plain Subbasin is considered good (DWR 1982). More locally, the groundwater sampling results from existing wells at the subject site (ENGEO, 2006) indicated that the majority of samples were below the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs).

- While the conducted calculations provide numerical estimations of the current net changes in storage (namely, -10 AFY), we recognize that this figure is an annual average and masks the yearly fluctuations inherent to a dynamic groundwater basin system. These systems are capable of responding to external changes such as drought years or wet years to achieve new equilibrium balance points. With the addition of the proposed well, the groundwater basin will adjust to achieve a new stable equilibrium point; groundwater levels in the vicinity of well will drop slightly to accommodate the new pumping and reach a new equilibrium contour configuration. In our opinion, addition of the proposed Sutter well pumping is not likely to adversely affect the ability of the groundwater basin to achieve a stable equilibrium condition.

- Based on the assessment of potential drawdown and the radius of influence for the proposed Sutter Medical Center well, its additional pumping does not represent a significant adverse impact on existing private wells in the local vicinity.

- Based on our calculations for the future build-out scenario in 2030, we estimate an approximate increase in groundwater demand of 168 AFY. This would include a 20% per capita reduction in water use by 2020, as recommended by the Governor of California.

2.0 INTRODUCTION

2.1 BACKGROUND

ENGEO Incorporated has prepared this groundwater study on behalf of P.R.I.S.M. LLC for two proposed groundwater supply wells associated within the proposed Sutter Medical Center (SMC) to be located north of Santa Rosa, California. The proposed Sutter Medical Center site is located at 50 Mark West Springs Road in Santa Rosa, Sonoma County, California (Latitude of 38.4953 degrees North; Longitude of 122.7520 degrees West). The approximate site location is shown on the Site Vicinity Map (Figure 1). The current hospital development includes a 2-story Medical Center Bed Tower and Diagnostic and Treatment (D&T) structure, a 3-story Joint Venture (JV) Bed Tower, a Surgery Wing structure, and associated maintenance structures.

The proposed Sutter Medical Center is located within the Larkfield District water system (Figure 2), which is currently owned and operated by California American Water Company (Cal-Am). Cal-Am currently pumps groundwater from four wells in the Larkfield District (Larkfield 1A, 3A, 4A and 5). The four wells, in addition to supplies from the Sonoma County Water Agency (SCWA), are used to meet the current demands within the Larkfield District (Santa Rosa General Plan, 2008). Additional water demand for the proposed Sutter Medical Center will be provided by a new private water supply well and a backup well proposed at the project site. The water supply wells will be independently owned and operated by SMC. The project's daily and peak flow water demand is based upon calculations that include demand from all the project components. This information is provided in units of gallons per day and is detailed in the Brelje & Race Consulting Engineers' Water and Wastewater Services Report, New Replacement Hospital Project, Sutter Medical Center of Santa Rosa, November 16, 2009, and more recent irrigation projections provided by the landscape architect for the project (Quadriga, November, 2009). Groundwater assessment to determine the suitability of the water basin evaluated long-term needs and this demand is presented in AFY (acre-feet per year). For the purpose of this study, we have assumed that the overall volume of water to be pumped from the proposed wells annually will be approximately 58 AFY.

The proposed SMC Wells are located within an area of the Santa Rosa Plain Sub-Basin generally referred to as the Larkfield Storage Unit (DWR 1975). In general, the Larkfield Storage Unit comprises three known aquifers that are referred to as Shallow, Intermediate, and Deep. The sources of groundwater for the Larkfield District Wells are the Intermediate and Deep aquifers. The source of groundwater for the proposed SMC wells will also likely be the Intermediate and Deep Aquifers. Based on the geology of the water-bearing formations in the area, the two lower aquifers appear to be semi-confined to confined and connected on a regional scale.

2.2 PURPOSE AND SCOPE

The purpose of this study is to support the groundwater-related portions of the Environmental Impact Report (EIR) for the proposed Sutter Medical Center. This groundwater study evaluates the following issues related to the proposed water supply well:

- The suitability of the proposed well to provide sufficient water quantity and quality for the hospital.
- Potential impacts to existing operating wells in the study area.
- Potential cumulative impacts to groundwater quality and long-term supply assuming reasonably foreseeable future growth in the study area, based on Sonoma County General Plan.

2.3 STUDY AREA

The project site is located near the boundary between two sub-watersheds of the Laguna de Santa Rosa Watershed (Figure 3). The proposed SMC water supply well system is located near the southern boundary of the western portions of the Mark West Creek watershed. The proposed Sutter Medical Center site is located across the watershed divide that separates the lower Mark West Creek watershed from the smaller Piner Creek watershed. For the purpose of this study, the study area is defined as the portion of the Mark West Creek watershed that overlies the Santa Rosa plain sub-basin as defined by DWR Bulletin 118, plus the portion of the Piner Creek watershed in the vicinity of the project site (Figure 3). The study area encompasses approximately 5,840 acres (roughly 7% of the area of the Santa Rosa Plain Subbasin) and generally occupies a relatively flat area in the northern portion of the Santa Rosa Plain. The proposed Sutter Medical Center and associated water supply well system site is located on an alluvial fan near the eastern edge of the study area.

3.0 HYDROGEOLOGIC SETTING

3.1 LOCATION

The study area is located in the northwestern portion of the Laguna de Santa Rosa watershed and more specifically represents the western portion of the watershed for Mark West Creek. Mark

West Creek generally flows westward towards the Laguna de Santa Rosa, located near the western edge of the Santa Rosa Plain. Topographically, the study area is relatively flat with an average topographic gradient towards the west-southwest of approximately 0.3%. Elevations within the study area range from near 200 feet above mean sea level near the base of the hills (MSL) at the eastern boundary to approximately 50 feet MSL at the western boundary near the Laguna de Santa Rosa.

Sub-watersheds of Santa Rosa Creek and the Laguna de Santa Rosa border the study area on the south. These sub-watersheds include the Piner Creek and Abramson Creek watersheds, which drain southwest towards Santa Rosa Creek. A sub-watershed of the Laguna de Santa Rosa containing Olivet Creek and designated as "unknown" also borders the southern boundary of the study area (Hargreaves 2002). The watershed for Windsor Creek borders the northern boundary of the study area. Due to the generally flat and subdued topography within the Santa Rosa Plain, the watershed divides are relatively subtle.

3.2 REGIONAL AND LOCAL GEOLOGY

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, about 4 million years before present. Locally, the site is mapped as underlain by Holocene-alluvium as shown on Figures 4 and 5 (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). This alluvium consists of unconsolidated deposits of sand, silt, gravel, and clay derived from the bedrock uplands to the east and older unconsolidated deposits. The alluvial deposits in this area are typically greater than 100 feet in thickness. Underlying the Holocene-alluvium is the Glen Ellen Formation (Cardwell, 1958). The Glen Ellen Formation was deposited during late Pliocene and early Pleistocene time as alluvial fans shed from the east towards shallow bays or lagoons (Cardwell, 1958). The Glen Ellen Formation typically comprises lenticular beds of poorly sorted gravel, sand, silt and clay. As is characteristic of alluvial fan deposits, individual beds vary widely in thickness, are not horizontally continuous, and typically grade into one another over short distances. Locally underlying and interfingering with the Glen Ellen Formation are the late Pliocene Wilson Grove (Merced) Formation and, in some instances, the Sonoma Volcanics (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). The marine Wilson Grove Formation generally comprises massive sandstone with thin claystone and siltstone interbeds and occasional gravels lenses (Cardwell, 1958). The Glen Ellen and Wilson Grove formations are the primary water-bearing formations in the study area.

3.3 SOILS

According to the USDA Web Soil Survey (Figure 6), the predominant mapped soil units within the study area generally consist of the following:

TABLE 1
Study Area Soils

MAPPED UNIT NAME	HYDROLOGIC SOIL GROUP	AVAILABLE WATER CAPACITY (inches)	APPROXIMATE PERCENTAGE OF STUDY AREA
Huichica Loam	C	3.8	22.95
Huichica Loam	D	2.8	21.34
Yolo Silt	B	10.6	16.48
Zamora Silty Clay Loam	B	10	10.42
Yolo Clay	B	9.7	7.41
Yolo Loam	B	9.6	7.23
Riverwash	D	1.8	4.04
Cortina Very Gravelly Sandy Loam	A	4	2.65
Yolo Loam Overwash	B	10.6	2.32
Alluvial Land, Clayey	C	6.6	1.53
Clear Lake Clay, Ponded	D	9	0.76
Yolo Sandy Loam	B	9.2	0.70
Felta Very Gravelly Loam	B	4.4	0.69
Haire Clay Loam	C	7.3	0.68
Yolo Sandy Loam	B	9	0.27
Spreckels Loam	C	4.6	0.20
Pajaro Clay Loam	C	8.9	0.09
Goulding Cobbly Clay Loam	D	1.5	0.02

The table above provides data both for soil moisture holding capacity and USDA hydrologic soil group for each soil type. The soil moisture holding capacity represents the amount of water that a typical total depth of each soil type can hold in inches; this moisture holding capacity is assumed for the entire mapped extent of each soil in the study area. For the soil moisture water balance, an area-weighted average moisture holding capacity was applied to the study area and used in the calculations to determine the distribution of rainfall into evapotranspiration, runoff, and recharge, and to estimate applied water for agriculture.

In addition to the soil moisture holding information, the spreadsheet also contains USDA soil group information. The USDA soil survey categorizes soils into four Hydrologic Soil Groups (A, B, C, and D) based on estimates of runoff potential. The Hydrologic Soil Groups (HSG) are defined as follows:

- Group A soils have low runoff potential, are well drained, and have high infiltration rates when saturated.

- Group B soils have moderate infiltration rates when saturated, are well to moderately well drained and thus have a moderate potential for runoff.

- Group C soils have slow infiltration rates when saturated, and consist of soils having a layer that impedes the downward movement of water.

- Group D soils have a high potential for runoff, and very slow infiltration rates when saturated.

As shown in the table above, study area soils are predominantly B soils (approximately 46% of the area). Approximately 26% and 25% of the study area is underlain by soils of the D and C HSGs, respectively, while A soils compose only a small fraction of the study area. The preponderance of B type soils indicates that a significant portion of the study area has soils with moderate infiltration rates. This demonstrated capacity for infiltration coupled with the observation that the study area is primarily flat is pertinent to the discussion of rainfall recharge rates, as discussed in the Water Balance section.

3.4 DWR-DESIGNATED AREAS OF SIGNIFICANT GROUNDWATER RECHARGE

The eastern portion of the study area occupies an alluvial fan that slopes gently towards the west from its apex near the location where Mark West Creek flows from the Mayacama Mountains out onto the Santa Rosa Plain (McLaughlin et al., 2008, Sowers et al. 1998). A large portion of this alluvial fan, as well as significant portions of the Santa Rosa Plain south of Mark West Creek (Figure 7), have been designated as areas of significant natural recharge by the California Department of Water Resources (DWR, 1982). According to the 1982 DWR study, recharge areas have been classified based on slope and soil permeability with areas of recharge designated as those with less than a 15% slope coupled with soils with infiltration rates greater than 0.6 inch/hour (1.5 cm/hr). Areas of slow recharge are designated as those with slopes greater than 15% or areas where soil infiltration rates are less than 0.6 inch/hour (1.5 cm/hr).

While acknowledging the DWR documentation of areas of significant recharge, soils data for the area demonstrate that the entire study area is underlain by alluvial soils that provide some amount of recharge to groundwater. Moreover, the relatively flat slopes within the study area result in significant recharge capabilities by slowing runoff and allowing water to percolate into the groundwater basin. The water balance therefore considers potential recharge across the entire study area and does not rely on the DWR designated recharge areas.

3.5 CLIMATE

The primary inflow component in our water balance equation is precipitation. Monthly rainfall data from 1987 to 2009 were acquired from the National Oceanic and Atmospheric

Administration rainfall gauge in Santa Rosa. Figure 8 shows the station location. Annual rainfall totals are provided in Table 1 in Appendix A. As shown, the study period includes average, wet, and dry years. Water years 1995, 1998, and 2006 are each significantly wetter than average, with rainfall totals ranging from 45.72 inches to 52.94 inches. Significant drought years are represented by the period from water year 1987 to 1990 (average rainfall 22.26 inches), with other low rainfall years occurring in 1994, 2001, and 2007 (20.75 to 21.39 inches). By including years with both above- and below-average rainfall, the study period is representative of long-term hydrologic conditions.

Review of the Sonoma County Water Agency isohyetal (rainfall distribution map) indicates that rainfall is about 32 inches in the central portion of the study area and increases to about 35 inches to the east and west. For the purposes of this water balance, the distribution of precipitation is assumed to be uniform across the study area.

It was also assumed that precipitation falling on impervious surface areas in urban areas would not be available for infiltration and therefore would not contribute to the water balance. In rural agricultural areas, it was assumed that precipitation falling on impervious surfaces would flow onto pervious surfaces and become available for infiltration.

Of the rainfall that occurs in the study area, only a portion ultimately becomes groundwater recharge. Rainfall is lost to the atmosphere both through interception and evapotranspiration, and the remaining rainfall is partitioned between runoff into Mark West Creek and recharge into the groundwater basin. Evapotranspiration reflects the amount of water that plants consume and return to the atmosphere either through transpiration or evaporation. Evaporation occurs from the soil and plant surfaces, while transpiration occurs from plant tissues, and evapotranspiraton is the combination of the two. Evapotranspiration rates vary based on the type of vegetation.

For the purposes of the water balance, evapotranspiration rates were estimated based on data acquired from the California Irrigation Management Information System (CIMIS) database of monthly evapotranspiration amounts (Table 2, Appendix A). The CIMIS gauge closest to the study area is in Windsor (Figure 8). Monthly evapotranspiration data are available from 1991 to present, but not for water years 1987-1991. For these years, monthly evapotranspiration were estimated using data from years with similar rainfall amounts. Crop-specific evapotranspiration information was obtained from California Department of Water Resources to take into consideration the different crop types within the study area (Table 3, Appendix A).

3.6 LAND USE

Current land uses within the study area were determined based on the 1999 DWR land use survey (Figure 9). The DWR survey provides actual acreages of land use types such as native vegetation, vineyards, deciduous tree crops, truck crops, urban areas, and commercial areas (Table 4, Appendix A).

Current land use in the study area generally consists of agriculture and rural residential west of Highway 101 and low- and medium-density residential areas, with scattered business and commercial land/minor agriculture east of Highway 101. The most extensive land use within the study area is agriculture, which mainly consists of vineyards in the west and central portions of the study area west of Highway 101. Vineyards cover approximately 40% of the study area, while native vegetation covers approximately 24% of the study area. Other crops such as deciduous trees, corn, hay, and truck crops cover an additional 7% of the study area. Approximately 22% of the study area is classified as urban, residential, industrial, and commercial. The remaining acreage is pasture, riparian vegetation, and idle land. The complete acreages for the DWR land use designations are summarized in Table 4. For the purposes of this study, it is assumed that 1999 agricultural land uses are reasonably representative of the study period, recognizing that irrigated agriculture was less extensive in 1987 than in 1999 or 2007.

3.7 RESIDENTIAL WATER DEMAND AND SUPPLY

The portion of the study area east of Highway 101, as well as the Community of Fulton, are within the Larkfield District water system service area, which is served by Cal-Am. The portion of the study area located west of Highway 101 is generally rural and, with the exception of the community of Fulton, relies on private wells for domestic and agricultural water supply.

The study area includes the southern half of the Cal-American operated Larkfield District (Figure 2). According to the State of California Department of Public Health (Drinking Water), Cal-Am currently services 2,357 connections within the Larkfield District water system and approximately 1,229 of those connections are within the subject study area (EPS 2007).

Cal-Am meets the demand within its service area with the four wells it operates within the District (Larkfield 1A, 3A, 4A and 5) and with water purchased from the Sonoma County Water Agency (SCWA). The annual groundwater production from the Cal-Am wells and the water purchased from SCWA are summarized in the table below.

TABLE 2
Larkfield District Water Sources

CALENDAR YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Cal-Am Annual Groundwater Production (AFY) – (Santa Rosa General Plan 2035)	616	775	690	843	867	688	856	831	763	642	677
Sonoma County Water Agency (SCWA) Supplies to Cal American (AFY)	661	580	569	494	437	614	388	533	506	522	575
Total for Larkfield District (AFY)	1276	1355	1259	1337	1304	1302	1244	1364	1269	1164	1252

Water deliveries from Cal–Am in the Larkfield District have averaged approximately 1284 AFY over the period 1997 through 2007. Cal-Am pumping data for 1987 through 1997 were not available. In order to assess the pumping volumes for those years, US census data for the area was applied to estimate population growth between 1990 and 2000. The estimated population growth was correlated with Cal-Am pumping to approximate values for 1987 through 1997.

In general, rural and agricultural areas not within the Cal-Am water system service area are dependent on private wells for both domestic and agricultural water supply. Water use in these areas was estimated based on typical rural domestic water use in addition to typical irrigation practices and water needs for the crop types within the study area. Based on review of parcel maps and aerial photographs of the study area, approximately 250 rural residences were identified within the study area. The unit residential water use was assumed to be 0.53 AFY. In support of this, well completion reports were requested from DWR and reviewed for the number and types of wells within the study area. Based on well completion reports received from DWR and information from published reports, approximately 230 wells have been installed in the study area (see Table 1 in Appendix B). According to the well completion reports, over 60% of the wells were installed for domestic uses, 20% for agricultural or agricultural/domestic uses, over 10% for monitoring purposes, and about 3% for municipal uses. Well depths range from about 25 feet in depth below ground surface (bgs) to 1,000 feet below the ground surface. Over 50% of the wells within the study area were relatively shallow wells (around 100 feet in depth or less) and drilled prior to 1980. Approximately 25% of the shallow wells are groundwater monitoring wells and the remaining 75% are shallow domestic wells. It is likely that many of the older wells have since been abandoned or replaced.

3.8 AGRICULTURAL WATER DEMAND AND SUPPLY

The portion of the study area west of Highway 101 is devoted primarily to agriculture. Of the agricultural lands, 79% contain vineyards and the remaining 21% contain miscellaneous crops. Based on conversations with the Sonoma County Water Agency, we have assumed that the water required for these crops is obtained primarily from groundwater pumping in the dry summer months, supplemented with precipitation in the wet winter months. A portion of this water demand is satisfied by reclaimed water use, which is discussed in the water balance inflows section. The soil moisture water balance analysis (as discussed below) was used to develop approximate applied water amounts to satisfy crop water requirements. This analysis assumes that farmers in the area are "perfect irrigators," meaning that they do not over-water their crops. On the other hand, it is also assumed that farmers are not practicing deficit irrigation, the practice of stressing vineyards by providing less water than demanded by ideal evapotranspiration conditions.

In addition to providing for plant evapotranspiration needs, agricultural water is also applied for frost protection in vineyards. During the spring (March, April, and May), frost can damage budding vines. Low-lying valley areas, where cold air tends to collect on cold, still nights, are more susceptible to frost damage than higher terraces or hillsides. The number of spring days when frost protection is needed varies by year and location, but is generally about seven days in the Windsor area (IWMI, 2009). Growers can protect vineyards with a number of means, including wind machines, traditional sprinklers, and micro-pulsating sprinklers. Use of traditional sprinklers often involves application of substantial amounts of water over short periods. Accordingly, many growers pump from streams or ponds with pumping systems that can provide frost protection water at substantial rates. For the purposes of this study, the consumptive use of frost protection water is assumed negligible, given the variety of frost protection systems, common use of surface water, and return of most applied water to the soil and groundwater.

Water also may be applied for heat protection when temperatures exceed 90^{o} Fahrenheit. Application of water for heat protection would result in evaporation losses. Water application for heat protection has been estimated at 0.17 acre-feet per year per acre in northern Napa County (West/Yost, 2005), but is applied only to a portion of the vineyard acreage. For the purposes of this study, the use of water for heat protection is considered insignificant for the Mark West Creek area, because it has a cooler, more coastal climate than Napa County.

3.9 STREAMFLOW

Mark West Creek flows in a west-southwesterly direction through the northern portion of the study area. The USGS has a stream gauge on Mark West Creek at the Fulton Road Bridge, approximately 3.6 miles southeast of Windsor. Stream gauge data is limited for Mark West Creek; however, we were able to locate data for the water years of 2007 and 2008 summarized on the table below.

TABLE 3
Mark West Creek Flows

USGS 11465500 Mark West C NR Windsor CA Stream Gauge Data	
CALENDAR YEAR	**ANNUAL FLOW AFY**
2007	15,501
2008	23,937

Precipitation data during the water years of 2007 and 2008 was 74 and 78 percent of normal for the region.

3.10 LOCAL HYDROGEOLOGY

The study area is located within the northern portion of the Santa Rosa Plain groundwater sub-basin 1-55.01. The groundwater sub-basin occupies a surface area of approximately 125 square miles and is located beneath an approximately 22-mile-long and 5- to 9-mile-wide northwest-trending fault bound valley which extends from near the town of Cotati in the south to near the town of Healdsburg in the north (DWR, 2004). The Rodgers Creek and Healdsburg faults are located along the east side of the basin and the Tolay and Bloomfield faults are located to the west (Jennings, 1975). The basin is bordered by the Mayacama and Sonoma mountains on the east and the Mendocino Range on the west. According to DWR (2004), most of the groundwater within the Santa Rosa Plain subbasin is at water table conditions with few local exceptions where folding and faulting creates confined conditions.

Geologic units within the study area include the Jura-Cretaceous Franciscan Complex, the Pliocene and Miocene Sonoma Volcanics, Petaluma and Wilson Grove Formation (Merced Formation), the Plio-Pleistocene Glen Ellen Formation and Pleistocene - Holocene alluvial fan and fluvial terrace deposits (Figure 4).

The basement rocks within the study area are mapped as undifferentiated mélange of the Central Belt of the Franciscan Complex (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). In general, these rocks comprise highly sheared, sandstone and argillite with varying sized blocks of various lithologies throughout (McLaughlin et al., 2008). In general, rocks of the Franciscan Complex are well consolidated and not considered water bearing, except in very localized areas where fracture zones are well developed. Wells within the study area do not rely on the Franciscan rocks as a source of groundwater.

The Pliocene and Miocene Petaluma Formation is mapped as unconformably overlying the Franciscan Complex and is interpreted to be underlying a large percentage of the Santa Rosa Plain (McLaughlin et al., 2008). The Petaluma Formation is predominantly composed of sandy to silty gravel, silty sandstone, siltstone, and mudstone that were deposited in fluvial, lacustrine and brackish to estuarine environments (McLaughlin et al., 2008; Cardwell, 1958). In general, water yields are low in this formation and, within the study area, it does not represent an important water-bearing formation.

The Pliocene and Miocene Sonoma Volcanics comprise a series of bimodal volcanic units that range from basalt flows to rhyolitic tuffs that accumulated over a 30-mile (east-west) by 40-mile (north-south) area. Most recent interpretations based on more extensive age dating indicate that these volcanic units were deposited contemporaneously with the Petaluma, Wilson Grove (Merced) and lower Glen Ellen Formations (McLaughlin, et al., 2008). The water yielding capacity of units of the Sonoma Volcanics vary widely depending on lithology, with higher yields from the tuff units (Cardwell, 1958). The Sonoma Volcanics are not a significant hydrogeologic formation in our study area.

The Pliocene and late Miocene Wilson Grove Formation (Merced Formation, Cardwell, 1958) comprises marine pebbly sandstone, siltstone and pebbly gravel (McLaughlin et al., 2008). The Wilson Grove Formation is mapped as underlying a large portion of the Santa Rosa Plain, predominantly along the western half of the Valley (McLaughlin et al. 2008 and Cardwell, 1958). This formation is considered one of the major water-bearing units within the Santa Rosa Plain subbasin with specific yields that range from 10 to 20 percent (DWR, 2004). According to Cardwell (1958), semi-confined to confined conditions may exist locally where clay lenses are present. Recharge is mainly from the southwestern portion of the basin; however, within the study area, much of the recharge likely comes from the overlying Glen Ellen Formation (DWR, 2004). Many of the wells within the study area rely on this formation as a source of groundwater, particularly the agricultural wells in the western portion of the study area.

Overlying the Wilson Grove Formation in the study area is the Plio-Pleistocene Glen Ellen Formation, which represents the primary source of groundwater for the existing wells in the vicinity of the proposed Sutter Medical Center, including the majority of wells within the eastern portion of the study area. The Glen Ellen Formation typically comprises non-marine, lenticular beds of poorly sorted gravel, sandstone, siltstone and mudstone (McLaughlin et al., 2008 and Cardwell, 1958). As characteristic of alluvial fan deposits, individual beds vary widely in thickness, are not horizontally continuous and typically grade into one another over short distances. The Glen Ellen Formation was deposited during late Pliocene and early Pleistocene time as alluvial fans shed from the east towards shallow bays or lagoons (Cardwell, 1958). Average specific yields range from 3 to 7 percent (DWR, 2004). Because the Glen Ellen Formation crops out in many areas within the Santa Rosa Plain, recharge is thought to occur readily, except where overlain by low permeability soils (DWR, 2004).

Pleistocene and Holocene alluvial fan and fluvial terrace deposits blanket the Santa Rosa Plain. These deposits generally comprise poorly sorted gravel, sand, silt, and clay and have a maximum exposed thickness of 100 feet (Cardwell, 1958). These units typically have specific yields that range between 8 and 17 percent and are tapped by some shallow wells within the study area.

Information compiled from published geologic mapping, DWR well completion reports and subsurface information from Cardwell (1958) was used to construct a geologic cross section through the study area (Figure 5). The cross section depicts the interfingering between the Glen Ellen Formation and the Wilson Grove Formation across the Santa Rosa Valley in the study area.

Based on DWR (1982) calculations, the groundwater storage capacity of the entire Santa Rosa Plain Subbasin is approximately 4,313,000 acre-feet. As previously discussed, the study area occupies approximately 5,840 acres or roughly 7% of the area of the basin. Rough calculations for storage capacity within the study area range between 250,000 and 350,000 acre-feet. These values are in the general range of the DWR calculated storage capacity for this portion of the basin (approximately 310,000 acre-feet).

3.11 GROUNDWATER LEVELS

According to DWR (2004), the groundwater within the Santa Rosa Plain Subbasin as a whole is approximately in balance, with increased groundwater levels in the northeast (in the vicinity of our study area) and decreased groundwater levels in the south. Recent groundwater contour mapping within our study area is lacking in the current literature. Cardwell (1958) produced the most comprehensive study of groundwater and hydrogeology in the basin, including a groundwater contour map that covers the study area. Based on Cardwell's (1958) groundwater contour map, groundwater levels within the study area are highest in the east (approximately160 feet above mean sea level) and gradually decrease towards the west to an elevation of around 50 feet near the Laguna de Santa Rosa; generally conforming to the topography across the Santa Rosa Valley.

GEI (2007), on behalf of Cal-Am, developed a groundwater contour map in the Larkfield District that includes areas east of Highway 101 within our study area. Based on available spring 2007 groundwater level data from DWR monitoring wells, GEI (2007) spring groundwater contours, and 2009 groundwater levels from the existing Wells Fargo and Sutter Vineyard wells (with reference to regional groundwater contour mapping from Cardwell), a generalized groundwater contour map was developed for the study area (Figure 10). The groundwater contour mapping shows the same general groundwater trend across the western portion of the study area that Cardwell depicted in 1958, and relatively low groundwater levels in the Larkfield District portion of the study area. These decreased groundwater levels indicate that a pumping depression has developed in this area since the time of Cardwell's study. Review of available groundwater pumping data suggests that this pumping depression is relatively stable.

Available groundwater level hydrographs from the existing Cal-Am and DWR wells were reviewed for the study area. The groundwater level hydrograph for Well 07N/09W01C1 (Appendix C) located in the western portion of the study area (Figure 10) has the longest historical record, extending from 1950 to the present. The historical trend shown on this hydrograph indicates that in 1950 groundwater levels were around 83 feet above mean sea level. Groundwater levels declined at a moderate rate to about 70 feet MSL until the early 1970s where groundwater level declined more rapidly to a low of near 50 feet MSL in 1977. Groundwater levels increased rapidly in the late 1970s to around 70 feet MSL and then increased gradually through the 1980s and 1990s to the spring 2009 level of approximately 84 feet MSL.

Based on this review, groundwater level trends from 1990 through 2008 for the five DWR wells in the vicinity of the study area all indicate either relatively stable or slightly increasing groundwater levels (Appendix C). Groundwater level trends from 2003 through 2007 for the four Cal-Am wells in the study area corroborate this, with three of the wells displaying relatively stable water levels (Wells 1A, 3A and 5A). One of the wells displays a substantial increase of more than 60 feet (Well 4A); this dramatic increase is likely localized and related to modifications in pumping practices within the Cal-Am water system.

These relatively stable to slightly increasing water level trends in the study area support the conclusion that the northeast portion of the Santa Rosa Plain Subbasin is in relative balance, with possibly a slight increase in storage due to decreases in groundwater pumping.

3.12 LAND SUBSIDENCE

Land subsidence is the lowering of the land surface resulting from changes that take place underground (Leake, 2004). Land subsidence can result from the withdrawal of fluid, most typically groundwater or petroleum, in weakly consolidated deposits, chemical weathering of soluble rocks such as limestone, oxidation of organic soils such as peat, or collapse due to underground mining (Leake, 2004). Land subsidence resulting from underground mining, chemical weathering of limestone or the oxidation of organic soils is not a concern in the study area due to the lack of underground mining and these geologic materials.

The overdrafting of aquifers and the resulting consolidation of clays and silts has been documented as a significant cause of subsidence in areas of the San Joaquin and Santa Clara valleys of California (Ireland, 1984; Poland, 1988). The consolidation of the clays and silts results from a loss of hydrostatic pressure associated with water withdrawal from the surrounding more permeable units in the aquifer.

As described in the local hydrogeology section of this report, the geologic formations that are the primary sources of groundwater underlying the study area comprise both Pliocene late Miocene marine deposits and Plio-Pleistocene alluvial deposits. These deposits are relatively incompressible and are therefore not subject to additional consolidation related to decreased hydrostatic pressure.

The proposed SMC well system will be located on the alluvial fan associated with Mark West Creek and underlain by both alluvial fan deposits and the Glen Ellen Formation. Because these geologic units are relatively well consolidated, the potential for subsidence related to pumping from the proposed well system is considered low.

3.13 GROUNDWATER QUALITY

According to a DWR study (1982) from the many wells tested within the Santa Rosa Plain subbasin, only a few wells contained constituents over the recommended concentrations for drinking water. DWR has concluded that, in general, the water quality within the Santa Rosa Plain subbasin is good (DWR, 2004).

More locally, groundwater sampling results from the recently installed Sutter Medical Center well (W-SMC, October 2009) and the existing Wells Fargo (W-WFC) and Sutter Vineyard wells (W-VI) at and near the subject site (ENGEO, 2006) indicated that the majority of samples when compared to the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs) were below the DHS MCLs. Appendix F of this report and Appendix C of the ENGEO 2006 Groundwater Aquifer Test and Water Quality Analysis report (report attached in Appendix E) provides water quality sample results for the W-SMC, W-WFC and the W-SV from which water samples were collected.

The initial water quality samples collected in July 2005 were analyzed to evaluate the following water quality parameters: total hardness as $CaCO_3$, total dissolved solids (TDS), total alkalinity as $CaCO_3$, pH; total silica, electrical conductivity, manganese, iron, and arsenic. The samples collected in November 2005 included additional constituents that were not analyzed in the initial samples including total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, hardness, pH, electrical conductivity, TDS, antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, and silica. Analysis of the water quality results indicates that the results from the start, the middle, and the end of each 2005 pump test are similar in value.

Near the end of the October 2009 pump test, water quality samples collected were analyzed to evaluate the following water quality parameters: total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, antimony, arsenic, aluminum, barium, beryllium, calcium, cadmium, chromium, fluoride, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, nitrate, nitrite, selenium, sodium, thallium, volatile hydrocarbons, perchlorate, total hardness, pH, asbestos and gross alpha. At the time of publishing this report, we had not received results on asbestos or gross alpha. Water quality analysis results indicate that the samples, when compared to the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs), were below the DHS MCLs, with the exception of Manganese. Manganese was reported at 870 ug/L. Arsenic reported at 9.5 ug/L was 0.5 ug/L below the MCL. Three days after the completion of the pump test, two water samples were recovered to confirm the arsenic and manganese concentrations (Appendix F). These analyses reported arsenic at 7.0 ug/L and 4.3 ug/L and Managanese at 810 ug/L and 850 ug/L, which in general is consistent with the initial results indicating elevated Manganese.

4.0 PROPOSED SUTTER MEDICAL CENTER WELL SYSTEM

4.1 BACKGROUND

The additional water demand for the proposed Sutter Medical Center will be supplied by a new water supply well and a backup water supply well, both to be located in the southwest corner of the project site (Figure 10). The projected average water demand after the first year for the proposed medical center not including the 2020+ future expansion is approximately 27,710 gallons per day (Brelje and Race 2009). Including the 2020+ future expansion the estimate water demand for the medical facility is approximately 35,220 gallons per day. Estimated peak irrigation demand for the first year is about 9,000,000 gallons, assuming a late spring or summer landscape plant installation (Brelje and Race 2009). As plants become established, estimated irrigation demands will diminish to about 6,100,000 gallons (Brelje and Race 2009). For the purpose of this study, we have assumed that the overall volume of water to be pumped from the proposed wells annually will be about 58 AFY (based on average water use including 2020+ expansion).

The existing Sutter Medical Center well (W-SMC) was constructed to an approximate depth of 510 feet below the ground surface using reverse circulation drilling methods. The boring was approximately 17 inches in diameter, with an 8-inch-diameter stainless steel casing.

According to the Water/Wastewater report prepared by Brelje and Race, the civil engineering firm designing the proposed well system, the peak pumping rate to meet the maximum demand for the medical facility including irrigation is estimated to be 90 gpm over a 10- to 16-hour period for the establishment year, and just under 70 gpm in subsequent years.

4.2 PREVIOUS PUMPING TEST RESULTS

ENGEO Incorporated previously published a groundwater aquifer test and water quality analysis report (2006) for the existing Wells Fargo Center well (formerly Luther Burbank Center well) located at the site. This report is attached as Appendix E. The existing agriculture groundwater supply well, W-WFC, is located near the center of the property at an elevation of approximately 160 feet above mean sea level (Figure 10). The well is situated approximately 700 feet from the proposed SMC wells. The WFC well was installed in August 2000 by Les Petersen Drilling and Pump, Inc., of Santa Rosa, California. The well was installed using rotary wash methods and is approximately 400 feet deep. The well consists of 10-inch-diameter 200-guage PVC (polyvinyl chloride) casing and screen. The well screen is slotted casing with 0.032-inch slot openings. Three screened intervals were installed at 100 to 160 feet, 180 to 320 feet, and 360 to 400 feet. The completed State of California Well Completion Report was provided to us and is included in the attached ENGEO report (Appendix E).

The results of the ENGEO 2006 report indicated that the demand of the proposed Sutter Medical Center was met by the existing agriculture production well. The previous estimated medical center demand was approximately 73,500 gallons per day, similar to the current proposed demand of around 84,300 gallons per day.

The 24-hour pumping test data from 2006 indicates that the aquifer at the WFC property has moderate to low transmissivity. Transmissivity (**T**) is a measure of the aquifer's ability to transmit water (i.e. how permeable it is). The transmissivity calculated from the previous pump test was 4,400 gallons per day per foot (gpd/ft).

The storage coefficient (**S**), or storativity, is the volume of water released from or taken into storage per unit surface area per unit change of the hydraulic head; it is a measure of the aquifer's ability to release groundwater from storage. During the previous 24-hour pumping test, the observation well located approximately 1,200 feet away, observed no effect from the continual pumping in W-WFC, and as a result, the calculations for storativity were limited. However, by applying reasonable assumptions, an estimated range of storativity between 0.15 and 0.35 was derived. It should be noted that these values are higher than what would be expected for wells that have tapped the deeper levels of the aquifer such as the proposed SMC Wells. Typical values for storativity for these types of aquifers range from .005 to .0005, which are indicative of partially confined to confined conditions. The recent pumping test performed on the SMC well provides information and data to further constrain the value of storativity and transmissivity within this aquifer.

4.3 INSTALLATION OF SUTTER WELL AND RECENT PUMPING TEST RESULTS

A well was recently drilled, designed and constructed in the vicinity of the southwest corner of the Sutter Property. Drilling and construction of the well commenced in August 2009 and was completed in September 2009. A well installation and testing report containing details of drilling, design, construction and testing for the recently installed Sutter Medical Center Well (SMC-W) will be published in November 2009.

The recent well was installed to a depth of approximately 510 feet below the existing ground surface. Three screened intervals were installed at 170 to 310 feet below the ground surface (bgs), 360 to 395 feet bgs, and 430 to 490 feet bgs. The well was constructed with 8-inch-diameter stainless steel casing and .045 – inch slot size stainless steel continuous wire wrap screens. A SRI PF#12 gravel filter pack with bentonite seals between screened intervals was installed in the annular space between the casing and borehole.

Following installation and development of the well, a 72-hour constant rate pumping test was conducted at an average pump rate of approximately 153 gallons per minute (gpm). The pumping rate of 153 gpm, at which the pump test was conducted, is more than 2 times greater than the proposed average pumping rate required to meet the projected water demands for the project. During the pumping test, drawdown measurements were recorded in four observation monitoring wells. The monitoring wells included the Wells Fargo Center Well located approximately 740 feet to the east-northeast of the SMC-W, the Vintners Inn Well (VI-W) located approximately 800 feet to the west, the Sutter Vineyard Well (SV-W) located approximately 1,890 feet to the east-southeast and a shallow domestic well located approximately 1,480 feet to the northeast.

The 72-hour pumping test data from the SMC well indicates that the aquifer underlying the property has moderate to low transmissivity. The transmissivity (T) calculated from the October 2009 pump test using the Cooper-Jacob drawdown method was 5,049 gallons per day per foot (gpd/ft).

Three of our observation wells (W-WFC, W-VI and W-SV) exhibited an effect from the continual pumping in W-SMC; however, because of an apparent local aquifer-wide recovery and other bias in the data, we were not able to obtain a reliable storativity value from the pump test data.

4.4 EVALUATION OF POTENTIAL IMPACTS ON NEARBY WELLS

In order to evaluate the local pumping effects of the SMC well system (using a pumping rate of 80 gpm which is greater than the estimated average), the radius of influence and drawdown of the groundwater surface was estimated at various distances from the pumping well using the Cooper-Jacob modification of the Theis equation. Input parameters for these calculations were based on data compiled from the recent pump tests performed on the recently installed SMC well existing well and a reasonable range of storativity values based on our analysis (Driscoll, 1986; Freeze and Cherry, 1979). The short-term pumping effects from the proposed well system will cause local drawdown in the aquifer near the pumping well. The approximate radius of influence was estimated for the well system at an 80 gpm pump rate. Using the Cooper-Jacob modification of the Theis equation with the value for T calculated from the 2009 pump test and a range of S values, the calculations indicate a radius of influence that ranges from approximately 1,000 to

2,400 feet (Table 4 below and Figure 11). The Radius of influence of a well is the horizontal distance from the center of the well to the limit of the cone of depression that develops in relation to pumping the well; in other words, it is the horizontal distance at which drawdown related to the well is theoretically zero. The range of storativity values cited below appears reasonable for the aquifer in the area. Kleinfelder (2009) used a storativity value of.0004 for drawdown calculation associated with the Faught Road test well, which is located in the same aquifer as the W-SMC. In addition, drawdown in the W-WFC monitoring well, although not able to be used to calculate a precise storativity value, appears to support a value within the middle of this range (an S value of approximately .0005) when the theoretical drawdown is calculated and compared with the observed drawdown using the transmissivity value obtained from the W-SMC. Based on this we have chosen to use a storativity value of .0005 for theoretical drawdown calculations at various distances from the SMC well. Based on an estimated 80 gpm pump rate over an 18-hour period, the calculated drawdown at a distance of 1,000 feet from the proposed well based on the calculated value of T and an S value of .0005 would be approximately 1.5 feet (see Table 5 below). This analysis also indicated that the estimated radius at which drawdown would be less than 1 foot was approximately 1,145 feet.

TABLE 4 – ESTIMATED THEORETICAL RADIUS OF INFLUENCE BASED ON A RANGE OF STORATIVITY VALUES FOR THE AQUIFER

STORATIVITY S	**THEORETICAL RADIUS OF INFLUENCE (feet)** (Based on W-SMC pumping rate of 80 gpm for 18 hours) T = 5,049 gpd/ft
.001	1,066
.0008	1,192
.0006	1,376
.0005	1,507
.0004	1,685
.0002	2,388

DWR well completion reports for the study area were reviewed for well locations and construction and for information on aquifer properties. In addition to reviewing the DWR well completion reports, an ENGEO representative performed a well reconnaissance and spoke with some of the property owners in the area at the north end of Coffey Lane. A summary of the information derived from our discussions with these property owners and the well completion reports is included in Table 1 of Appendix B. The approximate locations of these wells are plotted on Figure 12. Based on our reconnaissance survey, review of DWR well completion reports and the Sonoma County GIS data, four existing wells exist within a distance of 1,000 feet from the proposed Sutter well system.

Of these wells, one is the existing Wells Fargo Center Well (W-WFC), two others are agricultural wells and one is a domestic well (Figure 12); these wells are discussed below.

The existing WFC well is located approximately 740 feet from the proposed Sutter well system. As discussed above, three screened intervals were installed at 100 to 160 feet below the ground surface (bgs), 180 to 320 feet bgs, and 360 to 400 feet bgs. The pump within the W-WFC is set at a depth of approximately 325 feet bgs. A transducer equipped with a data logger was installed in the W-WFC in May 2009 to monitor water levels in the well. Measurements indicate that the non-pumping water level in the well was approximately 40 feet below the ground surface in June 2009 and the water level gradually decreased through the summer months to around 50 feet below the ground surface in September 2009. This water level decrease is indicative of the seasonal water level variations expected as a result of increased pumping and lack of recharge to the aquifer during the late spring and summer. During routine pumping of the WFC well, the recent transducer data indicate a maximum drawdown of about 40 feet. Our calculations indicate that pumping of the proposed SMC well at 80 gpm, may result in an estimated drawdown of around 2.5 feet in the WFC well. This indicates that the additional estimated drawdown will not expose the screened intervals or the pump within the WFC well.

TABLE 5
Drawdown Summary

Summary of Drawdown – Proposed SMC Well Based on T Value Calculated from Cooper - Jacob Modification of the Theis Equation (5,049 gpd/ft) and a Reasonable S Value of .0005	
Distance from Proposed Sutter Well (feet)	**Additional Drawdown at 80 gallons per minute (feet) for 18 hours**
50	12.4
100	9.9
250	6.5
500	4.0
1000	1.5
1200	0.7
1507	0

Another nearby well is located west of the proposed SMC well system on the Vintners Inn Property at a distance of about 800 feet. Three screened intervals were installed at 80 to 280 feet below the ground surface (bgs), 320 to 400 feet bgs, and 480 to 700 feet bgs. A transducer equipped with a data logger was installed in the in this well in August 2009 to monitor water levels in the well. Based on our review of the water level data, the non-pumping water level in this well is around 55 feet below the ground surface. The typical pumping level in this well results in greater than 50 feet of drawdown. This amount of drawdown appears to be already exposing the top of the screened interval. Based on discussions with vineyard manager, it is our understanding that the pump is set at a depth of around 500 feet below the ground surface in this well. The calculated drawdown from pumping the proposed SMC well at 80 gpm is estimated to be around 2.3 feet in this well. This additional drawdown is well within seasonal water level variations and would not be expected to expose the pump.

Two other nearby wells are located south of the proposed SMC well system at 4207/4205 Coffey Lane. These wells are located approximately 950 feet from the proposed SMC well. We were directed to speak with Brian White with Pacific Agriculture regarding the two wells located just south of the existing residences. Based on our telephone communication with Mr. White, we understand that the two wells were installed around 15 years ago and that one of the wells provides water for domestic use and the other provides water for the Coffey Lane Vineyards. We were directed by Mr. White to contact Les Petersen Drilling for the well construction information. We have contacted them on several occasions requesting construction information on the wells but have yet to receive the requested information. The calculated drawdown from pumping the proposed SMC well at 80 gpm is estimated to be approximately 1.7 feet in these two wells.

In addition to the four wells discussed above, according to DWR completion reports and County data, six domestic wells and one array of monitoring wells fall close to or are within a distance of 1,500 feet of the proposed Sutter well. These include the following:

- Approximately 1,270 feet from proposed SMC well - A series of shallow monitoring wells (35 feet) were constructed in 1988. These wells are located at 4605 Old Redwood Highway. DWR Well Numbers 313897, 313898 and 313899.

- Approximately 1,500 feet northeast from the proposed SMC well - We identified two domestic wells on two separate parcels. We were able to obtain a DWR completion report for one of the wells. A 54-foot-deep domestic well constructed in 1953 and located on Old Redwood Hwy; DWR Well Number 49-1219. No parcel number or address is included on the well completion report. The other domestic well is located at 4585 Old Redwood Hwy. We spoke with the well owner and based on our discussions it is our understanding that the well is approximately 160 feet deep. The pump depth and screened intervals was not known. We were granted permission by the well owner to monitor the well during the 72-hour pump test. Based on the water level data collected during the pump test, the well showed almost no change in water level during the majority of the test and a slight decline of approximately 1 inch towards the end of the test. Based on our calculations, a well at this distance would have experienced drawdown in excess of this during our pump test. One possible explanation for the lack of drawdown is related to the fact that this relatively shallow well is screened in the shallow aquifer and the SMC well is only screened in the intermediate and deep aquifers. This appears to support the conclusion that pumping the SMC well will have little drawdown effects on shallower neighboring wells that obtain the majority of their water from the shallow aquifer.

- More than 1,500 feet from proposed SMC well - A 160-foot-deep domestic well constructed in 2001 is located at 4121 Coffey Lane; DWR Well Number 778381. The well was screened from 60 to 160 feet within the shallow aquifer and the uppermost portion of the intermediate aquifer. The non-pumping groundwater level was at 50 bgs at time of construction.

- More than 1,500 feet from proposed SMC well - An 81-foot-deep domestic well constructed in 1974 and located at 4099 Coffey Lane (DWR Well Number 123464). The well was screened from 61 to 81 feet within the shallow aquifer, and the non-pumping groundwater level was at 10 feet bgs at time of construction.

- According to the County GIS database more than 1,500 feet from proposed SMC well – A domestic well is located on Parcel 058-040-052 at Coffey Lane. No DWR well completion report was located for this well.

- According to the County GIS database approximately 1,400 feet from proposed SMC well - A domestic well is located on Parcel 058-040-035 at Coffey Lane. No DWR well completion report was located for this well.

The calculated drawdown from pumping the proposed SMC well at 80 gpm for 18 hours is estimated to be less than 0.1 foot for wells at a distance of around 1500 feet from the SMC well. For the above listed wells at a distance of 1400 feet and 1270 feet, the calculated theoretical drawdown is estimated at 0.3 and 0.6 feet respectively. Additionally, the wells for which information was available all obtain most of their water from the shallower aquifer and not the intermediate and deeper aquifers that will be intersected by the proposed Sutter well system. Because of this, the short-term pumping effects would result in negligible additional drawdown in the above wells as observed in the domestic well located at 4585 Old Redwood Road during the 72-hour pumping test. In addition, based on review of the hydrographs for the area (Appendix C), estimated amount of drawdown in the above-discussed neighboring wells is within seasonal and historical groundwater level fluctuations for this area and would not be expected to adversely impact the performance of these wells.

The cumulative effects of pumping the proposed well at a rate of 52,006 gallons per day on an annual basis were also considered. As previously discussed, the proposed pumping rate equates to an additional 58 AFY from the Larkfield aquifer. This will likely expand the existing pumping depression towards the south during peak seasonal pumping, which typically occurs during the months between May and August (Figures 10, 13 and 14).

5.0 STUDY AREA WATER BALANCE

5.1 METHODOLOGY

A comprehensive water balance was prepared for the groundwater basin in the study area for 21 water years, 1987 to 2007. The water balance quantifies study area inflows and outflows to groundwater using available data gathered from various sources. The study period includes several drought events, and has an average rainfall approximately equal to the long-term average annual rainfall.

The water balance quantifies the significant water inflows and outflows to groundwater in the study area plus change in groundwater storage. Primary inflows include recharge from precipitation, subsurface groundwater inflows, return flows for groundwater pumping, percolation from Mark West Creek and infiltration from water Cal-Am imports from the SCWA. Primary outflows are urban pumping, rural residential pumping, agricultural irrigation pumping, and subsurface outflows. A month-by-month soil moisture water balance (using the Thornthwaite model; see Ritter, 2009) was used to characterize how rainfall partitions between soil moisture storage, evapotranspiration, groundwater recharge, and surface water runoff at different times of the year. Specific evapotranspiration values were applied to the different vegetation types with the area, with the assumption that neither native vegetation nor grain crops are irrigated. The latter generally are grown during the winter and require little or no irrigation. For all other vegetative land use types, the soil moisture balance was used to determine the amounts of applied water needed to meet evapotranspiration needs. It was assumed that all evapotranspiration demands beyond that provided by precipitation would be satisfied by groundwater pumping or recycled water application, as pertinent.

Perennial yield, or the amount of groundwater that can be developed on a sustainable basis without significant adverse impacts, is represented as the long-term average amount of inflows into groundwater, including rainfall recharge, subsurface inflow, return flows, and creek percolation. The inflows also were reviewed in relationship to the outflows (specifically pumping and subsurface outflows) to address the current state of the groundwater basin.

5.2 INFLOWS

5.2.1 Precipitation

The primary inflow component in the water balance equation is precipitation. As discussed in the Climate section, monthly NOAA rainfall totals from the Santa Rosa gauge were used for the study period (1987 through 2007) and applied to the pervious acreages within the study area, as determined by the DWR land use maps. The soil moisture balance calculations partition this rainfall into interception, evapotranspiration, runoff, and groundwater recharge as discussed below.

5.2.2 Imported Water

The study area receives imported water from Sonoma County Water Agency (SCWA) deliveries to the Cal-Am distribution network (as shown in Table 2 in the text). The SCWA water represents a net inflow (import) to the area. This inflow is partitioned to determine the portion that leaves the project area as wastewater, the portion that satisfies urban lawn evapotranspiration needs, and the portion that provides recharge to groundwater. Data acquired from Cal-Am for 1997 through 2007 indicate that on average SCWA delivers approximately 535 AFY to the entire

Cal-Am distribution network, including residences outside of the study area. Based on the relative ratio of houses within the study area, it is estimated that Cal-Am distributes approximately 270 AFY of the total 535 AFY of SCWA deliveries to connections within the study area.

Of the water that is imported, only a small fraction represents groundwater recharge. To estimate this amount, it is estimated that the imported water is distributed among approximately 1,230 residences. At each residence, it is estimated that 50% of the water was used inside the home and 50% was used outside the home. Of the water used inside the home, all of the water was considered as exported via the sewer system. Of the portion used outside the home for irrigation purposes, it was estimated that 15% would infiltrate back into the groundwater basin as recharge. This recharge percentage was based on percentages used for similar residential conditions (Todd Engineers, June 2004).

5.2.3 Recycled Water

In addition to water imported through the SCWA, reclaimed water is imported from both the City of Santa Rosa treatment plant and the Airport-Larkfield-Wikiup treatment plant. The SCWA provided a map delineating recycled water receiving areas, and this map was used to identify the acreage of land receiving recycled water. Discussions with the City of Santa Rosa staff indicate that the two properties receiving recycled water as shown on the map are the Denner Ranch property and the Kunde vineyard. City staff provided data indicating that the Denner Ranch property is currently receiving approximately 282 AFY, while the Kunde vineyard is receiving approximately 16 AFY. In addition to deliveries from the SCWA, the Larkfield-Wikiup Sanitation Zone also provides recycled water to pasture lands located near the airport property. Based on the acreage of pasture receiving recycled water, it is estimated that Larkfield-Wikiup is providing approximately 335 AFY to the study area.

Although the study area is receiving a significant amount of recycled water, it is assumed that no recycled water is allowed to percolate to groundwater as recharge. Instead, the recycled water delivery volumes are used to offset the total calculated agricultural water demand. Because agricultural wells do not have to pump water for the areas irrigated by recycled water, the recycled water provides a net benefit to the local groundwater basin.

5.2.4 Pumped Groundwater Infiltration

Another inflow to the groundwater basin comes via infiltration from pumped groundwater. These values represent return flows from groundwater pumped within the study area. For this study, it is assumed that all of the groundwater pumped for agricultural irrigation is consumed by the crops through evapotranspiration. However, both urban and rural residences receive groundwater and a portion of this water is returned to the groundwater basin through infiltration from landscape irrigation and from septic systems.

For the purpose of this study, it is estimated that each rural residence uses approximately 475 gallons of water per day. It is estimated that 60% of the 475 gallons is used in outdoor applications, and that 15% of water used in outdoor applications returns to the groundwater basin. It is also estimated that 40% of the 475 gpd is used in indoor applications and subsequently flows to the underground septic systems. We expect a portion of the water flowing into the septic systems to become groundwater recharge and a portion of the water to evapotranspirate. In the absence of published or accepted fractions of evapotranspiration to infiltration in standard septic systems, we assumed that 50% of water flowing to the septic system will become groundwater recharge.

In addition to groundwater pumped for residential use in rural areas, Cal-Am pumps groundwater for residential use in approximately 2,350 residences. Of these 2,350 residences, approximately 1,230 are within the study area. As with the imported water infiltration calculations, the pumped groundwater is distributed among the residences and it is estimated that 50% is used for outdoor purposes. Of that 50%, it is estimated that 15% will infiltrate and recharge groundwater.

In order to determine if any houses within the Cal-Am service area were also using septic systems, current utilities information was obtained from Sonoma County (Figure 15). The data from the county indicate that approximately 350 residences lie within the urban limits of the study area, but are on septic systems. These septic systems provide another source of infiltrated groundwater to groundwater, and again we assumed that 50% of septic system water becomes groundwater recharge.

5.2.5 Subsurface Inflow

As mentioned previously in the report, recent groundwater contour mapping within the vicinity of the study area is limited. To date, the most comprehensive groundwater study within the basin was performed by Cardwell (1958). As part of this USGS report, Cardwell produced groundwater contours within the basin. More recently GEI (2007), on behalf of Cal-Am, produced a groundwater contour map for the Larkfield District using June 1, 2007, monitoring data that includes areas east of Highway 101 within the study area. Based on this previous work, coupled with recent groundwater level readings within wells at the project site, a generalized map of groundwater contours was prepared to represent current conditions for the study area (Figure 10).

For the study area west of Highway 101, the groundwater surface reflects the overlying topography within the basin, with relatively high groundwater surface elevations to the east that decrease towards the Laguna de Santa Rosa on the west. General groundwater flow occurs in a west-southwest direction towards the Laguna and parallels surface water drainage. The general coincidence of surface watershed and groundwater divides allows definition of the water balance study area by the watershed divides, which generally results in a northern and southern study area boundary that is perpendicular to the groundwater contours in the area. Based on this, groundwater flow is generally parallel with the northern and southern boundaries of the study area. As a result, there is negligible flow into or out of the study area along these boundaries with the exception of the area east of Highway 101, near the groundwater depression.

For the study area east of Highway 101, the groundwater contours indicate a groundwater depression. As discussed in the groundwater levels section of this report, this depression has developed in response to groundwater pumping within the Larkfield district and would be expected to cause groundwater flow in this area to move downgradient into the depression.

Subsurface inflows occur along the northern and southern boundary of the eastern study area towards the pumping depression, as well as from the northeast where the Glen Ellen Formation is present in the hills. The subsurface inflows were computed using an aquifer width of 4,500 feet along the northern boundary of the study area and 2,000 feet along the southern study area boundary. Transmissivity and hydraulic gradient values of 5000 gpd/ft and .014 were applied respectively. Based on these values, the subsurface inflow is estimated at about 510 AFY (Table 5, Appendix A).

5.2.6 Mark West Creek Percolation

Mark West Creek receives water from the upper watershed and flows near the northern edge of the study area. To estimate percolation to groundwater from the creek, it was assumed that the upper portions of the creek (where the creek bottom is above the water table) would provide a net inflow to groundwater. Approximately 12,600 linear feet of the creek, with an estimated bottom width of 20 feet, was estimated to be available for percolation based on review of groundwater level contours. We have chosen a rate of 6 inches/day applied 90 days out of the year. The resulting percolation volume is 260 AFY.

5.3 OUTFLOWS

5.3.1 Evapotranspiration and Interception

After falling on the study area, precipitation is removed by interception and evapotranspiration. Interception is a process by which rainwater is captured by vegetation and evaporates before it hits the ground surface and becomes available for evapotranspiration, runoff, and recharge. This quantity of water is subtracted from gross precipitation. For this study area, interception is estimated to be 1% of total rainfall.

After interception, water is available for evapotranspiration, which is a major outflow. In order to determine the evapotranspiration rates for the crops in the study area, theoretical maximum evapotranspiration rates from the California Irrigation Management Information System (CIMIS) for the Santa Rosa area were multiplied by crop-specific evapotranspiration factors from the California Department of Water Resources. These factors allow quantification of the approximate monthly evapotranspiration rates based on crop type for use in the soil moisture balance. Evapotranspiration data are provided in Tables 2 and 3 of Appendix A.

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5.3.2 Surface Water Runoff and Groundwater Recharge

After interception and evapotranspiration are removed from the rainfall totals, the remaining water is partitioned between surface water runoff and groundwater recharge. For this study, runoff was estimated at 70% of the remaining available water and recharge was estimate at 30%.

5.3.3 Groundwater Pumping

The major outflow from groundwater is pumping. Pumping occurs from municipal wells operated by Cal-Am, rural residential wells, a small number of urban residential wells, agricultural wells, and wells used for commercial and institutional uses, primarily local wineries and schools.

Urban Use

Cal-Am operates four production wells in the study area as shown in Figure 10. Cal-Am pumping data available from 1997 to 2007 showed that the average groundwater pumping amount during this time period was 749 AFY, with pumping levels decreasing in recent years. This 749 AFY of pumped groundwater is added to the average 535 AFY delivered by SCWA for distribution to the community. Most of the groundwater that Cal-Am pumps is consumed and exported off site via a sewer system. A small fraction of this water is returned to the groundwater basin as infiltration, as accounted for in the inflows section.

Pumping data were not available from CalAm that extended back to the beginning of the study period in 1987. In order to extrapolate reasonable pumping volumes for 1987 to 1997, US Census data were used to determine growth rates in the area between 1990 and 2000. These data indicate that population rose by about 13% during this time period. Extrapolating this 13% growth rate, Cal-Am pumping in 1987 was approximately 542 AFY, and increased by 13% to 1997, when the estimated pumping matched available data showing 615 AFY. The SCWA water delivery data from 1987 to 1997 was also not available from either CalAm or the SCWA, so similarly scaled water distributions from SCWA to develop the best estimate of water delivered to the study area during the study period.

In addition to urban water use provided by Cal-Am, current utilities information supplied by Sonoma County (Figure 15) determined that 35 residences use well water. An average urban water use of 0.4 AFY was used to evaluate groundwater pumped through these wells. We also addressed water supply for local schools. Conversations with Cal-Am staff indicated that local schools are supplied primarily by well water. Eleven schools within the study area were identified, with an estimated indoor annual water use of 3.27 AFY for institutional use (Brown & Caldwell). Irrigated sports field areas were estimated at a combined 25 acres for all schools. We used our water balance calculations for pasture lands to estimate that 53 AFY is applied as irrigation to these fields. To be conservative, we have assumed these sports fields do not receive recycled water deliveries. Water use by local wineries was estimated by identifying local wineries and estimating their respective production through the State Alcohol Beverage

Control database and applying a water use rate of 2.5 gallons water for each gallon of wine produced. This resulted in an estimated winery water use of 10 AFY. This yields a total of 94 AFY for both schools and wineries.

Rural Residential Use

Rural residences within the study area are supplied with water through local pumping wells. There are currently approximately 250 rural residences within the study area and per-residence use was estimated at approximately 0.53 AFY, based on water supply data from Cal-Am. The total estimated rural residential use is approximately 133 AFY.

Agricultural Irrigation Use

Another major use of groundwater is agricultural irrigation. A large portion of the study area is currently being used for agricultural farming, and of this land, approximately 79% is used for vineyards. The other 21% is pasture and other miscellaneous crops. As described in the inflows section, the crop water demand is satisfied primarily by rainfall and pumped groundwater. A small fraction of this water demand is satisfied by reclaimed water use.

The soil moisture balance was used to determine how much water the crops required (evapotranspiration) and how much of that demand could be satisfied by precipitation or soil moisture storage. During months where plant water needs exceeded both the amount of precipitation and the amount of soil moisture, the water deficit became the required applied water amount. Based on this method, agricultural irrigation was estimated on a monthly basis and summed for each water year in the study period. On average, this amount of estimated irrigation demand was approximately 1728 AFY.

5.3.4 Subsurface Outflows

As discussed in the subsurface inflows section, subsurface inflows and outflows along the northern and southern boundaries of the study area are negligible, with the exception of the area near the existing groundwater depression. General groundwater flow is in a west-southwest direction in the western portion of the study area; accordingly, subsurface outflows to the west were estimated across the width of the aquifer in the study area. The estimate of subsurface outflow to the west was based on an aquifer width of approximately 10,500 feet, a transmissivity value of 12,500 gpd/ft and a hydraulic gradient of 0.006. Based on these values, subsurface outflow to the west is about 838 AFY (Table 5, Appendix A).

5.4 CHANGES IN STORAGE

The results of the soil moisture balance as described above are presented in the attached Table 6, Appendix A. This table summarizes the major inflows and outflows to groundwater in the study area. Average annual inflow under current conditions amounts to an estimated 2,830 AFY, while average annual outflow is an estimated 2,840 AFY indicating a balance of inflows and outflows over the 21-year study period. While on a year-to-year basis, 14 of the 21 years experienced greater outflows than inflows, the 7 years experiencing higher inflows were significantly more positive than the 14 years were negative. This indicates that on a long-term basis, the basin is in relative equilibrium with several high inflow years compensating for a greater number of high outflow years.

As discussed in the groundwater levels section of the report, hydrograph data over the study period document relatively stable to slightly increasing groundwater levels within this area of the basin. This independent information indicates that the groundwater basin within the study area is in relative balance with a possible increase in storage over the last few years of the study period. These physical observations correspond to the results of the water balance, which also indicate that the basin is in relative equilibrium.

As shown on the table, there is a net deficit of -10 AFY. This small net deficit is well within the error of an analysis of this type and is indicative of an overall water balance within the study area.

The limitations of available data and resulting need to apply assumptions and estimates inevitably result in a degree of uncertainty in a water balance assessment, such that specific water balance computations probably are significant only to one or two digits. All estimates for the various components of a water balance are subject to probable error, with varying degrees of uncertainty because of the amount and quality of data and method of estimating. Some measured components (e.g. municipal pumping) are relatively accurate, while other components (e.g. evapotranspiration) are quite variable in magnitude over space and time, and thus are difficult to evaluate or even measure accurately.

While the probable error in individual components can be large in some cases, the estimates in a water balance are not all simultaneously overestimating or underestimating the actual values. Accordingly, the net error would have a relatively small range of error compared to that of individual components.

For this study, each element of the water balance was evaluated independently using available data. Data always are inadequate to some degree, resulting in a need to interpolate, extrapolate, or apply assumptions and estimates. Each of these introduces a degree or error and uncertainty.

The intent of this water balance has been to provide a conservative estimate; in other words, we endeavored to provide a reasonable evaluation of available groundwater supply and to identify existing beneficial uses of water, including urban and rural residential use and agricultural irrigation.

5.5 SUTTER WELL IMPACTS

5.5.1 General Impacts

It is useful to analyze the potential impacts of the proposed SMC well pumping in the context of the existing water balance. The water balance summarization provided in Table 6 of Appendix A shows that the average annual inflows to groundwater under current conditions (perennial yield) amount to approximately 2,830 AFY. This represents the average total amount of water entering local groundwater during a given year. As discussed above, the proposed Sutter well would pump an average of 58 AFY, which is only 2.0% of the perennial yield. Therefore, the proposed well extraction by itself represents a small portion of the total water entering the study area groundwater each year.

While the total pumping volume from the well may average 58 AFY, a portion of this pumping increase will be offset by reducing water demand elsewhere. The Sutter hospital is currently striving to achieve “zero impact” to the sewer system, meaning the project will not increase existing sewer system loads. This will be accomplished through a series of offset programs that reduce the amount of sewage produced in other areas of the sewer district by reducing water use. This will be accomplished through rebate programs for high-efficiency appliance retrofits. We understand that the Sutter hospital project is currently planning to provide approximately 30 AFY in offsets, with potentially an additional 5 AFY in the future. Water pumped from the proposed well beyond this approximate 30-35 AFY will not increase the sewer system loads and instead will primarily support the buildings’ HVAC systems. These offsets effectively reduce water demand elsewhere in the study area by 30 AFY, meaning that the net pumping increase proposed by the hospital would be approximately 28 AFY.

One can compare the net pumping increase of 28 AFY to the existing pumping for municipal, institutional, rural residential, and agricultural use. According to the results of the analysis, current pumping is approximately 1,949 AFY, which is 68% of the perennial yield. Adding the proposed SMC well would increase these beneficial uses slightly to 1,977 AFY, or 70% of the perennial yield. This indicates that while a little over two-thirds of the water entering the basin is pumped for beneficial uses, there is also a significant portion that leaves the basin as subsurface outflow. This subsurface outflow moves westward and a portion may surface in the lower reaches of Mark West Creek and the Laguna de Santa Rosa.

As discussed in Section 4.3, we expect some minor decreases in groundwater levels near the proposed well due to groundwater extraction. This reduction in groundwater levels and the resulting cone of depression will intercept additional groundwater flows in the vicinity of the proposed well. Since a portion of the groundwater currently flowing westward in the groundwater basin emerges as surface flow in both Mark West Creek and in the Laguna de Santa Rosa, a diminution of groundwater flow could result in reduced creek flows in those areas. However, we do not anticipate significant reduction in flows compared to existing flow rates.

The maximum net loss of surface flow to the creeks could be estimated by the net proposed pumping rate of 28 AFY proportioned throughout down-gradient portions of the Laguna within our study area. This waterway length is approximately 8,810 feet in length. Converting the maximum theoretical loss of 28 AFY yields 0.039 cfs, and distributing this theoretical loss over the 8,810 foot length of the Laguna yields a corresponding maximum potential flow loss of 0.0000044 cfs per linear foot of creek. This maximum potential reduction distributed over the length of the creek is a very small number and supports the expectation that the potential impacts to flow within the creeks would be insignificant.

In addition to examining maximum distributed potential flow loss, we compared the potential cumulative flow loss estimated for the well with existing flow rates data for the down-gradient creeks. As presented in Section 3.9, the limited available Mark West flow data shows annual flow volumes of 15,501 AFY and 23,937 AFY in 2007 and 2008, respectively. While precipitation during both these years was below average and it can be assumed that average creek flows are significantly higher, 28 AFY still represents only a small fraction of the total annual flow in Mark West Creek. In 2007, 28 AFY represented 0.18% of annual flow, and in 2008, 28 AFY was 0.12% of annual flow.

In addition to the acquired Mark West stream gauge data, the United States Geologic Survey operates multiple stream gauges along the Laguna de Santa Rosa. The closest gauge to the study area is located near Mirabel Heights, roughly 2 miles downstream near the confluence with Windsor Creek. This gauge has stream flow data available for 2005-2008, a time period during which average annual rainfall was 77% of the long term average. According to stream flow data available for 2005 to 2008 in Mirabel Heights, the Laguna de Santa Rosa average annual flow volume is 208,060 AFY. The maximum monthly flow rate occurs in January with average monthly flows of 56,424 AF, or 919 cfs. Minimum monthly flow rates occur in September with average monthly flows of 123.8 AF, or 2.1 cfs. Because the flow data spans three relatively dry years that experienced only 77% of the average long term precipitation, we can adjust the flow data to represent flows during an average precipitation year. Using the adjustment, average September flow rates are approximately 160.7 AF, or 2.7 cfs, and average January flows are 73,277 AF, or 1,193 cfs.. The proposed net extraction of 28 AFY corresponds to 2.3 AF per month and 0.039 cfs. During the peak winter month of January, 0.039 cfs represents only 0.0033% of the flow in the Laguna. In the driest month of September, 0.039 cfs represents 1.8% of the flow. This result represents the very conservative assumption that the entire volume of water drawn from the Sutter well would be pulled directly from the Laguna de Santa Rosa. Based on the facts that the aquifer thickness in the vicinity of the Laguna de Santa Rosa is roughly 1,000 feet and the Laguna is approximately 5 miles from the proposed well, we expect that the numbers calculated above are a very conservative over-estimation of the potential impact to the Laguna.. Based on the above comparisons and the great distance between the proposed well and the creek, we do not expect significant impacts to surface water flows within either Mark West Creek or the Laguna de Santa Rosa.

The groundwater basin is a dynamic system and addition of the proposed 58 AFY pumping extractions (net 28 AFY) would result in adjustment of the basin water balance to a new equilibrium point. As shown in Figure 13, the existing pumping depression will expand slightly in response to the SMC well. This new well will likely intercept a portion of the water flowing south as subsurface flow, and may draw more water from the adjacent southern boundary of the groundwater basin. Based on the relatively small volumes of water the SMC well will extract compared to the overall availability of water within the groundwater basin, we anticipate that the system will establish a new equilibrium, with only minor impacts to the groundwater basin as a whole.

5.5.2 Sutter Well Impacts in Drought Scenarios

While the above section discussed the general impacts of the Sutter well based on the average annual yield, it is also useful to study the project impacts under future drought conditions. As discussed in the climate section, the study period includes the drier than average years of 1994, 2001, and 2007, as well as the extended drought interval occurring from 1987 to 1990. The Water Balance Summarization Table 6 in Appendix A shows the net change in groundwater storage for each of these drought periods. On average, the singular drought years of 1994, 2001, and 2007 had net outflows of 1,435 AFY. The average net outflow during the 1987-1990 period was 977 AFY. As would be expected, the calculated significant drop in groundwater recharge indicates that the existing groundwater basin experiences significant changes to the inflow/outflow ratios during drought periods.

In addition, examining the groundwater recharge for these years demonstrates that the recharge volumes are also below average. The average groundwater recharge for 1994, 2001, and 2007 is 2,216 while the average groundwater recharge for 1987-1990 is 1,911. The addition of the proposed Sutter well will command a larger portion of the groundwater recharge during drought years. The total Sutter Well pumping of 58 AFY represents 2.7% of the average groundwater recharge for 1994, 2001, and 2007, and 3.1% of the total annual recharge for 1987-1990. While these percentages are higher than the calculated approximate 2.0% of groundwater recharge during average years, they still represent a small portion of the groundwater entering the study area during drought years.

5.5.3 Sutter Well Impacts on Riparian Habitat

The riparian habitat along the Mark West Creek corridor represents a rich, diverse ecosystem and it is worthwhile to consider any potential impacts on this ecosystem from the Project. In general, riparian habitat borders rivers and streams, and studies have shown that these riparian habitats support some of the greatest diversity of wildlife species in the Bay Area (Baylands). Accordingly, we have considered the potential impact of the proposed well on nearby riparian habitats. As shown in Figure 11, the proposed well is expected to have a radius of influence of approximately 1,500 feet. However, the nearest location of Mark West Creek in relationship to the proposed well site is approximately 4,100 feet away. Since the creek corridor is significantly outside of the calculated radius of influence, we do not expect to see any additional groundwater level drawdown in the vicinity of the creek corridor. This indicates that riparian vegetation along Mark West creek should not be significantly impacted by the proposed well.

5.5.4 Sutter Well Impacts on Vineyards

In addition to analyzing potential impacts to riparian habitat which was done in the preceding section, it is also worthwhile to examine potential impacts to surrounding vineyards. While Section 4.3 discussed potential impacts to neighboring winery wells, an additional way groundwater drawdown could impact vineyards would be if the vines were relying on groundwater. According to the Deficit Irrigation of Quality Winegrapes Using Micro-Irrigation Techniques report published by the University of California Cooperative Extension, vineyard root zones can extend up to 20 feet. This maximum depth of 20 feet occurs in deep, well-aerated soils and can be significantly less in areas with root zone limiting conditions. Comparison of groundwater and surface water contours in the agricultural area west of Highway 101 and adjacent to our project site shows that groundwater is approximately 25-35 feet below the surface. Even considering the maximum root zone depth of 20 feet, local groundwater levels are 5-15 feet farther below the root zone. This indicates that there is little likelihood that vineyards adjacent to the project site are relying on groundwater. Thus, we do not expect that the localized groundwater drop of several feet that could arise from the proposed well would have adverse effects on the nearby vineyards.

5.6 CUMULATIVE IMPACTS

The water balance analysis indicates an existing equilibrium condition between inflows and outflows of the basin. In the future, this balance is likely to change in response to future proposed land-use alterations in the study area, which may increase pumping of groundwater. The future use of groundwater resources in the City of Santa Rosa and greater Sonoma County has been outlined in several planning level documents.

The Sonoma County Year 2020 General Plan also addresses groundwater issues for the area in which the proposed well is planned. The General Plan addresses the importance of regional groundwater management as a means to conserve use of limited groundwater resources.

The City of Santa Rosa has adopted a general plan, which includes commercial, residential and open space areas within the existing study basin area. The City of Santa Rosa has also prepared a SB 610 water supply assessment as part of an update of the City's General Plan for 2035. Based on the results of the SB 610 assessment, the current City's projected groundwater extraction rate will be approximately 2,300 AFY, which is greater than its current uptake.

Continued future monitoring of groundwater levels will be important in the determination of limitations to the aquifer in regard to equilibrium conditions and the results of monitoring activities should carefully be considered in regard to the cumulative impacts of additional proposed well locations located within the study area. It is expected that future implementation of major groundwater extraction wells will be performed in conformance with generally adopted policies that regulate the beneficial uses of the aquifer.

6.0 FUTURE WATER DEMANDS

6.1 FUTURE BUILD-OUT SCENARIO

6.1.1 Additional Residences

As the Larkfield district and the community of Fulton continue to grow in the future, the water demands and subsequent impacts on local water resources will continue to change. This study evaluates water demand for the potential build-out scenario in the year 2030. While the future build-out configuration and related occupancy will be influenced by many factors and is unpredictable, the increased number of residences in 2030 was estimated using zoning maps provided by Sonoma County. These maps delineate parcels based on zoned uses such as residential, commercial, and industrial. Each zone contains information about the maximum number of business or residences that can be constructed per acre. This information was compiled for all of the zones in the study area to determine the approximate maximum number of residences that could be constructed in the build-out scenario.

The Sonoma County zoning data indicate that the maximum built-out scenario in the study area will contain 467 additional residences. Approximately 120 of the units are zoned to be within the rural areas and the town of Fulton. The remaining 347 houses are to be within the Mark West urban envelope. Based on the zoning data and map (Figure 15), it appears that in the rural areas this development will primarily consist of single-family houses. There are multiple parcels within the urban areas zoned for multiple units, including several complexes that could be high density condominiums or apartments. It is assumed that the residences built in rural areas will be serviced by well water and septic systems, that areas within Fulton will receive Cal-Am water and use septic systems, and that residences within the Mark West urban area will receive Cal-Am water and be connected to the existing sewer system.

While the numbers presented above represent the maximum build-out scenario, it is important to consider the build-out timeline. Based on conversations with Sonoma County and reasonable assumptions about residential growth rates, it is assumed that growth rates within the study area will be 2% until the maximum build-out is achieved. If there are currently approximately 1,200 residences existing houses within Mark West, a 2% growth rate would achieve the build-out scenario of 1,526 residences in 2020. Additionally, a 2% growth rate in Fulton and the rural areas, currently containing approximately 300 residences, will achieve build-out at 2024. By 2030, complete build-out conditions would occur with an additional 467 residences.

6.1.2 Land Use Changes

Agricultural land and related water use changes were considered based on recent trends and local constraints on the expansion of agriculture. Sonoma County Crop Reports were reviewed for trends, focusing on vineyards. Sonoma County data are assumed to be generally indicative of trends in the lower Mark West watershed area. Available information from Sonoma County provides grape acreages from 1976 to 2007 (2007 Sonoma Agricultural Crop Report, Sonoma

County Office of the Agricultural Commissioner, June 3, 2008). Since 1976, the most striking change in Sonoma County agriculture has been the expansion of vineyards. In 1976, vineyards occupied about 25,000 acres. This vineyard area expanded gradually until 1996 (to about 35,000 acres) and then increased dramatically to 60,000 acres by 2002. Since that time, the vineyard acreage in the County has been relatively stable with minimal increase. In 2008, grapes occupied 61,971 acres in Sonoma County (2008 Sonoma Agricultural Crop Report, Sonoma County Agricultural Commissioner's Office, July 2009).

In Sonoma County, the increase in vineyards occurred in part as replacement of other crops and in part as expansion into areas not previously farmed, particularly on slopes adjacent to established vineyard areas. Additional expansion of vineyard acreage into the future is constrained by local factors including availability of suitable cropland for conversion, availability of hillside land suitable for vineyards and relatively high cost of hillside vineyard development, County prohibitions on vineyard development on very steep slopes, and competition for available land with urban and rural residential land uses. Given all of these constraining factors, negligible vineyard expansion is indicated for the study area by 2030.

6.1.3 Water Conservation Measures

In considering the demands on the groundwater basin in 2030, we recognized that water conservation measures will likely play a growing part in the State's efforts to protect water resources for the expanding population. As the population grows and drought events occur, both factors stressing water supply availability, water conservation measures become increasingly important. Based on conversations with Cal-Am staff, it is understood that although there are no formally adopted long-term water conservation goals for 2020 or 2030, Cal-Am is currently working to implement water conservation measures in accordance with the California Urban Water Conservation Council. For the purposes of analyzing changes to the water balance in 2030, it is assumed that the Larkfield-Wikiup area will adopt the Governor of California's proposed water conservation goals of 20% reduction in per capita water demand by 2020. This could be accomplished through a variety of water conservation measures such as installing low-flow fixtures in new residences, retrofitting existing residences with low-flow fixtures, encouraging drought tolerant landscaping, etc. We assume that the proposed 30 AFY in offsets from the Sutter project will contribute to the 20% reduction by 2020, instead of being additional conservation beyond the 20% threshold.

To quantify this 20% reduction demand, current household water demands both in the rural areas and in the urban areas were examined. For rural areas, a current water use of approximately 0.53 AFY has been applied in this study. Urban residences usually reside on smaller parcels and consequently use less water, estimated as approximately 0.4 AFY. Including a 20% reduction in demand would reduce rural consumption to 0.42 AFY and urban consumption to 0.32 AFY. These per-household reductions help offset the impact of the increased population in 2030.

One potential effect from water conservation efforts would be the elimination of over-watering practices. In the current water balance over-watering in urban areas contributes to groundwater recharge. In order to quantify the effects of eliminating over-watering practices, we calculated the annual reduction in groundwater recharge that would occur if over watering practices desist by 2030. To do this we calculated the amount of residential water use that becomes groundwater in current conditions with the over-watering scenario. This calculation demonstrates that 7.5% of total urban residential water use and 9% of total rural residential water use currently infiltrates to groundwater, respectively. These two percentages are slightly different due to the assumption that rural residences would use more water in outdoor irrigation because of the larger parcel sizes. We calculated that 7.5% of urban water use in 2030 represents 46 AFY and 9% of rural water use in 2030 represents 20 AFY, yielding a total of 66 AFY. Therefore, in 2030, we expect to see 66 AFY less water infiltrating to groundwater.

6.1.4 Climate Change

Current climate change models are not sufficiently refined or accurate to predict impacts on a watershed scale. Increased temperatures might be presumed, with some increase in evapotranspiration losses, while effects on precipitation are not known. Unlike the Sierra Nevada, there is no significant snowpack in the Russian River watershed that influences the hydrology of the Russian River system or provides seasonal water storage. During preparation of Sonoma County Water Agency's 2005 Urban Water Management Plan, Agency staff met with researchers at Lawrence Livermore National Laboratory (LLNL) to explore the possible development of a predictive climate model to assess climate change impacts on Agency water supply (SCWA Water Project EIR, p. 5.16-13). However, the researchers indicated that such modeling would not likely be able to provide reasonably accurate results because of the variable nature of storm formation in the Pacific region. Preliminary climate model results for the Pacific coast have predicted that the region could be the same, wetter or drier. Accordingly, the Agency is continuing to rely on historical records for its water supply studies and climate change impacts are not considered in the 2030 scenario.

6.2 FUTURE WATER BALANCE

Future changes to water demand patterns and quantities in the study area will impact the groundwater basin to a certain degree. The current water balance provides a useful framework to analyze the expected changes in 2030 as presented above. This section considers the cumulative impacts of the Sutter hospital in the context of additional changes in 2030. A summary of these impacts is presented below:

Increase in Demand Based on Current Water Consumption Rates:	203 AFY
Decreased recharge due to increased impervious surfaces:	8 AFY
Net Increased Demand from SMC well	28 AFY
TOTAL	239 AFY
Decrease in Demand if 20% Conservation is Implemented:	137 AFY
Decreased recharge if conservation leads to elimination of over-watering:	66 AFY
TOTAL INCREASE CONSIDERING CONSERVATION	168 AFY

Based on the assumptions explained above regarding per-household water consumption and growth, the approximate increase in water demand would be 239 AFY. This value includes the loss of recharge from precipitation to the groundwater basin caused by conversion of pervious surfaces to impervious surfaces. This value also includes the net increase in demand caused by the SMC well, taking into consideration the offset program.

Also provided above is the expected net water savings if all households implement the suggested 20% by 2020 water demand reduction. This calculation was also based on the rates and household totals described above. By including the calculated 137 AFY of savings and the 66 AFY loss of recharge caused by the potential elimination of water-watering, the total net increase in demand in 2030 is approximately 168 AFY. Given an estimated perennial yield of 2,830 AFY (Table 6, Appendix A), then a 168 AFY increase represents 5.9% of the perennial yield. Without the water conservation measures, the water demand would equal 8.5% of the current perennial yield.

We can compare the increased water demand to flows in the Laguna to develop a conservative idea of how the future build-out scenario could affect creek flows. Distributing the increased demand of 168 AFY along the 8,810 linear feet of waterway adjacent to our study area yields a maximum theoretical loss of .00005224 cfs per linear foot of creek. As measured by the USGS stream gauge near Mirabel Heights, average annual flow volume in the Laguna is 208,060 AFY. This average flow was calculated from years where the average precipitation was 77% of normal, indicating that during average rainfall years the Laguna experiences approximately 270,909 AFY of flow within the project watershed. Based on this average annual stream flow, the calculated increased demand of 168 AFY represents only 0.062% of annual flows in the Laguna.

We understand that Cal-Am intends to develop a well within the basin study area, which may potentially serve growth demands outside of the areas identified in this study. We would expect that any additional production wells of this nature would carefully consider the cumulative impact of additional extraction of groundwater from the basin in regards to impacts to regional beneficial uses as part of the regulatory process required to develop production wells currently implemented in the area.

It is understood from discussions with the County that Cal-Am is considering installing an additional groundwater well along the northern border of the study area within Larkfield Wikiup. This well could be used both as an emergency back-up supply and as a potential supply to satisfy future growth in demand. While the production capacity of this new well is unknown, it was evaluated in terms of the production capacity of existing wells. The two major production wells that Cal-Am currently operates produce roughly 300 AFY and 200 AFY. Assuming an average, the potential new Cal-Am well would produce 250 AFY. This new well could thus help satisfy the increased water demand by 2030. Based on the uncertain qualities inherent in future projections, we cannot assume that no additional supply wells would be needed within the study area.

6.3 CONCLUSIONS

Based on the results of the analysis, and the review of existing policy documents that create a management framework for groundwater extraction in the study, we conclude the following for the existing condition.

- Groundwater is a potential potable water source for the proposed Sutter Medical Center development. In that particular portion of Sonoma County, groundwater serves the needs of many residents and a variety of land uses.

- A water balance for the current conditions covering a study period between 1987 and 2007 indicates that inflows and outflows within the study area are at a near balance with estimated inflows of around 2,830 acre-feet per year (AFY) and estimated outflows of 2,840 AFY. This appears to indicate a small net negative change in storage around 10 AFY. It should be noted that very often data and measurements in hydrology are imperfect and have margins of error of 5% or more. Recognizing that this total contains a margin of error and is derived from imperfect data, we conclude that the total is well within the margin of error typical for a study of this type and indicative of a net balance. This is further supported by hydrograph data within the study area that indicates relatively stable to slightly increasing water levels during the study period.

- The existing groundwater basin below the proposed hospital is in an equilibrium state with regard to inflows and outflows. Minor changes to the groundwater balance caused by the proposed well pumping will likely include a small decline in storage around the pumping wells.

- The Sonoma County Water Agency and the City of Santa Rosa recognize the importance of groundwater as a resource and have prepared several policy level documents to manage future water resources in the region. Future groundwater development will be guided by City and County policy.

- In general, water quality within the Santa Rosa Plain Subbasin is considered good (DWR 1982). More locally, groundwater sampling results from existing wells at the subject site (ENGEO, 2006) indicated that the majority of samples when compared to the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs) were below the DHS MCLs.

- While the conducted calculations provide numerical estimations of the current net changes in storage (namely, -10 AFY), we recognize that this figure is an annual average and masks the yearly fluctuations inherent to a dynamic groundwater basin system. These systems are capable of responding to external changes such as drought years or wet years to achieve new equilibrium balance points. With the addition of the proposed well, the groundwater basin will adjust to achieve a new stable equilibrium point; groundwater levels in the vicinity of well will drop slightly to accommodate the new pumping and reach a new equilibrium contour configuration. In our opinion, addition of the proposed Sutter well pumping is not likely to adversely affect the ability of the groundwater basin to achieve a stable equilibrium condition.

- Based on the assessment of potential drawdown and the radius of influence for the proposed Sutter Medical Center well, its additional pumping does not represent a significant adverse impact on existing private wells in the local vicinity.

- Based on our calculations for the future build-out scenario in 2030, we estimate an approximate increase in groundwater demand of 168 AFY. This would include a 20% per capita reduction in water use by 2020, as recommended by the Governor of California.

7.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, owners, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our services.

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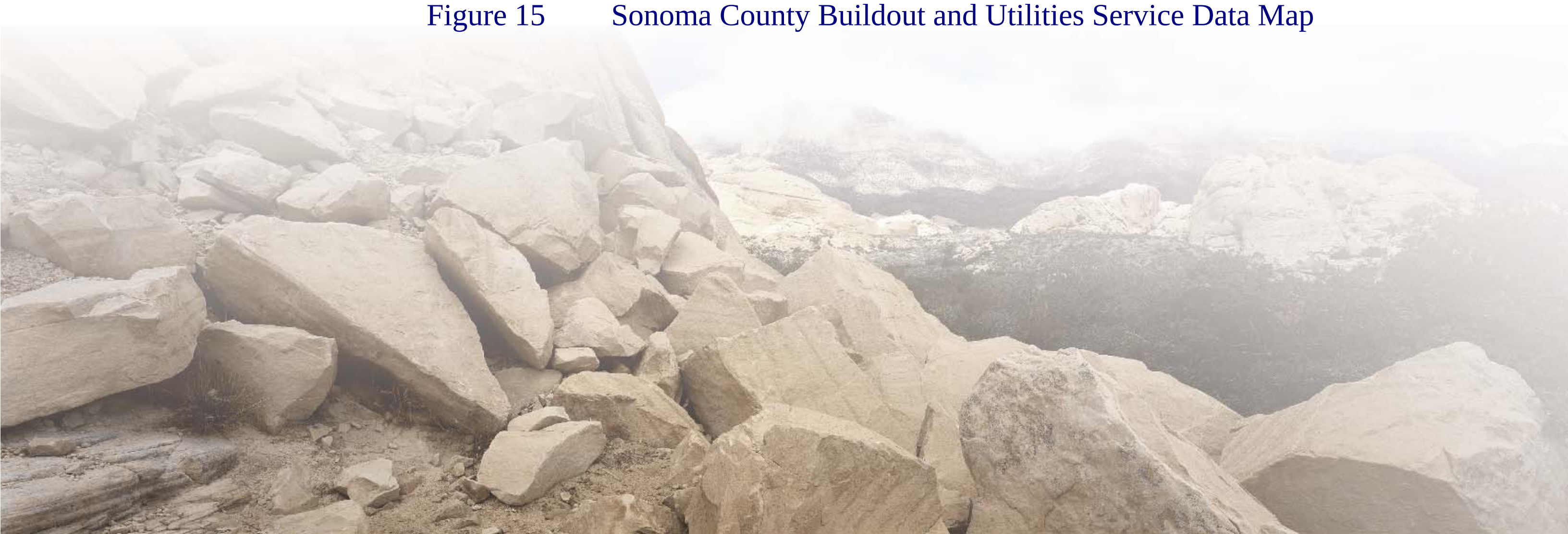

BASE MAP SOURCE: MS STREETS AND TRIPS

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VICINITY MAP

SUTTER MEDICAL CENTER GROUNDWATER STUDY

SONOMA COUNTY, CALIFORNIA

PROJECT NO.:	6486.200.502
DATE:	NOVEMBER 2009
DRAWN BY: DLB	CHECKED BY: SPM

FIGURE NO. 1

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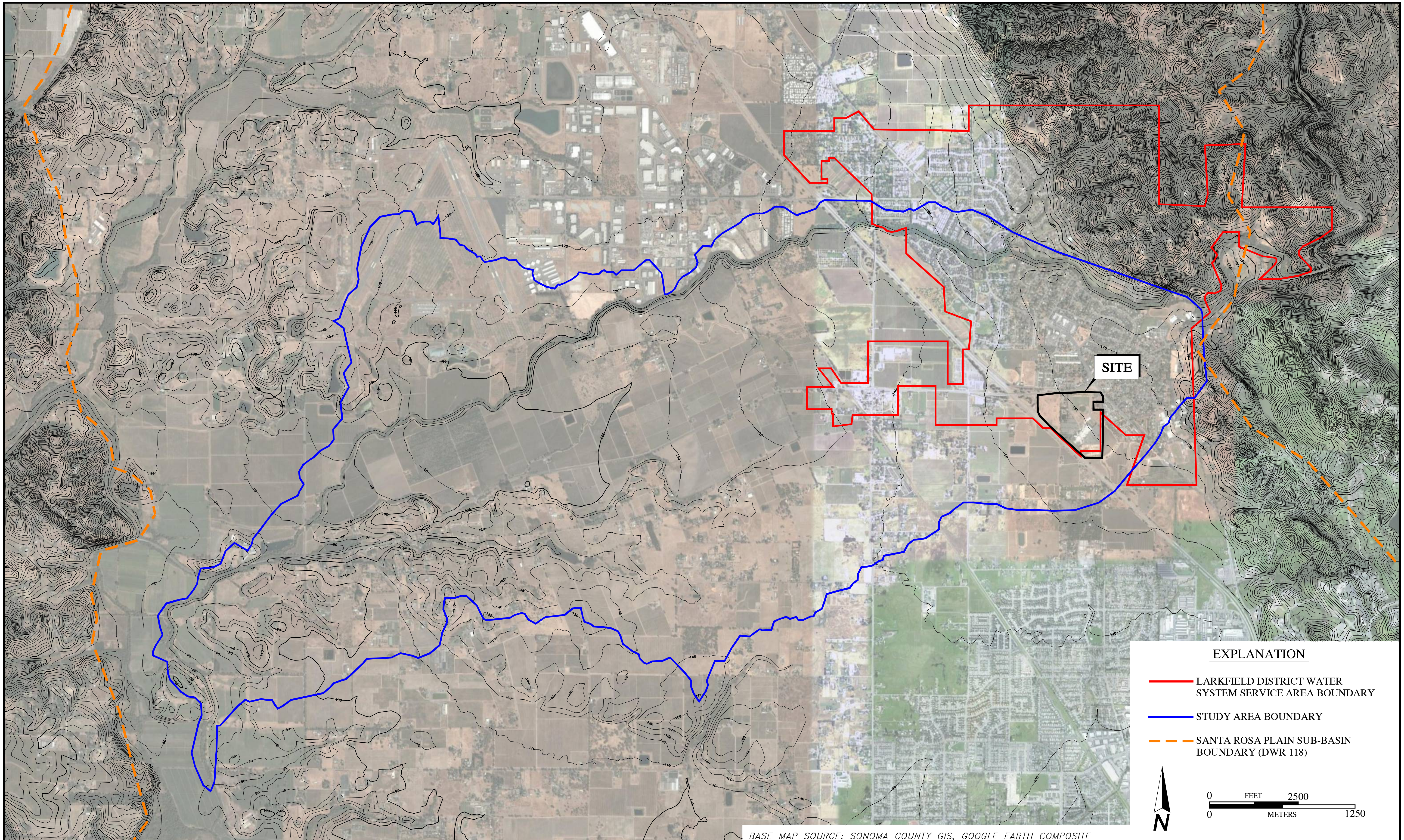

BASE MAP SOURCE: SONOMA COUNTY GIS, GOOGLE EARTH COMPOSITE

ENGEO Expect Excellence	STUDY AREA SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 2

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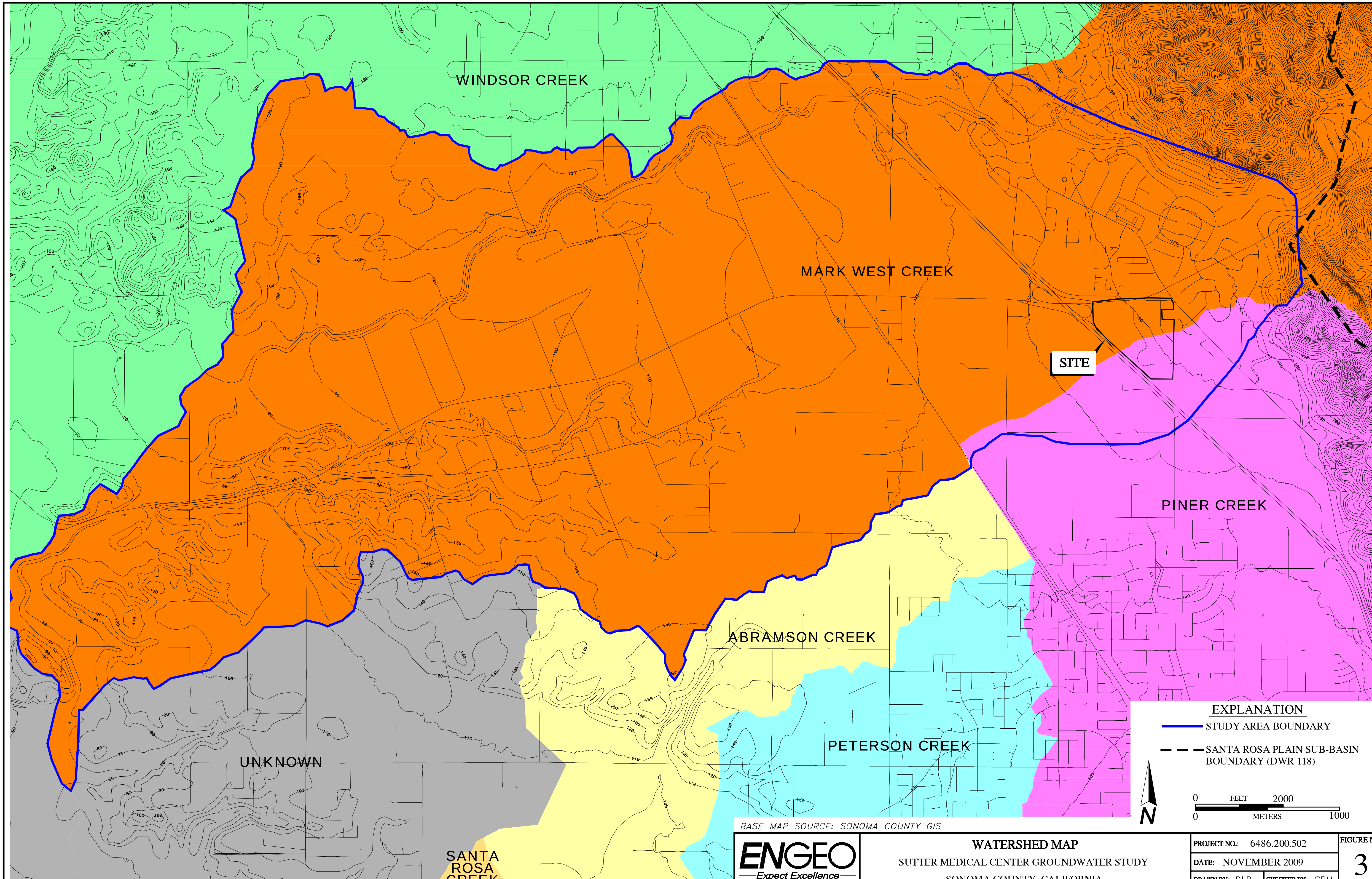

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WATERSHED MAP
SUTTER MEDICAL CENTER GROUNDWATER STUDY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.502	
DATE: NOVEMBER 2009	
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FIGURE NO. 3

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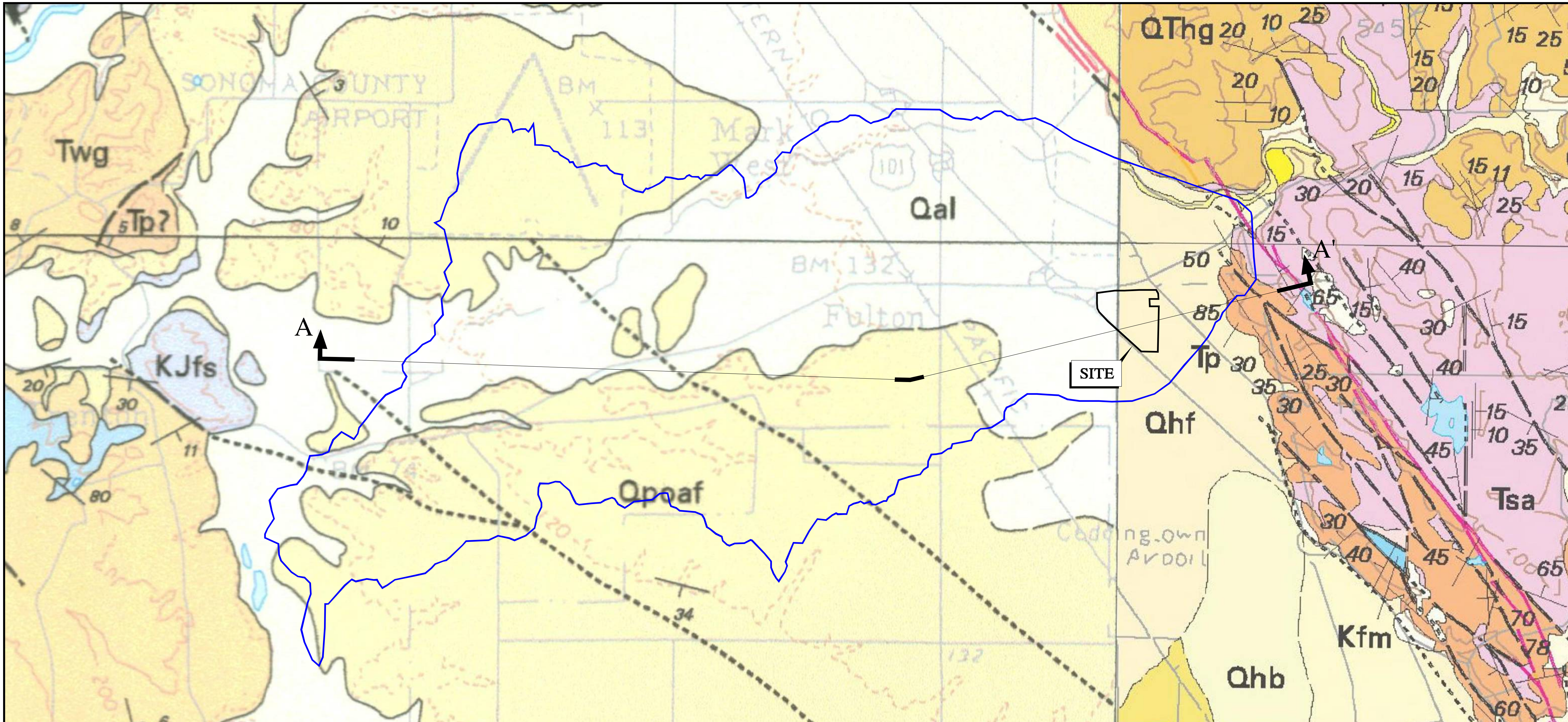

BASE MAP SOURCE: GRAYMER, 1999–2001 ◄ ► BASE MAP SOURCE: GRAYMER, 2007

EXPLANATION

STUDY AREA BOUNDARY

GRAYMER GEOLOGY, 1999–2001

Qal	ALLUVIAL FAN AND FLUVIAL DEPOSITS
Qpoaf	OLDER ALLUVIAL FAN DEPOSITS
Twg	WILSON GROVE FORMATION
Tp	PETALUMA FORMATION
KJfs	GRAYWACKE AND MELANGE

GRAYMER GEOLOGY, 2007

Qhf	ALLUVIAL FAN DEPOSITS
Qhb	BASIN DEPOSITS
QThg	HUICHICA AND GLEN ELLEN FORMATION
Tsa	ANDESITE TO BASALT LAVA FLOWS
Tp	PETALUMA FORMATION
Kfm	METAGRAYWACKE

N

0 FEET 3000
0 METERS 1500

SEE FIGURE 5 FOR CROSS SECTION

ENGEO Expect Excellence	GEOLOGIC MAP SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 4

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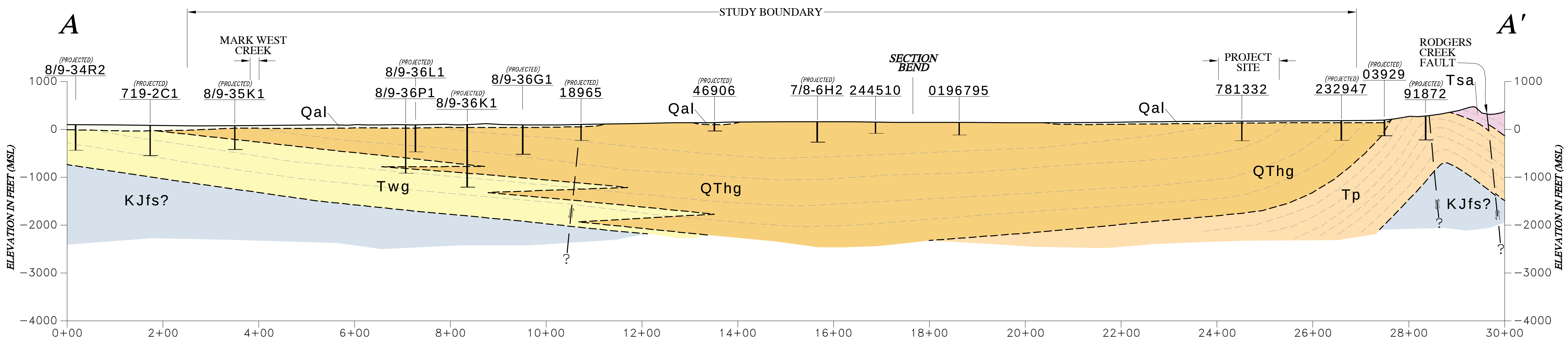
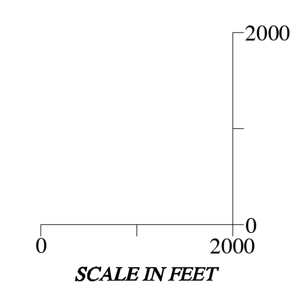


EXPLANATION

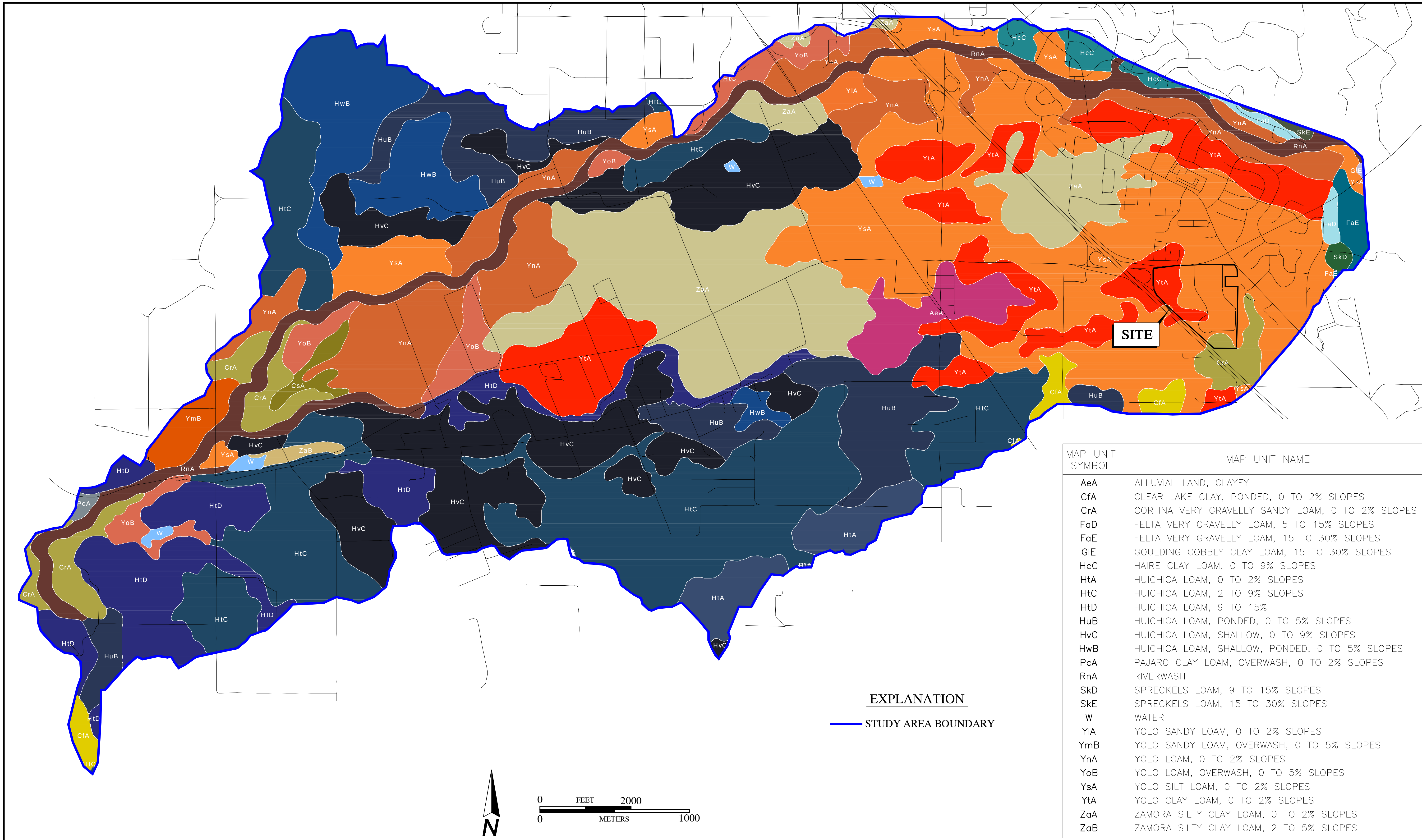
Qal	ALLUVIAL FAN AND FLUVIAL DEPOSITS
QThg	HUICHICA AND GLEN ELLEN FORMATION
Twg	WILSON GROVE FORMATION
Tp	PETALUMA FORMATION
Tsa	ANDESITE TO BASALT LAVA FLOWS
KJfs	GRAYWACKE AND MELANGE



1"=2000'

ENGEO Expect Excellence	GEOLOGIC CROSS SECTION SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 5

ORIGINAL FIGURE PRINTED IN COLOR



MAP UNIT SYMBOL	MAP UNIT NAME
AeA	ALLUVIAL LAND, CLAYEY
CfA	CLEAR LAKE CLAY, PONDED, 0 TO 2% SLOPES
CrA	CORTINA VERY GRAVELLY SANDY LOAM, 0 TO 2% SLOPES
FaD	FELTA VERY GRAVELLY LOAM, 5 TO 15% SLOPES
FaE	FELTA VERY GRAVELLY LOAM, 15 TO 30% SLOPES
GIE	GOULDING COBBLY CLAY LOAM, 15 TO 30% SLOPES
HcC	HAIRE CLAY LOAM, 0 TO 9% SLOPES
HtA	HUICHICA LOAM, 0 TO 2% SLOPES
HtC	HUICHICA LOAM, 2 TO 9% SLOPES
HtD	HUICHICA LOAM, 9 TO 15%
HuB	HUICHICA LOAM, PONDED, 0 TO 5% SLOPES
HvC	HUICHICA LOAM, SHALLOW, 0 TO 9% SLOPES
HwB	HUICHICA LOAM, SHALLOW, PONDED, 0 TO 5% SLOPES
PcA	PAJARO CLAY LOAM, OVERWASH, 0 TO 2% SLOPES
RnA	RIVERWASH
SkD	SPRECKELS LOAM, 9 TO 15% SLOPES
SkE	SPRECKELS LOAM, 15 TO 30% SLOPES
W	WATER
YIA	YOLO SANDY LOAM, 0 TO 2% SLOPES
YmB	YOLO SANDY LOAM, OVERWASH, 0 TO 5% SLOPES
YnA	YOLO LOAM, 0 TO 2% SLOPES
YoB	YOLO LOAM, OVERWASH, 0 TO 5% SLOPES
YsA	YOLO SILT LOAM, 0 TO 2% SLOPES
YtA	YOLO CLAY LOAM, 0 TO 2% SLOPES
ZaA	ZAMORA SILTY CLAY LOAM, 0 TO 2% SLOPES
ZaB	ZAMORA SILTY CLAY LOAM, 2 TO 5% SLOPES

BASE MAP SOURCE: U.S.D.A.

ENGEO
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U.S.D.A. SOILS MAP
SUTTER MEDICAL CENTER GROUNDWATER STUDY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.502
DATE: NOVEMBER 2009
DRAWN BY: DLB
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FIGURE NO 6

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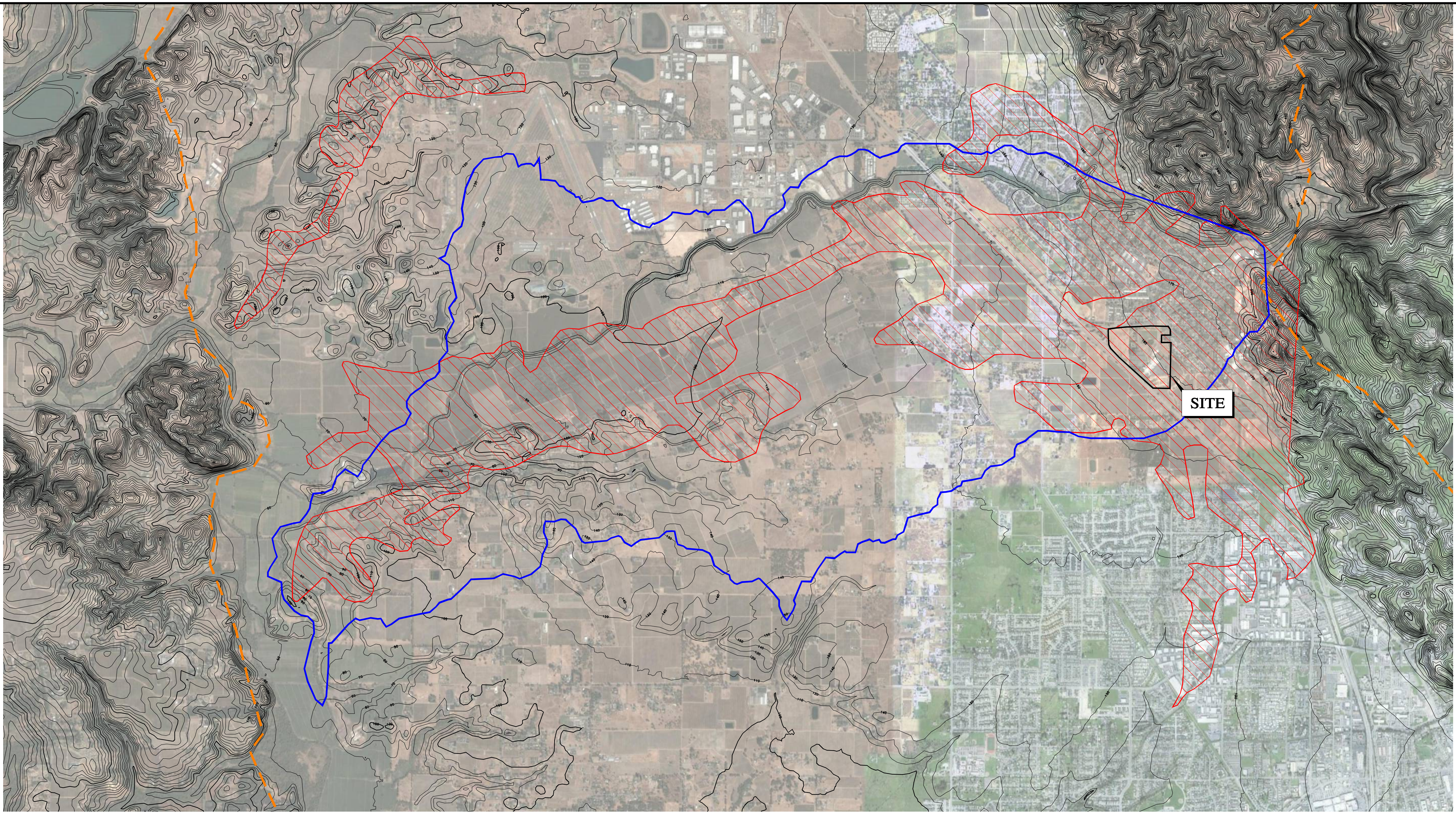

EXPLANATION

STUDY AREA BOUNDARY

AREAS DESIGNATED BY DWR AS AREAS OF NATURAL RECHARGE (SOIL INFILTRATION RATE GREATER THAN 1.5cm/hr., SLOPE LESS THAN 15% (DWR , 1982)

SANTA ROSA PLAIN SUB-BASIN BOUNDARY (DWR 118)

N

0 FEET 3000

0 METERS 1500

BASE MAP SOURCE: GOOGLE EARTH, CALIFORNIA DEPARTMENT OF WATER RESOURCES (DWR, 1982)

ENGEO Expect Excellence	AREAS OF NATURAL RECHARGE SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 7

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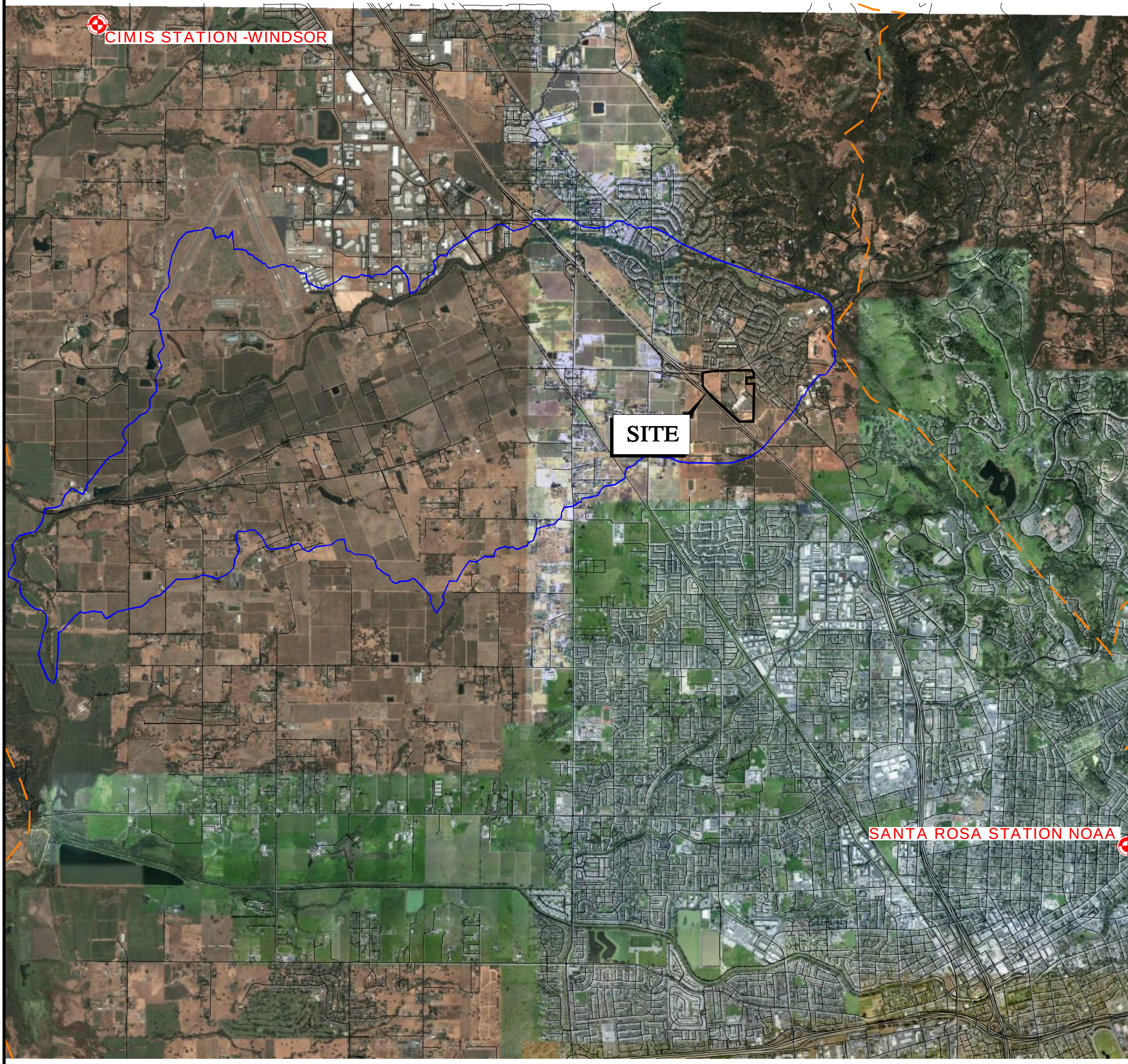

EXPLANATION

STUDY AREA BOUNDARY

SANTA ROSA PLAIN SUB-BASIN BOUNDARY (DWR 118)

N

0 FEET 5500
0 METERS 2750

BASE MAP SOURCE: SONOMA COUNTY GIS, GOOGLE EARTH COMPOSITE

ENGEO Expect Excellence	RAINFALL AND EVAPOTRANSPIRATION NOAA AND CIMIS DATA STATIONS SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 8

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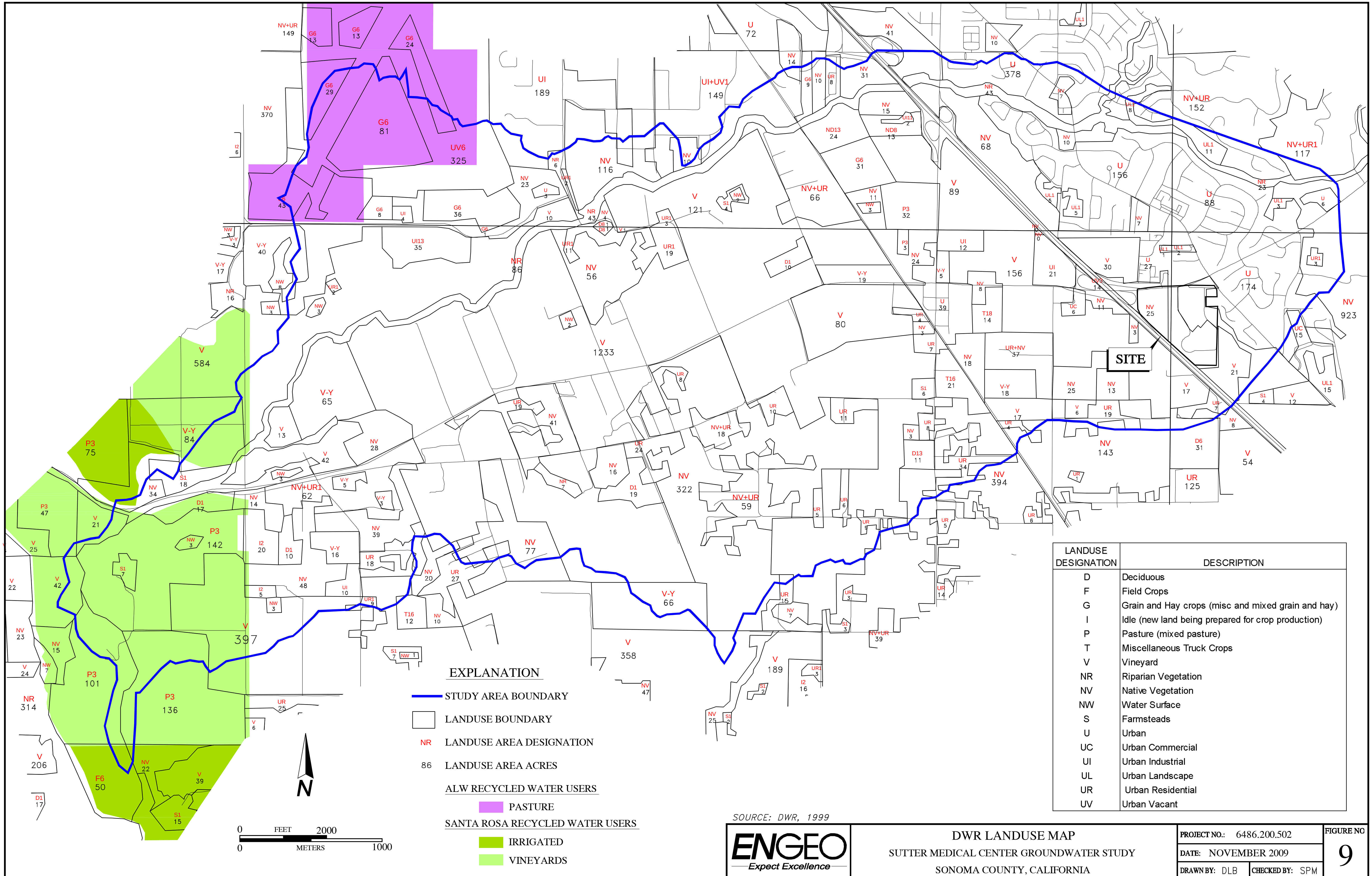

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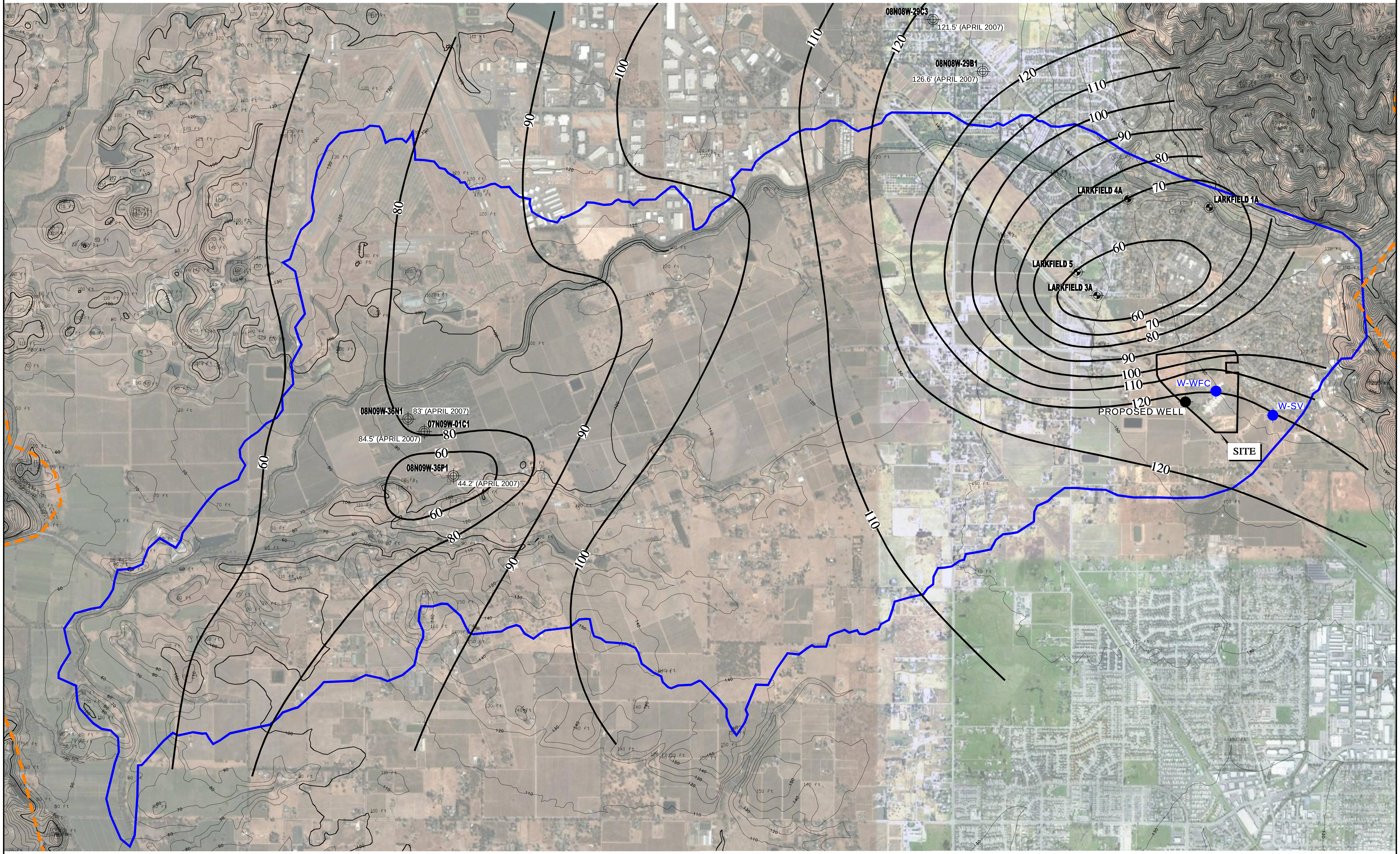

N

0 FEET 1500
0 METERS 750

EXPLANATION

STUDY AREA BOUNDARY

80 GROUNDWATER CONTOURS IN FEET

SANTA ROSA PLAIN SUB-BASIN BOUNDARY (DWR 118)

08N09W-36P1
44.2' (APRIL 2007) APPROXIMATE LOCATION OF DWR MONITORING WELL SHOWING GROUNDWATER ELEVATION

LARKFIELD 5 APPROXIMATE LOCATION OF CAL-AM PRODUCTION WELL

W-WFC APPROXIMATE LOCATION OF WELLS FARGO CENTER WELL

W-SV APPROXIMATE LOCATION OF SUTTER VINEYARD WELL

BASE MAP SOURCE: GOOGLE EARTH

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GROUNDWATER CONTOUR MAP
SUTTER MEDICAL CENTER GROUNDWATER STUDY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.502		FIGURE NO. 10
DATE: NOVEMBER 2009		
DRAWN BY: DLB	CHECKED BY: SPM	

ORIGINAL FIGURE PRINTED IN COLOR

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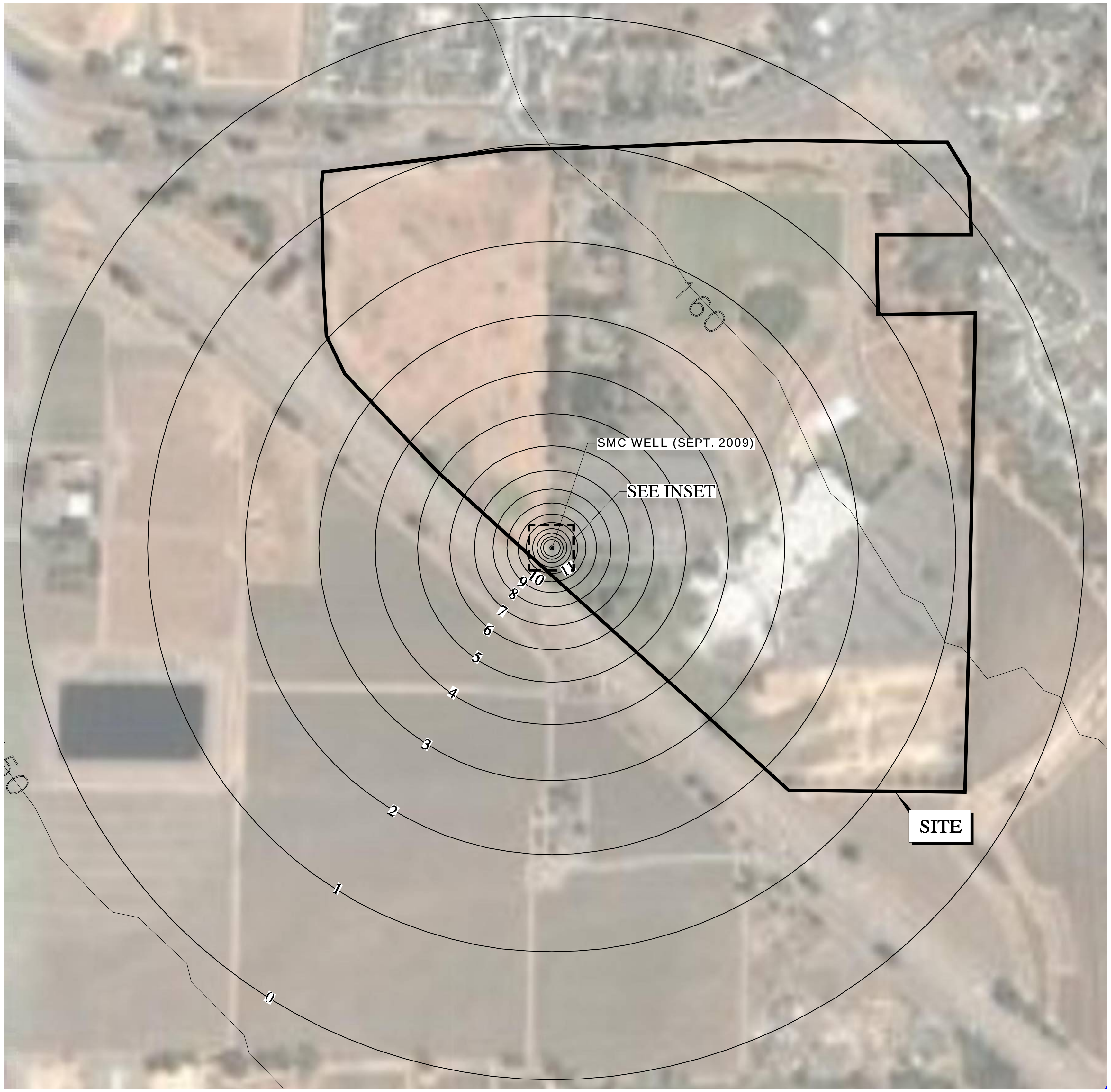
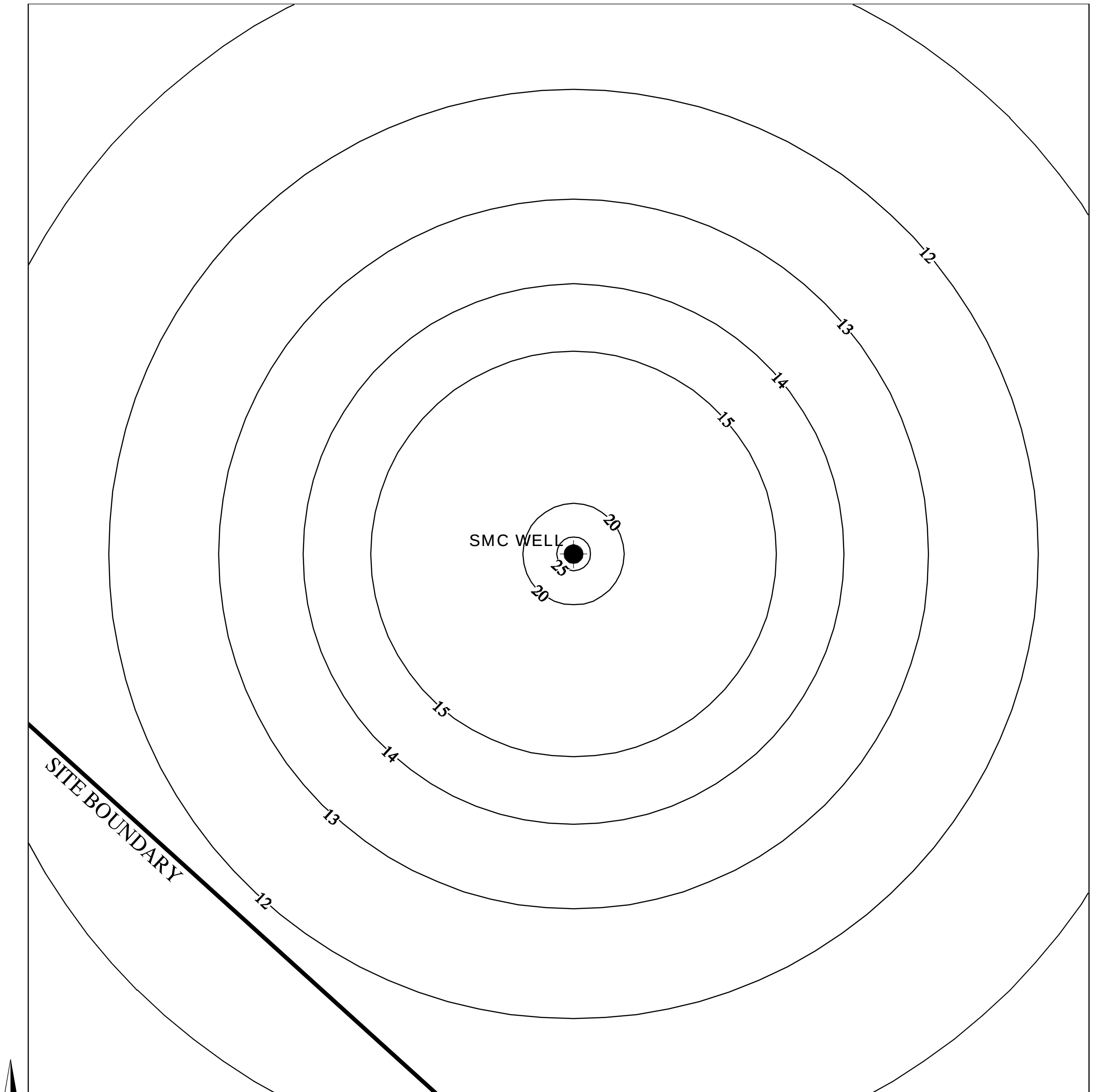


0 FEET 350
0 METERS 175



N

0 FEET 20
0 METERS 10

INSET

EXPLANATION

20 CONTOUR (IN FEET) REPRESENTING ADDITIONAL GROUNDWATER DRAWDOWN BASED ON 80gpm PUMPING 18 HOURS

BASE MAP SOURCE: GOOGLE EARTH

ENGEO Expect Excellence	ESTIMATED MAXIMUM RADIUS OF INFLUENCE SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 11

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ORIGINAL FIGURE PRINTED IN COLOR

EXPLANATION

- STUDY AREA BOUNDARY
- SANTA ROSA PLAIN SUB-BASIN BOUNDARY (DWR 118)
- 7/9-2C1 — APPROXIMATE LOCATION OF WELL (CARDWELL, 1958)
- 95211 — APPROXIMATE LOCATION OF WELL (DOMESTIC, IRRIGATION, MONITORING, MUNICIPAL OR TEST WELL - SEE TABLE 1 APPENDIX B FOR DETAILS) (DWR)
- 08N09W-36P1 — APPROXIMATE LOCATION OF GROUNDWATER MONITORING WELL (DWR)
- LARKFIELD 3A — APPROXIMATE LOCATION OF WATER SUPPLY WELL (CAL-AMERICAN)
- W-WFC — APPROXIMATE LOCATION OF WELLS FARGO CENTER WELL
- W-SV — APPROXIMATE LOCATION OF SUTTER VINEYARD WELL

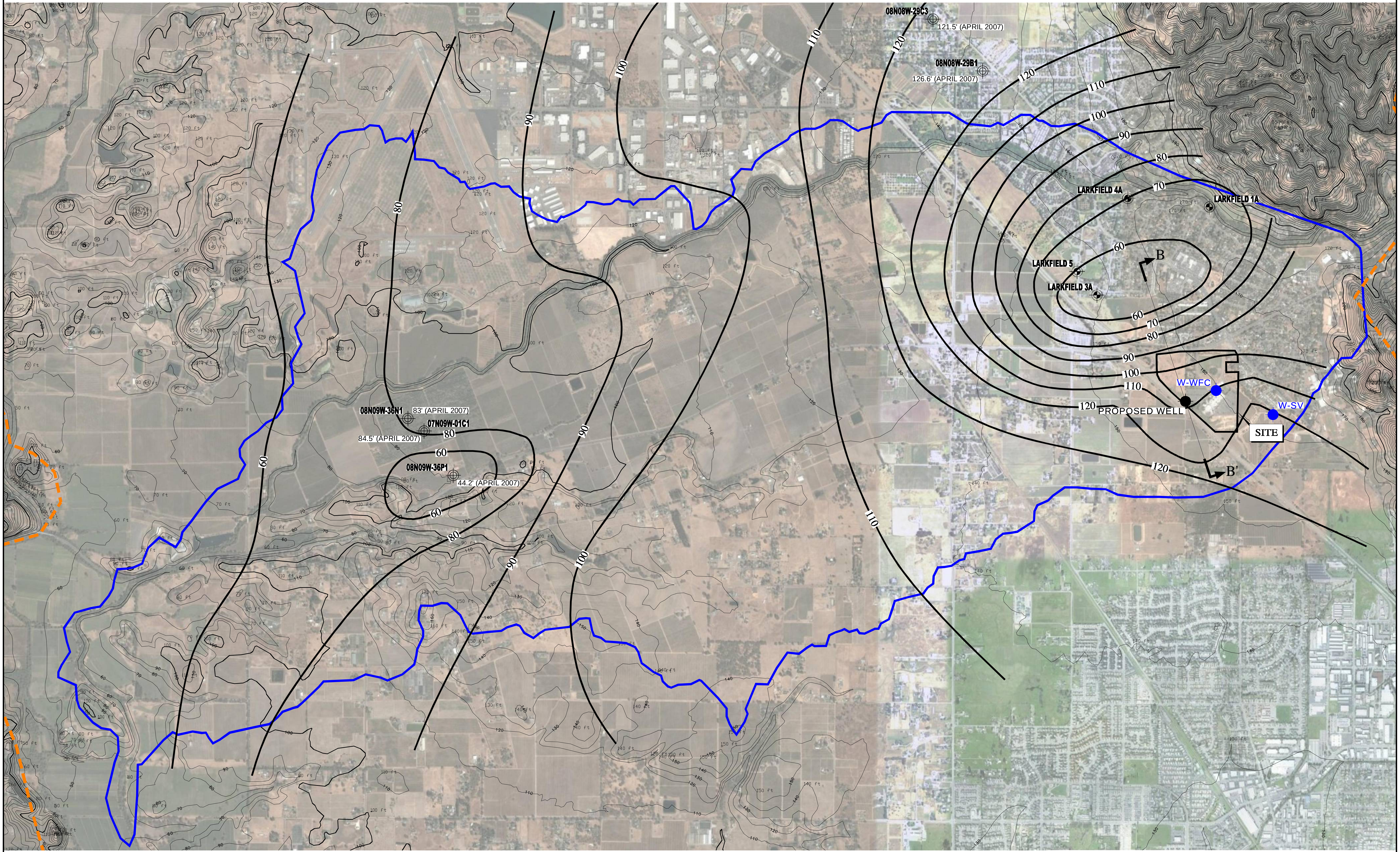
N

0 FEET 1000
0 METERS 500

BASE MAP SOURCE: SONOMA COUNTY GIS, GOOGLE EARTH COMPOSITE

ENGEO Expect Excellence	WELLS WITHIN STUDY AREA VICINITY SUTTER MEDICAL CENTER GROUNDWATER STUDY SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 12

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

STUDY AREA BOUNDARY

80 GROUNDWATER CONTOURS IN FEET

SANTA ROSA PLAIN SUB-BASIN BOUNDARY (DWR 118)

08N09W-36P1 44.2' (APRIL 2007) APPROXIMATE LOCATION OF DWR MONITORING WELL SHOWING GROUNDWATER ELEVATION

LARKFIELD 5 APPROXIMATE LOCATION OF CAL-AM PRODUCTION WELL

W-WFC APPROXIMATE LOCATION OF WELLS FARGO CENTER WELL

W-SV APPROXIMATE LOCATION OF SUTTER VINEYARD WELL

N

0 FEET 1500
0 METERS 750

SEE FIGURE 14 FOR CROSS SECTION

BASE MAP SOURCE: GOOGLE EARTH

ENGEO Expect Excellence

PROJECTED GROUNDWATER CONTOURS WITH SUTTER WELL SYSTEM
SUTTER MEDICAL CENTER GROUNDWATER STUDY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.:	6486.200.502
DATE:	NOVEMBER 2009
DRAWN BY:	DLB
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FIGURE NO.	13

ORIGINAL FIGURE PRINTED IN COLOR

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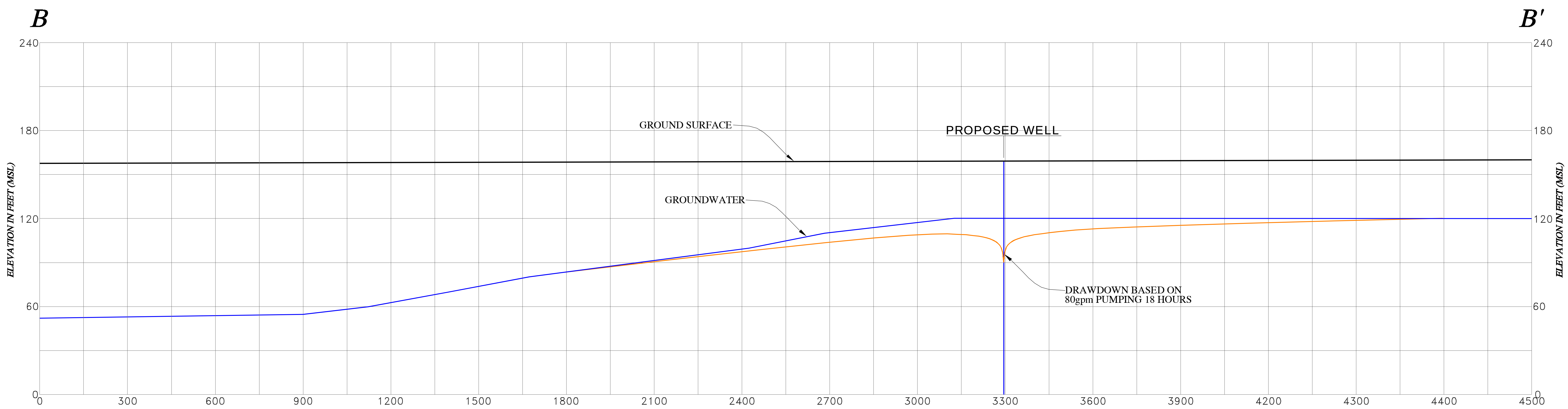
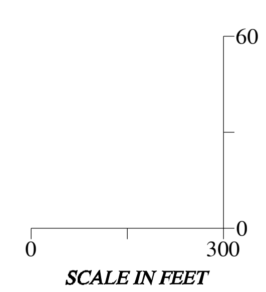
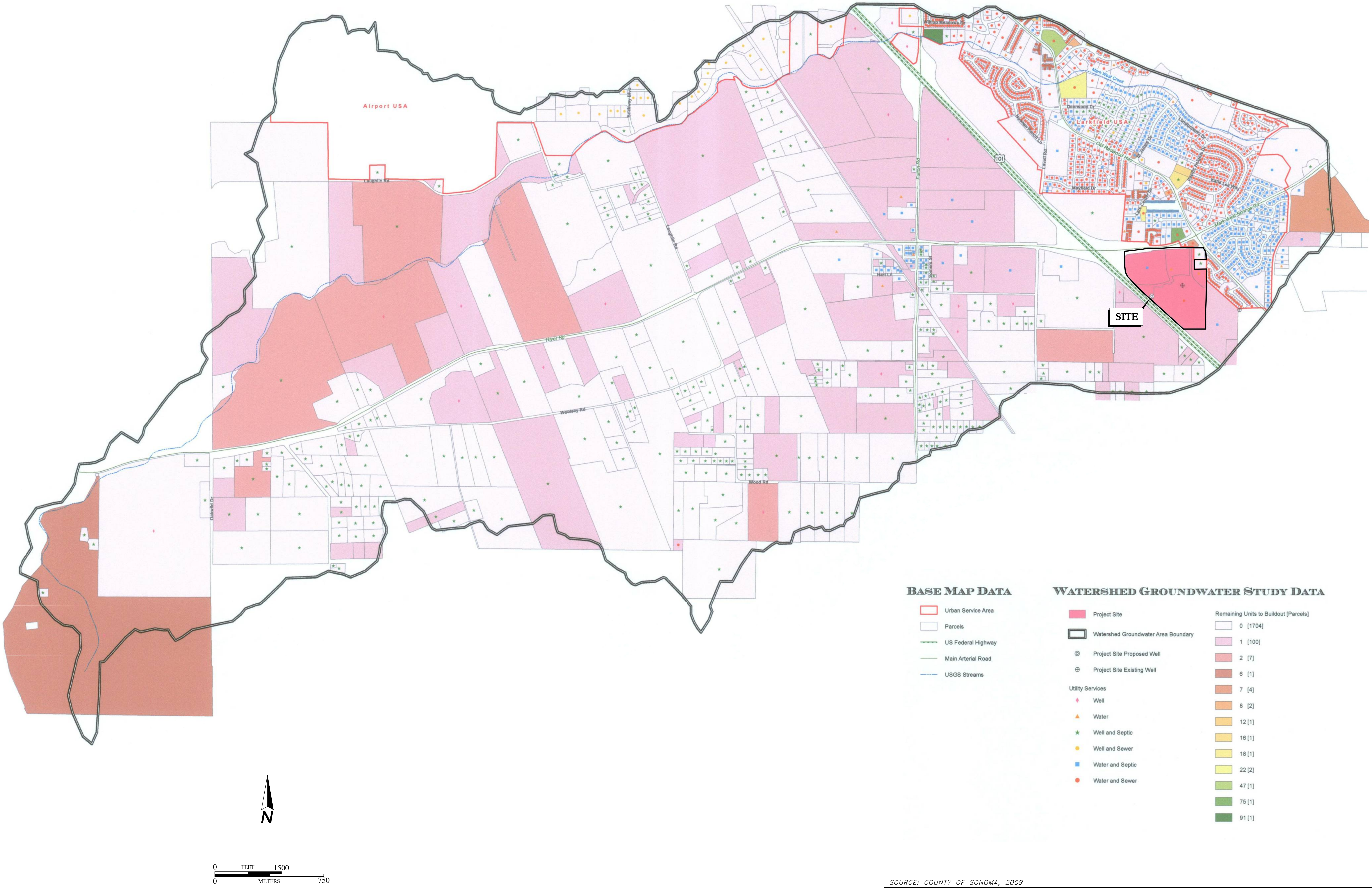




ENGEO
Expect Excellence

CROSS SECTION DEPICTING PROJECTED
CONE OF DEPRESSION FROM SUTTER WELL
SUTTER MEDICAL CENTER GROUNDWATER STUDY
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.502	FIGURE NO. 14
DATE: NOVEMBER 2009	
DRAWN BY: DLB	CHECKED BY: SPM



SOURCE: COUNTY OF SONOMA, 2009

ENGEO Expect Excellence	SONOMA COUNTY BUILDOUT AND UTILITIES SERVICE DATA MAP SUTTER MEDICAL CENTER GROUNDWATER STUDY SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.502 DATE: NOVEMBER 2009 DRAWN BY: DLB CHECKED BY: SPM	FIGURE NO. 15

ORIGINAL FIGURE PRINTED IN COLOR

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APPENDIX A

Water Balance Tables

APPENDIX A

Table 1: Precipitation Per Year

Water Year	Precipitation (inches)
1986-1987	18.95
1987-1988	22.09
1988-1989	26.62
1989-1990	21.38
1990-1991	22.67
1991-1992	24.29
1992-1993	37.28
1993-1994	21.39
1994-1995	47.29
1995-1996	38.37
1996-1997	33.86
1997-1998	52.94
1998-1999	32.13
1999-2000	30.57
2000-2001	20.95
2001-2002	32.51
2002-2003	34.88
2003-2004	29.35
2004-2005	37.83
2005-2006	45.72
2006-2007	20.75
Average	31.04

Table 2: Monthly Windsor Evapotranspiration rates*

Month	Evapotranspiration (inches)
	Windsor
Jan	0.82
Feb	1.44
Mar	2.87
Apr	4.31
May	5.26
Jun	6.14
Jul	6.3
Aug	5.76
Sep	4.25
Oct	3.1
Nov	1.38
Dec	0.86
Total	42.49

*Data acquired from CIMIS

Table 3: Crop Specific Evapotranspiration Data**

Year	Dau_Name	Pasture ET (inches)	Other Deciduous ET (inches)	Vine ET (inches)
1998	Santa Rosa	39.60	30.00	14.40
1999	Santa Rosa	43.20	33.60	15.60
2000	Santa Rosa	43.20	32.40	15.60
2001	Santa Rosa	44.40	34.80	16.80
	AVERAGE	**42.60**	**32.70**	**15.60**

**Data acquired from the DWR

Table 4: 1999 DWR Land Use Designations

	DWR Classification	Crop Type	Acreage
Vineyards, Deciduous Trees	D	Deciduous - Prunes	14.8
	D	Deciduous - Apples	55.9
	D	Deciduous - Walnuts	35.0
		Deciduous - Pears	4.8
	T	Flowers, Nursery, and Christmas Tree Farm	32.4
	V	Vineyard	2363.3
Native vegetation, grains	G	Grain and Hay crops (misc and mixed grain and hay)	39.1
	I	Idle (new land being prepared for crop production)	24.3
	NR	Riparian Vegetation	142.7
	NV	Native Vegetation	1376.9
	NW	Water Surface	18.0
		Estimated Native Vegetation within Urban Area	20.0
Urban, Commercial, Industrial, Residential	S	Farmsteads	29.6
	U	Urban	536.2
	UC	Urban Commercial	5.7
	UI	Canneries/Food processing	35.3
	UI	Sewage Treatment (inc ponds)	35.3
	UI	General Industrial	164.3
	UR	Residential (single family lots 1-5 acres)	39.3
	UR	General Residential	251.2
	UV	Railroad right of way	13.6
	UV	vacant paved areas	41.1
	UV	airport runways	128.4
Pasture, Lawn, Corn,Truck Crops	UL	Urban Landscape - irrigated lawn area	31.2
	F	Field Crops (corn)	4.5
	P	Pasture (mixed pasture)	419.7
	T	Miscellaneous Truck Crops	13.8
		TOTAL ACREAGE	5876.3

TABLE 5 - SUBSURFACE GROUNDWATER FLOW CALCULATIONS

SUBSURFACE INFLOWS							
Estimated Width of Aquifer (ft)	**Hydraulic Gradient**	**Transmisivity (gpd/ft)**	**Hydraulic Conductivity (gpd/sqft)**	**Hydraulic Conductivity (cm/s)**	**Q - gpd**	**Q-AFD**	**Q-AFY**
4500	1.40E-02	5000	1.25E+01	5.90E-04	3.15E+05	0.97	353
2000	1.40E-02	5000	1.25E+01	5.90E-04	1.40E+05	0.43	157
						TOTAL INFLOW	510
SUBSURFACE OUTFLOWS							
Estimated Width of Aquifer (ft)	**Hydraulic Gradient**	**Transmisivity gpd/ft**	**Hydraulic Conductivity (gpd/sqft)**	**Hydraulic Conductivity (cm/s)**	**Q - gpd**	**Q-AFD**	**Q-AFY**
10500	5.70E-03	1.25E+04	1.25E+01	5.90E-04	748125	2.30	838
						TOTAL OUTFLOW	838
						NET OUTFLOW	-328

Table 6: Water Balance Summarization

	INFLOWS (AFY)						OUTFLOWS (AFY)			
	Net Precipitation Recharge to Basin	Imported Water Infiltration	Pumped Groundwater Infiltration	Mark West Percolation	Subsurface Inflow	Total Annual Inflow	Gross Pumping	Subsurface Outflows	Total Annual Outflow	**Net AFY (Inflows - Outflows)**
1986-1987	847	29	117	260	510	1763	2735	838	3573	**-1809**
1987-1988	1025	29	118	260	510	1943	2124	838	2962	**-1020**
1988-1989	1482	30	118	260	510	2400	1996	838	2834	**-433**
1989-1990	407	30	119	260	510	1326	1344	838	2182	**-856**
1990-1991	1107	31	119	260	510	2027	2228	838	3066	**-1040**
1991-1992	1082	31	119	260	510	2003	1983	838	2821	**-818**
1992-1993	2451	31	120	260	510	3372	1669	838	2507	**865**
1993-1994	810	32	120	260	510	1732	1973	838	2811	**-1078**
1994-1995	3726	32	120	260	510	4648	1322	838	2160	**2488**
1995-1996	2676	33	121	260	510	3599	1958	838	2796	**803**
1996-1997	2174	33	121	260	510	3098	2095	838	2933	**165**
1997-1998	4287	29	129	260	510	5215	1443	838	2281	**2934**
1998-1999	2110	28	125	260	510	3034	2271	838	3109	**-75**
1999-2000	1652	25	132	260	510	2579	1811	838	2649	**-69**
2000-2001	737	22	134	260	510	1663	2595	838	3433	**-1771**
2001-2002	2174	31	125	260	510	3100	2345	838	3183	**-84**
2002-2003	2326	19	133	260	510	3249	2070	838	2908	**341**
2003-2004	2179	27	132	260	510	3108	2868	838	3706	**-598**
2004-2005	2279	25	128	260	510	3203	584	838	1422	**1780**
2005-2006	3712	26	122	260	510	4630	2118	838	2956	**1674**
2006-2007	805	29	124	260	510	1729	2505	838	3343	**-1614**
TOTAL	40048	601	2597	5465	10710	59421	42038	17598	59636	**-215**
AVERAGE	1907	29	124	260	510	2830	2002	838	2840	**-10**

APPENDIX B

Well Survey
(Based on DWR Well Completion Reports in Vicinity of Study Area)

A P P E N D I X B

TABLE 1
WELL SURVEY BASED ON DWR WELL COMPLETION REPORTS

County	Township	Section	Log Number	Parcel Number	Address	Use	Date Installed	Well Depth (bgs)	Static Water Level (bgs)	Well Diameter (inches)	Screen Interval (bgs)	Test Type	Pump Test (gpm)	Test Duration (hours)	Initial Water Level (bgs)	Water Level at Test End (bgs)	Drawdown (feet)	Specific Capacity (gpm/foot)
SON49	08N08W	27	195291	39-240	5170 Wikiup Bridge Way	domestic	9/22/1987	325	NA	6 1/2	0-182 and 174-325	NA	7	1	30	160	130	0.05
SON49	08N08W	28	176968	039-025-066	5040 Old Redwood Highway	domestic	6/23/1988	352	NA	16	182-342	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	28	339040	058-202-004	4752 Londonberry Drive	NA	11/1/1991	565	NA	NA	170-565	pump	NA	NA	NA	NA	NA	NA
SON49	08N08W	28	66858	039-210-006	5001 Carriage Lane	domestic	6/17/1985	169	81	8	69-169	bailer	30	6	NA	NA	NA	NA
SON49	08N08W	28	163415	058-111-005	4946 Deerwood Drive	domestic	10/5/1984	137	NA	6	107-137	bailer	40	4	70	90	20	2.00
SON49	08N08W	28	151082	039-034-020	5187 Old Redwood Highway	domestic	8/19/1986	295	60	8	155-195 and 235-295	bailer	100	12	60	295	235	0.43
SON49	08N08W	28	17251	058-080-062	5201 Lavell Road	domestic	6/30/1989	230	60	6	70-180 and 200-230	bailer	40	1	60	70	10	4.00
SON49	08N08W	28	94880	058-122-005	4931 Londonberry Drive	domestic	8/5/1981	145	80	6	121-145	bailer	30	4	80	120	40	0.75
SON49	08N08W	28	271751	039-320-051	5146 Old Redwood Highway	domestic	10/16/1987	200	30	6	80-200	airlift	50	4	NA	NA	NA	NA
SON49	08N08W	28	313368	039-040-012	100 Wikiup Drive	domestic	7/25/1988	166	50	5	66-166	airlift	59	4	NA	NA	NA	NA
SON49	08N08W	28	235253	039-240-030	5465 Wikiup Bridge Way	domestic	5/14/1984	329	75	5	249-329	airlift	30	4	75	210	135	0.22
SON49	08N08W	29	195235	039-012-21	5387 Faught Road	domestic	12/8/1986	128	52	6	98-128	NA	15	1	52	98	46	0.33
SON49	08N08W	29	177380	059-170-035	5007 Fulton Road	domestic/ irrigation	5/24/1985	273	20	8 1/2	73-93, 133-153 and 173-273	bailer	60	3	20	35	15	4.00
SON49	08N08W	29	228838	058-090-008	5000 Fulton Road	irrigation	7/30/1981	517	35	16	54-78, 96-260, 278-326, 402-450, 470-515	pump	1850	6	35	208	173	10.69
SON49	08N08W	29	313897	058-171-022	4605 Old Redwood Highway	monitoring	7/15/1988	35	20 1/2	2	8-35	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	313898	NA	4605 Old Redwood Highway	monitoring	7/15/1988	35	20 1/2	2	8-35	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	313899	NA	4605 Old Redwood Highway	monitoring	7/15/1988	35	24	2	8-35	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	34	94860	058-050-15	126 Angela Drive	domestic	6/19/1981	607	10	5	77-107, 127-137 and 277-287	bailer	NA	4	10	80	70	NA
SON49	08N08W	34	232947	058-050-070	50 Ursuline Road	domestic/ irrigation	9/26/1983	380	14	8 1/2	50-80, 110-140, 180-260 and 295-375	airlift	140	5	14	260	246	0.57
SON49	08N08W	34	23772	NA	725 Mark West Springs Road	NA	9/25/1956	185	20	4	52-72	NA	43	4	NA	NA	NA	NA

TABLE 1
WELL SURVEY BASED ON DWR WELL COMPLETION REPORTS

County	Township	Section	Log Number	Parcel Number	Address	Use	Date Installed	Well Depth (bgs)	Static Water Level (bgs)	Well Diameter (inches)	Screen Interval (bgs)	Test Type	Pump Test (gpm)	Test Duration (hours)	Initial Water Level (bgs)	Water Level at Test End (bgs)	Drawdown (feet)	Specific Capacity (gpm/foot)
SON49	08N08W	34	105456	NA	4152 Old Redwood Highway	NA	8/24/1978	435	240	6 1/2	256-435	bailer	25	4	240	250	10	2.50
SON49	08N08W	34	15532	058-360-044	4391 Old Redwood Highway	domestic	8/20/1971	87	20	8	66-86	bailer	60	NA	NA	NA	NA	NA
SON49	08N08W	34	91972	058-050-069	400 Angela Drive	domestic	7/25/1973	355	20	10	113-335	bartley pump	NA	NA	NA	NA	NA	NA
SON49	08N08W	34	180522	058-050-054	136 Ursuline Road	domestic	5/15/1985	130	20	5	58-130	airlift	40	1	20	60	40	1.00
SON49	08N08W	34	3989	058-050-047	180 Ursuline Road	irrigation	5/26/1977	315	280	6	190-315	airlift	15	2	280	NA	NA	NA
SON49	08N08W	34	433183A-I	NA	4601 Old Redwood Highway	test well	7/19/1991	NA	13-16 1/2	NA	NA	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	28	916121	039-034-046	5350 Faught Road	irrigation	6/25/2004	304	64 1/2	8	140-300	airlift	30	2 1/2	NA	NA	NA	NA
SON49	08N08W	27	562179	039-240-024	5210 Wikiup Bridge Way	domestic	9/19/1995	206	NA	10	NA	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	27	365636	039-024-01	6120 Wikiup Bridge Way	domestic	4/15/1991	510	380	5	170-190 and 390-510	airlift	60	4	380	495	115	0.52
SON49	08N08W	27	536127	NA	685 Quietwater	domestic	7/2/1998	285	artesian	10 1/2	140-285	airlift	300	2	0	280	280	1.07
SON49	08N08W	27	821817	067-320-016	665 Quietwater	domestic	10/5/1999	138	45	5	98-138	airlift	100	2	45	130	85	1.18
SON49	08N08W	27	781344	067-320-018	723 Quietwater	domestic	9/15/2000	380	artesian	5	240-380	airlift	100	2	0	220	220	0.45
SON49	08N08W	27	701663	067-320-019	755 Quietwater	domestic	10/13/1999	45	17	5	25-45	airlift	4	3	17	42	25	0.16
SON49	08N08W	28	784648	039-230-013	549 Carriage Court	irrigation	7/12/2000	249	70	5	129-149 and 209-249	airlift	30	1	70	100	30	1.00
SON49	08N08W	28	769992	058-111-003	4954 Deerwood Drive	domestic	5/16/2003	220	75	5	80-220	airlift	30	2	75	210	135	0.22
SON49	08N08W	28	781372	058-131-001	4938 Deerwood Drive	domestic	4/4/2001	220	60	5	80-220	airlift	60	2	60	210	150	0.40
SON49	08N08W	28	370797	058-202-004	4752 Londonberry Drive	test well	10/1/1990	605	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	28	740007	058-132-003	4925 Deerwood Drive	domestic	7/19/2001	288	145	5	160-240 and 248-288	airlift	50	1	145	210	65	0.77
SON49	08N08W	29	820358	039-025-029	5321 Old Redwood Highway	monitoring	4/5/2000	30	24.5	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	820359	039-025-029	5321 Old Redwood Highway	monitoring	4/5/2000	30	25	8	10-30	NA	NA	NA	NA	NA	NA	NA

TABLE 1
WELL SURVEY BASED ON DWR WELL COMPLETION REPORTS

County	Township	Section	Log Number	Parcel Number	Address	Use	Date Installed	Well Depth (bgs)	Static Water Level (bgs)	Well Diameter (inches)	Screen Interval (bgs)	Test Type	Pump Test (gpm)	Test Duration (hours)	Initial Water Level (bgs)	Water Level at Test End (bgs)	Drawdown (feet)	Specific Capacity (gpm/foot)
SON49	08N08W	29	820360	039-025-029	5321 Old Redwood Highway	monitoring	4/5/2000	30	25	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	820361	039-025-029	5321 Old Redwood Highway	monitoring	4/5/2000	30	25	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	733302	039-025-029	5321 Old Redwood Highway	monitoring	2/1/2001	40	34	8	20-40	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	733303	039-025-029	5321 Old Redwood Highway	monitoring	2/1/2001	40	34	8	5-40	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	733304	039-025-029	5321 Old Redwood Highway	monitoring	2/2/2001	40	35	8	5-40	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	733305	039-025-029	5321 Old Redwood Highway	monitoring	2/2/2001	40	39	8	5-40	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	704065	039-025-029	5321 Old Redwood Highway	monitoring	9/21/1998	50	22	9	30-50	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	704064	039-025-029	5321 Old Redwood Highway	monitoring	9/21/1998	50	22	9	20-40	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	704063	039-025-029	5321 Old Redwood Highway	monitoring	9/23/1998	34	23	9	14-34	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	704062	039-025-029	5321 Old Redwood Highway	monitoring	9/23/1998	35	21	9	15-35	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803508	039-025-029	5321 Old Redwood Highway	monitoring	6/9/2003	29	8 1/2	9	9-29	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803509	039-025-029	5321 Old Redwood Highway	monitoring	6/13/2003	30	16	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803510	039-025-029	5321 Old Redwood Highway	monitoring	6/12/2003	30	19 1/2	7	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803511	039-025-029	5321 Old Redwood Highway	monitoring	6/11/2003	26 1/2	9	7	6-26	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803512	039-025-029	5321 Old Redwood Highway	monitoring	6/11/2003	25	8	7	5-25	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803513	039-025-029	5321 Old Redwood Highway	monitoring	6/10/2003	33	11	7	13-33	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803514	039-025-029	5321 Old Redwood Highway	monitoring	6/13/2003	30	16	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803515	039-025-029	5321 Old Redwood Highway	monitoring	6/12/2003	30	17	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803516	039-025-029	5321 Old Redwood Highway	monitoring	6/12/2003	30	16	8	10-30	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803517	039-025-029	5321 Old Redwood Highway	monitoring	6/12/2003	50	21	8	40-50	NA	NA	NA	NA	NA	NA	NA

TABLE 1
WELL SURVEY BASED ON DWR WELL COMPLETION REPORTS

County	Township	Section	Log Number	Parcel Number	Address	Use	Date Installed	Well Depth (bgs)	Static Water Level (bgs)	Well Diameter (inches)	Screen Interval (bgs)	Test Type	Pump Test (gpm)	Test Duration (hours)	Initial Water Level (bgs)	Water Level at Test End (bgs)	Drawdown (feet)	Specific Capacity (gpm/foot)
SON49	08N08W	29	803518	039-025-029	5321 Old Redwood Highway	monitoring	6/13/2003	55	21	8	40-55	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803519	039-025-029	5321 Old Redwood Highway	monitoring	6/19/2003	40	20	9	39-50	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	29	803520	039-025-029	5321 Old Redwood Highway	monitoring	6/18/2003	50	20	9	40-50	NA	NA	NA	NA	NA	NA	NA
SON49	08N08W	34	740014	058-101-003	441 Mark West Springs Road	domestic	8/14/2001	76	20	5	26-76	airlift	12	1	20	50	30	0.40
SON49	08N08W	34	797187	058-080-017	510 Mark West Springs Road	domestic	5/7/2003	260	130	5	80-260	airlift	70	1	130	240	110	0.64
SON49	08N08W	34	562517	058-050-070	4300 Old Redwood Highway	irrigation	3/2/1998	463	30	8	83-163, 183-383 and 423-463	airlift	100	4	30	200	170	0.59
SON49	08N08W	28	427535	058-111-008	4947 Deerwood Drive	domestic	8/14/1991	233	95	5	93-233	airlift	3	4	95	220	125	0.02
SON49	08N08W	28	384770	058-131-003	4914 Deerwood Drive	domestic	8/4/1991	223	140	5	168-223	airlift	30	1	140	215	75	0.40
SON49	07N08W	4	49-1217	NA	3920 Barnes Road	NA	7/8/1949	102	10	8	NA	NA	100	NA	NA	NA	NA	NA
SON49	07N08W	4	49-1219	NA	East Fulton Road	domestic	5/4/1953	54	NA	6	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	4	49-1221	NA	3572 Coffey Lane	irrigation	8/15/1952	276	15	12	15-276	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	4	49-1222	NA	Hemlock Street	municipal	7/?/1984	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	4	91485	NA	3796 Coffey Lane	domestic	8/5/1974	128	18	6 1/2	118-128	NA	40	1	18	32	14	2.86
SON49	07N08W	4	17523	NA	3856 Bluegrass Lane	domestic	6/8/1972	50	34	6	40-50	NA	20	NA	NA	NA	NA	NA
SON49	07N08W	4	17528	NA	3818 Bluegrass Lane	domestic	12/26/1972	48	11	6	40-48	NA	20	NA	NA	NA	NA	NA
SON49	07N08W	4	14383	059-090-027	4000 Barnes Road	domestic	12/19/1972	73	19	8 1/2	63-73	NA	18	1	19	39	20	0.90
SON49	07N08W	4	49-1223	NA	3795 Coffey Lane	irrigation	9/26/1952	128	12	10	20-128	NA	100	NA	NA	NA	NA	NA
SON49	07N08W	4	49-1224	NA	3964 Barnes Road	domestic	7/26/1952	44	NA	6	34-44	NA	20	NA	NA	NA	NA	NA
SON49	07N08W	4	96897	NA	3544 Barnes Road	domestic	9/4/1961	116	26	8	108-116	NA	40	1	26	71	45	0.89
SON49	07N08W	4	52935	NA	3612 Barnes Road	domestic	8/9/1959	60	31	6	52-60	NA	40	NA	31	59	28	1.43

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SON49	07N08W	4	74996	NA	3694 Barnes Road	domestic	9/7/1973	65	12	6 1/2	45-65	bailer	12	NA	12	52	40	0.30
SON49	07N08W	4	245372	NA	3704 Barnes Road	domestic	2/3/1982	135	20	5	60-135	bailer	60	4	20	90	70	0.86
SON49	07N08W	4	105596	059-080-012	3920 Barnes Road	domestic	5/2/1978	99	25	6	59-99	bailer	30	4	25	60	35	0.86
SON49	07N08W	4	121028	NA	4095 Barnes Road	domestic	11/13/1974	100	22	5	60-100	bailer	30	2	22	62	40	0.75
SON49	07N08W	4	105083	058-310-051	3826 Bluegrass Lane	domestic	11/6/1978	75	25	6 1/2	35-75	bailer	30	4	25	40	15	2.00
SON49	07N08W	4	111012	NA	3850 Bluegrass Lane	domestic	10/7/1977	102	30	8	75-102	bailer	60	4	30	70	40	1.50
SON49	07N08W	4	158510	NA	END Bluegrass Lane	domestic/ irrigation	10/7/1976	60	23	8 1/2	21-60	bailer	40	2	NA	NA	NA	NA
SON49	07N08W	4	70858	NA	Coffey Lane	irrigation	7/20/1963	92	12	8	73-78 and 85-89	NA	30	1	12	57	45	0.67
SON49	07N08W	4	13296	NA	3409 Coffey Lane	domestic	6/22/1971	86	32	6	78-86	NA	24	NA	NA	NA	NA	NA
SON49	07N08W	4	96882	NA	3417 Coffey Lane	domestic	6/27/1961	92	NA	6	84-92	NA	30	1	NA	NA	NA	NA
SON49	07N08W	4	50102	NA	3663 Coffey Lane	domestic	12/26/1957	80	19	8	72-80	NA	25	NA	19	59	40	0.63
SON49	07N08W	4	67824	NA	3663 Coffey Lane	irrigation	10/19/1961	188	18	12	18-180	bailer	80	2	18	30	12	6.67
SON49	07N08W	4	45543	NA	3795 Coffey Lane	domestic	4/25/1957	48	7	6	20-32 and 36 to 48	NA	20	NA	NA	NA	NA	NA
SON49	07N08W	4	38714	NA	4032 Coffey Lane	domestic	3/3/1977	66	18	6 1/2	56-66	bailer	20	1	18	48	30	0.67
SON49	07N08W	4	80943	NA	3973 Coffey Lane	domestic	1/2/1973	75	10	8	55-75	bailer	20	3	10	12	2	10.00
SON49	07N08W	4	80441	058-031-018	3845 Coffey Lane	domestic	10/22/1980	71	20	6 1/2	31-71	bailer	30	1 1/2	20	30	10	3.00
SON49	07N08W	4	562536	058-033-004	3882 Coffey Lane	domestic	6/30/1997	530	20	5	70-90, 110-250 and 270-330	airlift	100	4	20	520	500	0.20
SON49	07N08W	4	70243	NA	4032 Coffey Lane	domestic	3/31/1963	76	12	8	53-59 and 68-76	NA	80	1	12	28	16	5.00
SON49	07N08W	4	121625	058-031-022	4041 Coffey Lane	irrigation	12/24/1975	64	12	8	0-64	NA	50	1	12	30	18	2.78
SON49	07N08W	4	123464	058-040-042	4099 Coffey Lane	domestic	1/30/1974	81	10	6	61-81	bailer	60	3	10	35	25	2.40

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SON49	07N08W	4	23441	NA	Dennis Lane	domestic	7/22/1955	60	16	8	40-60	NA	13	2	16	45	29	0.45
SON49	07N08W	4	70860	NA	Dennis Lane	domestic	7/5/1963	48	15	6	40-48	NA	32	1	15	41	26	1.23
SON49	07N08W	4	56208	NA	Dennis Lane	domestic	9/15/1959	56	30	6	39-54	NA	40	2	30	40	10	4.00
SON49	07N08W	4	112992	NA	1918 Dennis Lane	domestic	9/30/1963	48	12	6	40-48	NA	28	1	12	44	32	0.88
SON49	07N08W	4	17506	NA	1918 Dennis Lane	domestic	11/10/1971	52	18	6	44-52	NA	30	NA	18	40	22	1.36
SON49	07N08W	4	17514	NA	1965 Dennis Lane	domestic	2/22/1972	52	12	NA	44-52	NA	18	NA	12	40	28	0.64
SON49	07N08W	4	23852	NA	2008 Dennis Lane	domestic	10/4/1956	40	19	6	32-40	NA	30	NA	19	35	16	1.88
SON49	07N08W	4	17519	NA	2025 Dennis Lane	domestic	4/20/1972	52	43	6	44-52	NA	18	NA	NA	NA	NA	NA
SON49	07N08W	4	80974	NA	2032 Dennis Lane	domestic	2/18/1967	52	18	6	44-52	NA	36	NA	NA	NA	NA	NA
SON49	07N08W	4	49-1226	NA	2116 Dennis Lane	domestic	12/8/1952	40	16	6	27-37	NA	12	NA	16	30	14	0.86
SON49	07N08W	4	70209	NA	2132 Dennis Lane	domestic	5/12/1962	80	11	8	60-62, 44-54 and 72-80	NA	40	1	18	54	36	1.11
SON49	07N08W	4	23755	NA	2145 Dennis Lane	domestic	9/13/1956	55	22	8	39-55	NA	18	2	22	53	31	0.58
SON49	07N08W	4	94865	034-020-347	3810 Elwin Lane	domestic	6/30/1981	151	18	5	50-150	bailer	25	4	18	35	17	1.47
SON49	07N08W	4	56324	NA	Elwin Lane	domestic	4/12/1960	60	15	8	44-58	NA	10	1	15	45	30	0.33
SON49	07N08W	4	19868	NA	1913 Miguel Avenue	irrigation	4/22/1972	194	12	8 1/2	104-144 and 174-194	bailer	40	NA	12	55	43	0.93
SON49	07N08W	5	49-1227	NA	Fulton Road and Wood Road	NA	12/?/1949	153	NA	8	NA	bailer	60	1	NA	NA	NA	NA
SON49	07N08W	5	49-1230	NA	2488 Fulton Road	NA	7/2/1946	96	15	8	74-96	NA	23	3	15	88	73	0.32
SON49	07N08W	5	49-1232	034-030-078	2365 Fulton Road	NA	10/8/1946	112	20	8	90-112	NA	2	1	20	38	18	0.11
SON49	07N08W	5	49-1234	NA	Fulton Road and Wood Road	domestic	4/5/1952	56	18	6	46-56	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	5	509504	059-020-021	2610 Fulton Road	domestic/ irrigation	7/28/1997	139	20	6	59-79 and 99-139	airlift	30	1	20	125	105	0.29

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SON49	07N08W	5	49-1236	NA	2434 Fulton Road	domestic	1950?	67	NA	8	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	5	49-1237	NA	Fulton Road	domestic	1950?	88	NA	6	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	5	427098	059-030-009	1349 Wood Road	irrigation	4/25/1997	216	14	5	176-216	bailer	18	6	14	79	65	0.28
SON49	07N08W	5	74869	059-070-064	3925 Barnes Road	domestic/ irrigation	7/11/1973	119	20	8 1/2	60-80 and 100-120	bailer	50	NA	20	35	15	3.33
SON49	07N08W	5	94855	058-031-019	1919 Dennis Lane	domestic/ irrigation	5/22/1981	320	35	8	115-125, 159-169, 270-312	bailer	50	4	35	55	30	1.67
SON49	07N08W	5	153277	NA	2190 Francisco Avenue	domestic	9/1/1976	68	25	6 1/2	28-68	bailer	15	NA	25	50	25	0.60
SON49	07N08W	5	141554	034-020-032	2193 Francisco Avenue	domestic	2/24/1976	98	21	8 1/2	58-98	bailer	75	NA	21	56	35	2.14
SON49	07N08W	5	46633	NA	2191 Francisco Avenue	domestic	10/29/1969	59	20	6	39-59	bailer	20	NA	20	40	20	1.00
SON49	07N08W	5	23555	NA	2193 Francisco Avenue	domestic	5/15/1955	56	18	6	48-56	NA	24	NA	18	40	22	1.09
SON49	07N08W	5	14404	NA	2230 San Miguel Road	domestic	4/18/1968	148	12	6	138-148	NA	30	1	12	56	44	0.68
SON49	07N08W	5	121618	059-060-041	2865 Fulton Road	domestic	9/23/1975	120	27	8	61-65 and 104-120	NA	50	1	27	57	30	1.67
SON49	07N08W	5	147418	NA	2407 Francisco Avenue	domestic	6/13/1976	76	22	8	56-76	NA	12	1 1/2	22	39	17	0.71
SON49	07N08W	5	95674	034-020-031	2225 Francisco Avenue	domestic	6/14/1974	116	12	8	104-116	bailer	30	1 1/2	12	52	40	0.75
SON49	07N08W	5	112983	NA	2291 Francisco Avenue	domestic	9/18/1963	52	10	6	44-52	NA	20	1	10	48	38	0.53
SON49	07N08W	5	113000	NA	2297 Francisco	domestic	5/26/1964	66	11	6	58-66	NA	20	1	11	61	50	0.40
SON49	07N08W	5	210060	034-030-046	2301 Francisco Avenue	domestic	3/16/1988	130	25	6	70-130	NA	24	1 1/2	25	60	35	0.69
SON49	07N08W	5	163127	NA	2341 Francisco Avenue	domestic	10/8/1984	88	22	6	35-86	bailer	30	4	23	45	22	1.36
SON49	07N08W	5	67973	NA	2520 Francisco Avenue	domestic	12/2/1961	52	20	6	44-52	NA	15	NA	20	48	28	0.54
SON49	07N08W	5	141345	059-020-007	2810 Francisco Avenue	domestic	9/15/1976	70	25	6 1/2	31-70	bailer	40	NA	25	30	5	8.00
SON49	07N08W	5	121742	059-020-042	3020 Francisco Avenue	domestic	2/28/1979	134	25	8 1/2	124-134	bailer	40	1	25	62	37	1.08

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SON49	07N08W	5	121457	059-020-042	3020 Francisco Avenue	domestic	7/3/1966	76	13	6	50-53 and 68-76	NA	18	1	13	35	22	0.82
SON49	07N08W	5	17627	034-030-078	2365 Fulton Road	NA	11/13/1969	197	35	8	177-197	NA	70	2 1/2	35	40	5	14.00
SON49	07N08W	5	23712	034-030-078	2365 Fulton Road	irrigation	12/9/1955	208	18	6	190-208	NA	80	NA	18	88	70	1.14
SON49	07N08W	5	177255	034-030-069	2411 Fulton Road	domestic	6/24/1985	79	18	6	39-79	bailer	25	1	18	21	3	8.33
SON49	07N08W	5	197866	059-020-039	2514 Fulton Road	domestic	6/23/1986	141	24	6	51-141	airlift	15	1	24	75	51	0.29
SON49	07N08W	5	56413	059-020-022	2702 Fulton Road	domestic	3/23/1960	75	15	8	65-75	bailer	25	2	15	55	40	0.63
SON49	07N08W	5	23681	NA	2705 Fulton Road	domestic	3/27/1956	72	16	8	64-72	NA	15	NA	16	70	54	0.28
SON49	07N08W	5	68045	059-020-031	2712 Fulton Road	domestic/ irrigation	7/25/1963	77	16	6	63-77	bailer	30	1	16	35	19	1.58
SON49	07N08W	5	225383	059-020-045	2722 Fulton Road	domestic	5/19/1986	115	5	6	75-110	airlift	40	1	5	80	75	0.53
SON49	07N08W	5	225376	059-020-046	2730 Fulton Road	domestic	5/16/1986	115	6	6	75-115	airlift	25	1	6	100	94	0.27
SON49	07N08W	5	225379	059-020-044	2740 Fulton Road	domestic	5/16/1986	107	4	6	67-107	airlift	60	1	4	105	101	0.59
SON49	07N08W	5	244505	059-070-069	2752 Fulton Road	domestic	9/25/1981	96	25	6	70-96	bailer	25	4	25	60	35	0.71
SON49	07N08W	5	61286	059-070-072	2826 Fulton Road	domestic	4/1/1960	79	15	6	63-77	NA	30	1	15	35	20	1.50
SON49	07N08W	5	64880	059-070-026	2834 Fulton Road	domestic	3/31/1961	75	33	6	61-72	NA	7	1	33	65	32	0.22
SON49	07N08W	5	232901	059-060-040	2855 Fulton Road	domestic	4/21/1982	160	18	6	120-160	bailer	24	1	18	52	34	0.71
SON49	07N08W	5	232977	059-070-021	2856 Fulton Road	domestic	6/26/1984	143	30	5	73-78, 90-92 and 114-140	airlift	20	1	30	100	70	0.29
SON49	07N08W	5	23864	059-060-031	2901 Fulton Road	domestic	11/21/1956	92	46	6	84-92	NA	40	NA	46	91	45	0.89
SON49	07N08W	5	84364	059-010-003	1350 Parnell Road	domestic	6/1/1979	183	NA	6 1/2	159-183	bailer	30	2	NA	NA	NA	NA
SON49	07N08W	5	244510	059-060-019	3029 Parnell Road	domestic	10/5/1981	215	50	5	175-215	bailer	20	4	50	70	20	1.00
SON49	07N08W	5	308471	059-070-080	1980 Raplee Terrace	domestic	6/21/1989	235	20	6	100-129 and 160-230	airlift	25	4	20	140	120	0.21

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SON49	07N08W	5	96851	NA	Raplee Terrace	domestic	10/26/1961	68	20	6	60-68	NA	24	1	20	65	45	0.53
SON49	07N08W	5	70216	NA	2000 San Miguel Avenue	domestic	7/2/1962	68	20	8	60-68	NA	32	1	20	60	40	0.80
SON49	07N08W	5	63293	NA	Wood Road	domestic	9/10/1980	374	NA	8	354-374	bailer	NA	2	NA	NA	NA	NA
SON49	07N08W	5	74862	034-030-028	1260 Wood Road	domestic	7/11/1973	97	20	6 1/2	57-97	bailer	25	NA	20	45	25	1.00
SON49	07N08W	6	49-1240	NA	Wood Road and Fulton Road	NA	1943?	112	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	6	46906	NA	2300 Woolsey Road	domestic	6/16/1970	158	29	8	138-158	bailer	33	NA	29	104	75	0.44
SON49	07N08W	6	95211	NA	South of Woolsey Road	Domestic	8/10/1973	115	30	8 1/2	36-47, 63-82 and 98-115	NA	10	1	30	60	30	0.33
SON49	07N08W	6	95670	059-040-012	2025 Wood Road	domestic	5/3/1974	88	10	8	76-88	bailer	15	1	10	31	21	0.71
SON49	07N08W	6	14412	NA	2286 Woolsey Road	domestic	7/30/1968	80	4	6	70-80	NA	14	1	4	40	36	0.39
SON49	07N08W	6	45984	059-120-011	2393 Wood Road	domestic	7/4/1971	140	33	8 1/2	120-140	NA	50	1	33	53	20	2.50
SON49	07N08W	6	95677	NA	1995 Wood Road	domestic	7/19/1974	92	19	8	80-92	bailer	12	2 1/2	19	42	23	0.52
SON49	07N08W	6	34681	NA	2800 Francisco Avenue	irrigation	8/25/1978	200	30	8	30-196	bailer	50	2	30	150	120	0.42
SON49	07N08W	6	56420	NA	1352 Wood Road	domestic/ irrigation	6/1/1960	130	16	8	50-60, 70-80 and 100-130	bailer	40	1	16	55	39	1.03
SON49	07N08W	6	12097	NA	1617 Wood Road	domestic	5/14/1970	59	12	6	39-59	bailer	50	NA	12	22	10	5.00
SON49	07N08W	6	12174	NA	1737 Wood Road	domestic	6/9/1970	96	12	8	46-56 and 76-96	bailer	60	NA	12	40	28	2.14
SON49	07N08W	6	177145	034-050-055	1812 Wood Road	domestic/ irrigation	9/27/1985	340	17	6	80-100, 120-200 and 300-340	bailer	50	2	17	40	23	2.17
SON49	07N08W	6	116514	059-040-011	1865 Wood Road	domestic	10/15/1973	100	47	6 1/2	60-100	bailer	20	NA	47	72	25	0.80
SON49	07N08W	6	3874	034-050-048	1990 Wood Road	domestic	12/19/1989	157	23	6	86-126 and 146-157	bailer	15	5	23	85	62	0.24
SON49	07N08W	6	116545	NA	1905 Wood Road	domestic	2/13/1974	97	12	6 1/2	55-65 and 81-97	bailer	40	NA	12	27	15	2.67
SON49	07N08W	6	61494	NA	2006 Wood Road	domestic	11/13/1963	82	20	6 1/2	62-82	NA	10	1	20	60	40	0.25

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SON49	07N08W	6	80961	NA	2008 Wood Road	domestic	6/6/1966	104	20	6	96-104	NA	24	NA	20	80	60	0.40
SON49	07N08W	6	13257	NA	2010 Wood Road	domestic	7/2/1968	76	52	6	68-76	NA	18	NA	52	65	13	1.38
SON49	07N08W	6	80971	NA	2019 Wood Road	domestic	11/3/1966	76	47	6	68-76	NA	24	NA	47	65	18	1.33
SON49	07N08W	6	55576	NA	2071 Wood Road	domestic	7/15/1970	137	20	4 1/2	77-137	bailer	25	NA	20	45	25	1.00
SON49	07N08W	6	70792	NA	2071 Wood Road	domestic	3/25/1965	71	10	6 1/2	51-71	bailer	10	NA	10	50	40	0.25
SON49	07N08W	6	34366	NA	2119 Wood Road	domestic	4/28/1977	98	38	8 1/2	88-98	bailer	14	2	38	50	12	1.17
SON49	07N08W	6	120907	059-120-010	2421 Wood Road	domestic	8/5/1966	125	32	8	111-125	bailer	24	1	32	72	40	0.60
SON49	07N08W	6	55025	NA	2401 Wood Road	domestic	6/23/1973	151	23	6 1/2	31-91 and 131-151	bailer	30	NA	23	75	52	0.58
SON49	07N08W	6	55139	NA	1299 Triple Oak Way	domestic	12/18/1974	95	30	8	75-95	NA	15	2	30	90	60	0.25
SON49	07N08W	6	55131	NA	1345 Triple Oak Way	domestic	12/6/1974	145	50	8	80-100 and 125-145	NA	20	2	50	100	50	0.40
SON49	07N08W	6	96864	NA	2278 Woolsey Road	domestic	2/21/1962	124	NA	6	83-86, 99-101, 88-93 and 116-124	NA	36	1	NA	NA	48	0.75
SON49	07N08W	6	121462	059-120-023	2487 Woolsey Road	domestic	8/20/1966	130	22	8	120-130	NA	25	1	22	58	36	0.69
SON49	07N08W	6	109966	059-320-017	2617 Woolsey Road	domestic/ irrigation	7/5/1977	170	40	6 1/2	70-130 and 150-170	bailer	40	2	40	55	15	2.67
SON49	07N08W	6	18965	059-320-019	2695 Woolsey Road	irrigation	5/17/1969	314	80	8 1/2	80-100, 120-140 and 254-314	NA	35	3	80	160	80	0.44
SON49	07N08W	4	966125	059-080-010	4024 Barnes Road	domestic	11/8/2004	240	NA	5	100-240	airlift	100	2	NA	NA	NA	NA
SON49	07N08W	6	926707	059-040-005	1933 Wood Road	domestic	3/24/2003	92	17	5	52-92	airlift	15	1	17	82	65	0.23
SON49	07N08W	4	410366	058-031-016	3866 Bluegrass Lane	domestic	5/12/1993	97	10	6	37-97	airlift	42	3	10	95	85	0.49
SON49	07N08W	4	80014	NA	3800 Coffey Lane	domestic	6/9/1967	108	20	6	100-108	NA	36	NA	20	48	28	1.29
SON49	07N08W	4	561465	058-033-004	3882 Coffey Lane	domestic	1/26/1996	155	10	5	75-95 and 115-155	airlift	75	4	10	140	130	0.58
SON49	07N08W	4	822476	NA	3964 Coffey Lane	domestic	5/4/1999	360	40	8	60-140, 180-200, 240-280 and 300-360	airlift	300	2	40	200	160	1.88

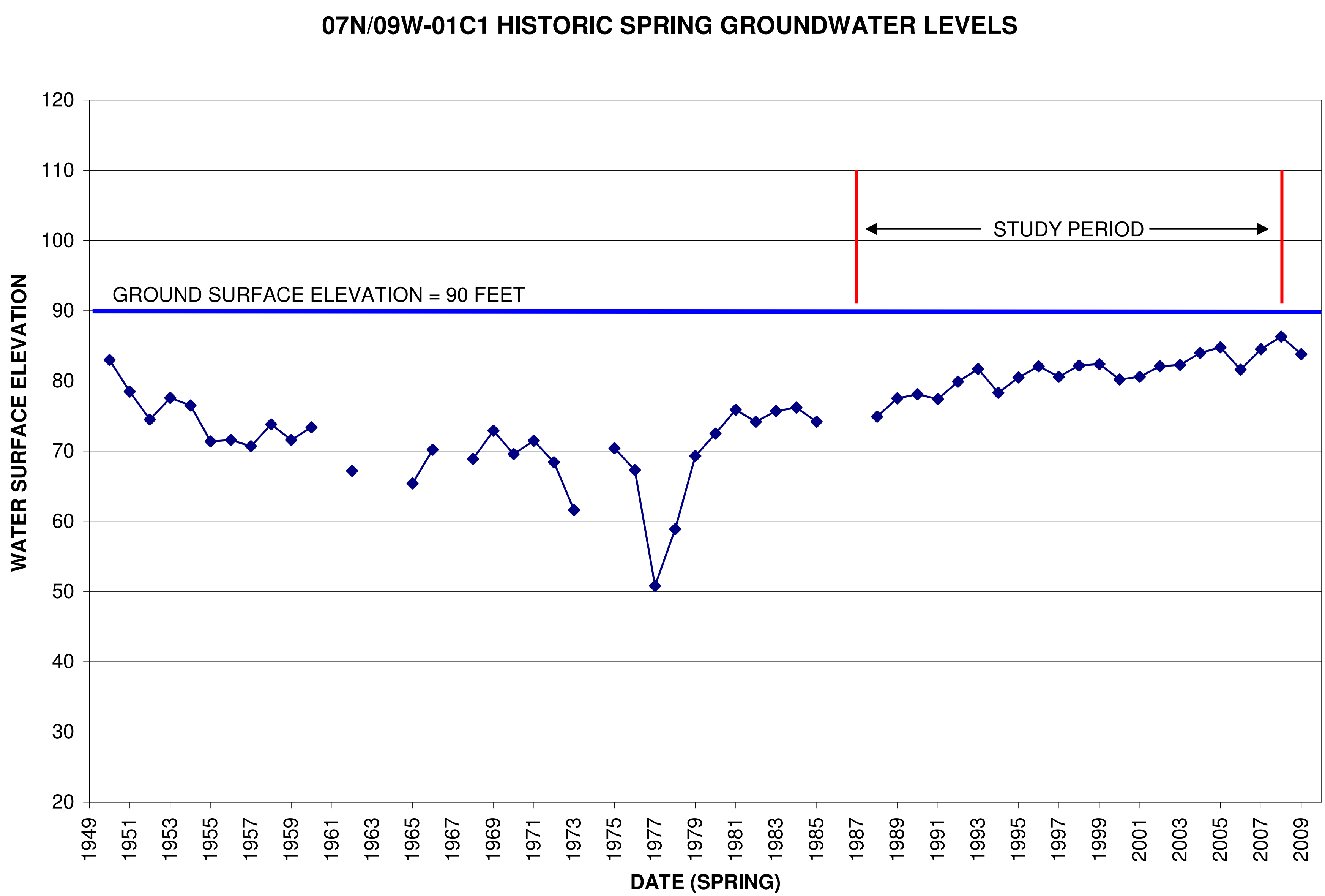
TABLE 1
WELL SURVEY BASED ON DWR WELL COMPLETION REPORTS

County	Township	Section	Log Number	Parcel Number	Address	Use	Date Installed	Well Depth (bgs)	Static Water Level (bgs)	Well Diameter (inches)	Screen Interval (bgs)	Test Type	Pump Test (gpm)	Test Duration (hours)	Initial Water Level (bgs)	Water Level at Test End (bgs)	Drawdown (feet)	Specific Capacity (gpm/foot)
SON49	07N08W	4	532951	058-031-023	4033 Coffey Lane	domestic	8/21/1997	203	49	6	105-115 and 155-203	airlift	100	1	49	150	101	0.99
SON49	07N08W	4	778381	058-040-053	4121 Coffey Lane	domestic	8/7/2001	160	50	5	60-160	airlift	100	2	50	150	100	1.00
SON49	07N08W	4	740002	059-010-002	3806 Barnes Road	domestic	6/21/2001	245	28	5	165-245	airlift	100	1	28	110	82	1.22
SON49	07N08W	5	336893	059-070-065	4005 Barnes Road	domestic	4/12/1990	154	30	6	70-150	airlift	40	4	30	80	50	0.80
SON49	07N08W	5	792259	034-030-012	2707 Francisco Avenue	NA	11/7/2002	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SON49	07N08W	5	415779	059-020-028	2914 Francisco Avenue	domestic	1/4/1994	100	21	6	40-100	airlift	10	1	21	111	90	0.11
SON49	07N08W	5	965827	059-070-022	2868 Fulton Avenue	domestic	3/16/2005	170	25	5	100-170	airlift	25	1	25	100	75	0.33
SON49	07N08W	5	916795	059-070-066	2972 Fulton Avenue	irrigation	3/8/2005	240	31	6	75-115, 135-155 and 175-235	airlift	45	2 1/2	31	225	194	0.23
SON49	07N08W	6	427007	034-050-053	1818 Wood Road	domestic	7/5/1995	177	18	5	104-124 and 137-177	bailer	12	5	18	103	85	0.14
SON49	07N08W	6	415622	034-050-045	1938 Wood Road	domestic	10/11/1994	152	20	6	71-111 and 131-151	airlift	40	2 1/2	20	150	130	0.31
SON49	07N08W	6	561420	059-320-017	2617 Woolsey Road	domestic	6/13/1995	200	30	8	50-60, 80-100 and 140-160	airlift	150	4	30	150	120	1.25
SON49	07N08W	5	415729	NA	1503 Wood Road	domestic/ irrigation	6/10/1994	185	15	6	85-185	bailer	18	1	15	65	50	0.36

APPENDIX C

Hydrographs

APPENDIX C


07N/09W-01C1 HISTORIC SPRING GROUNDWATER LEVELS
WATER SURFACE ELEVATION
DATE (SPRING)
GROUND SURFACE ELEVATION = 90 FEET
STUDY PERIOD
120
110
100
90
80
70
60
50
40
30
20
1949
1951
1953
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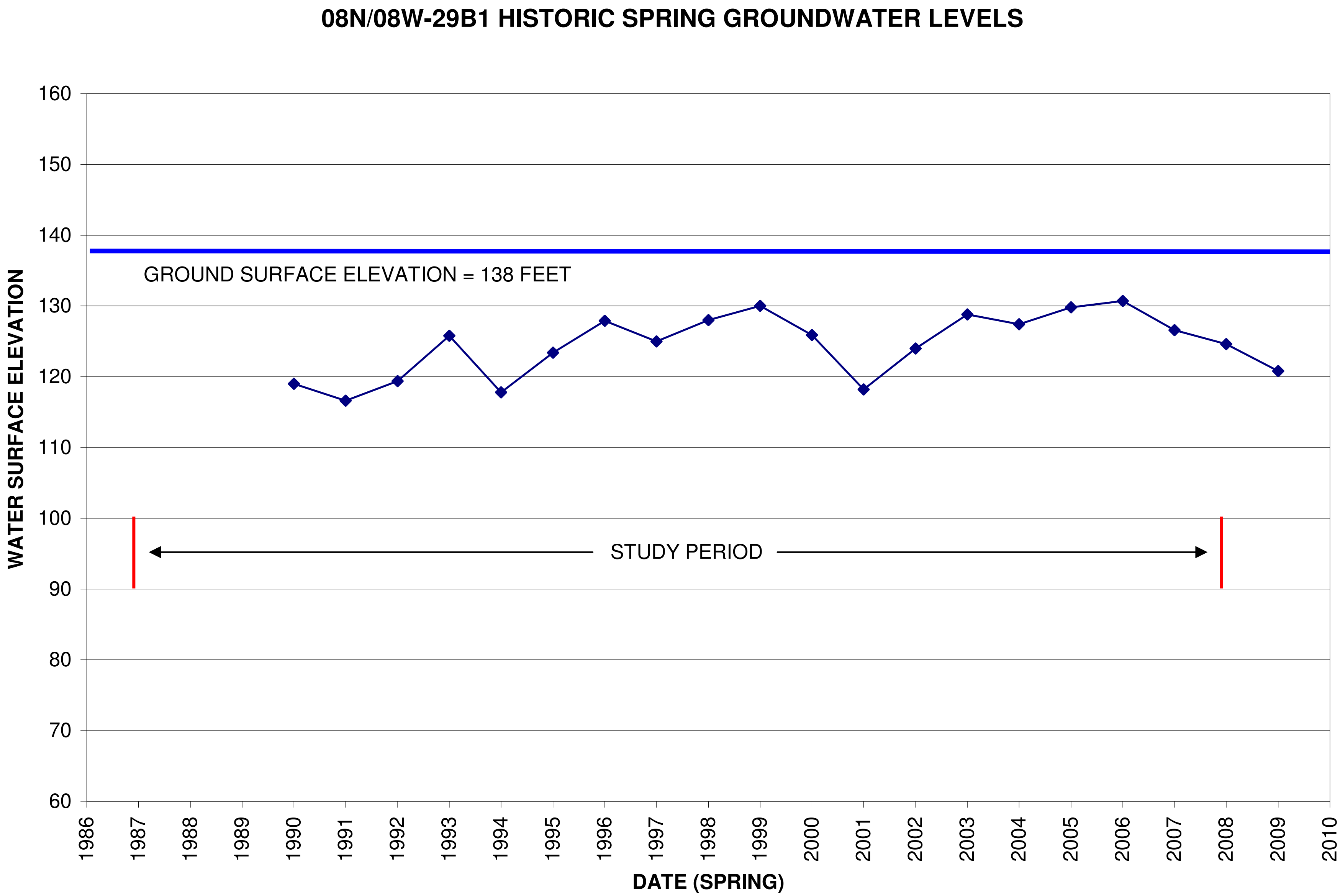
08N/08W-29B1 HISTORIC SPRING GROUNDWATER LEVELS
GROUND SURFACE ELEVATION = 138 FEET
STUDY PERIOD
WATER SURFACE ELEVATION
DATE (SPRING)
160
150
140
130
120
110
100
90
80
70
60
1986
1987
1988
1989
1990
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1992
1993
1994
1995
1996
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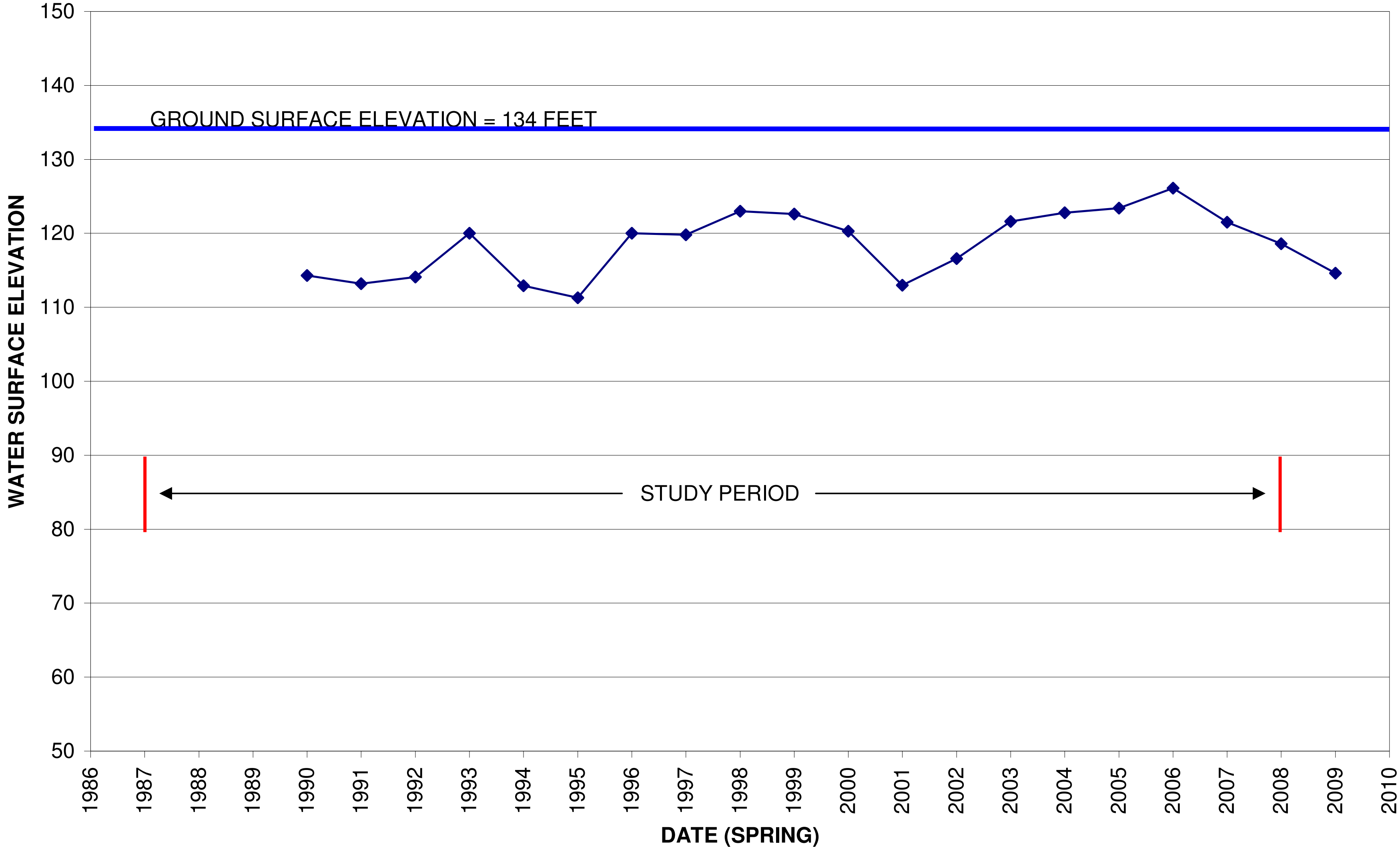
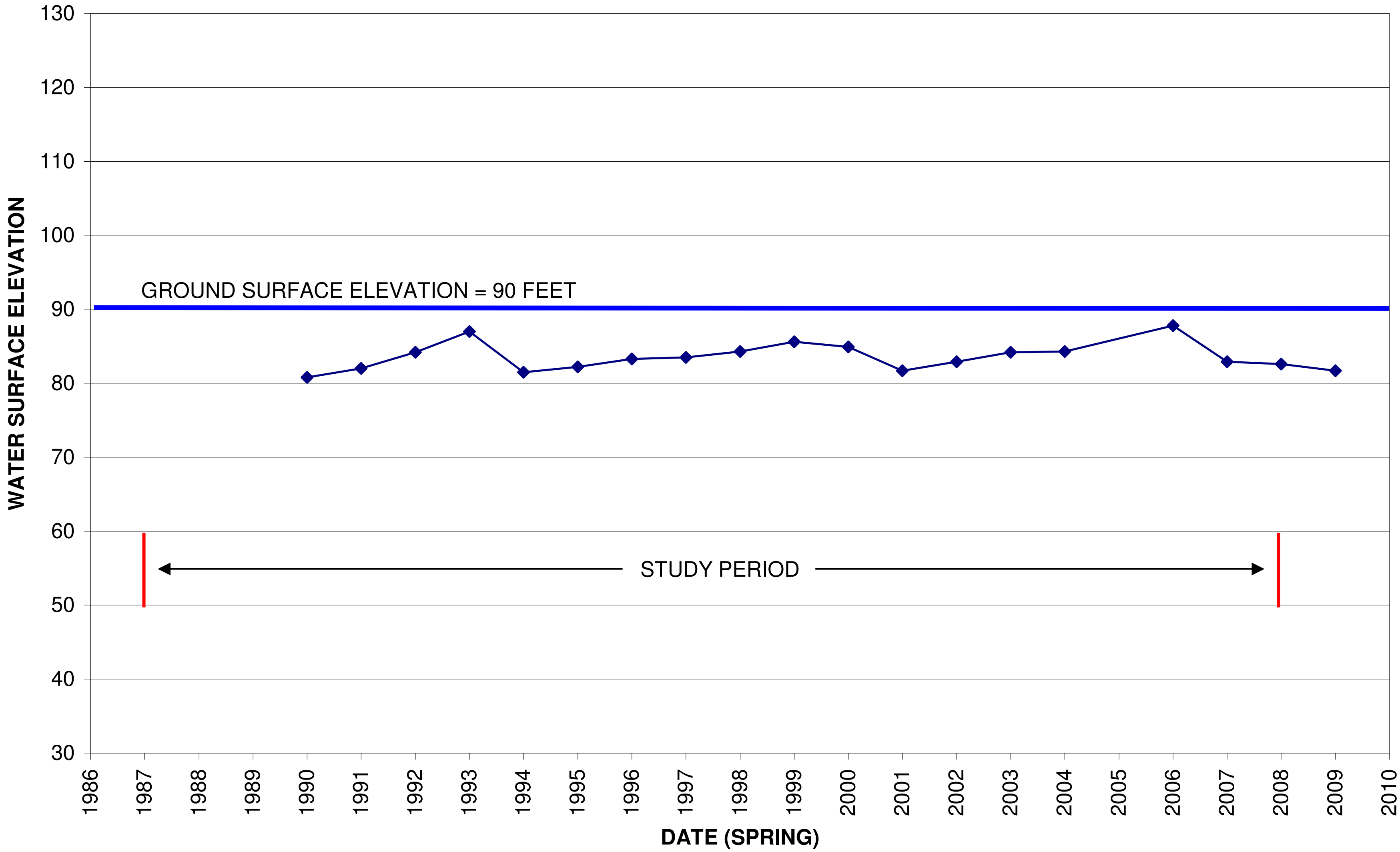
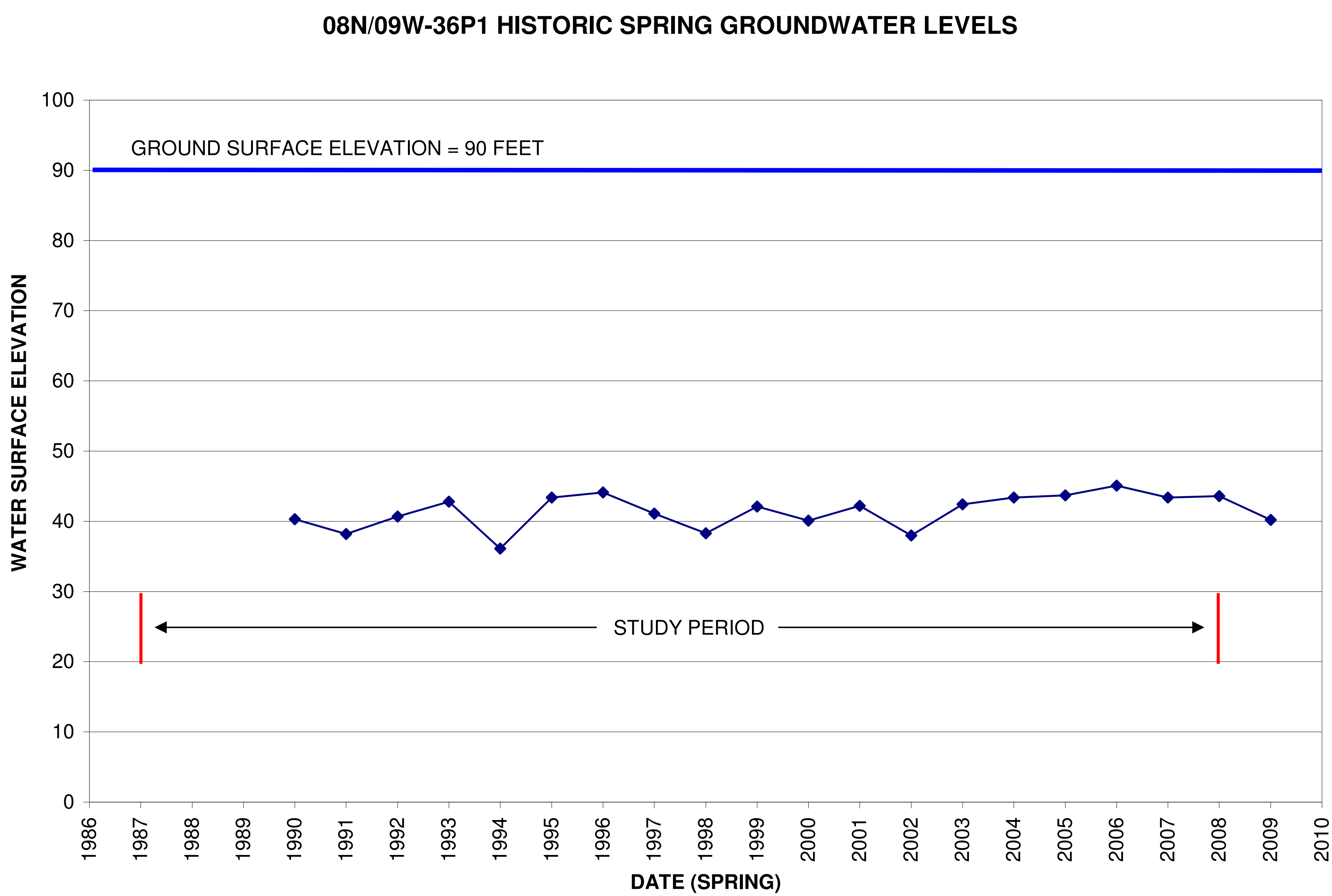
2006
2007
2008
2009
2010

08N/08W-29C3 HISTORIC SPRING GROUNDWATER LEVELS



08N/09W-36N1 HISTORIC SPRING GROUNDWATER LEVELS





08N/09W-36P1 HISTORIC SPRING GROUNDWATER LEVELS
GROUND SURFACE ELEVATION = 90 FEET
STUDY PERIOD
WATER SURFACE ELEVATION
DATE (SPRING)
0
10
20
30
40
50
60
70
80
90
100
1986
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1989
1990
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1994
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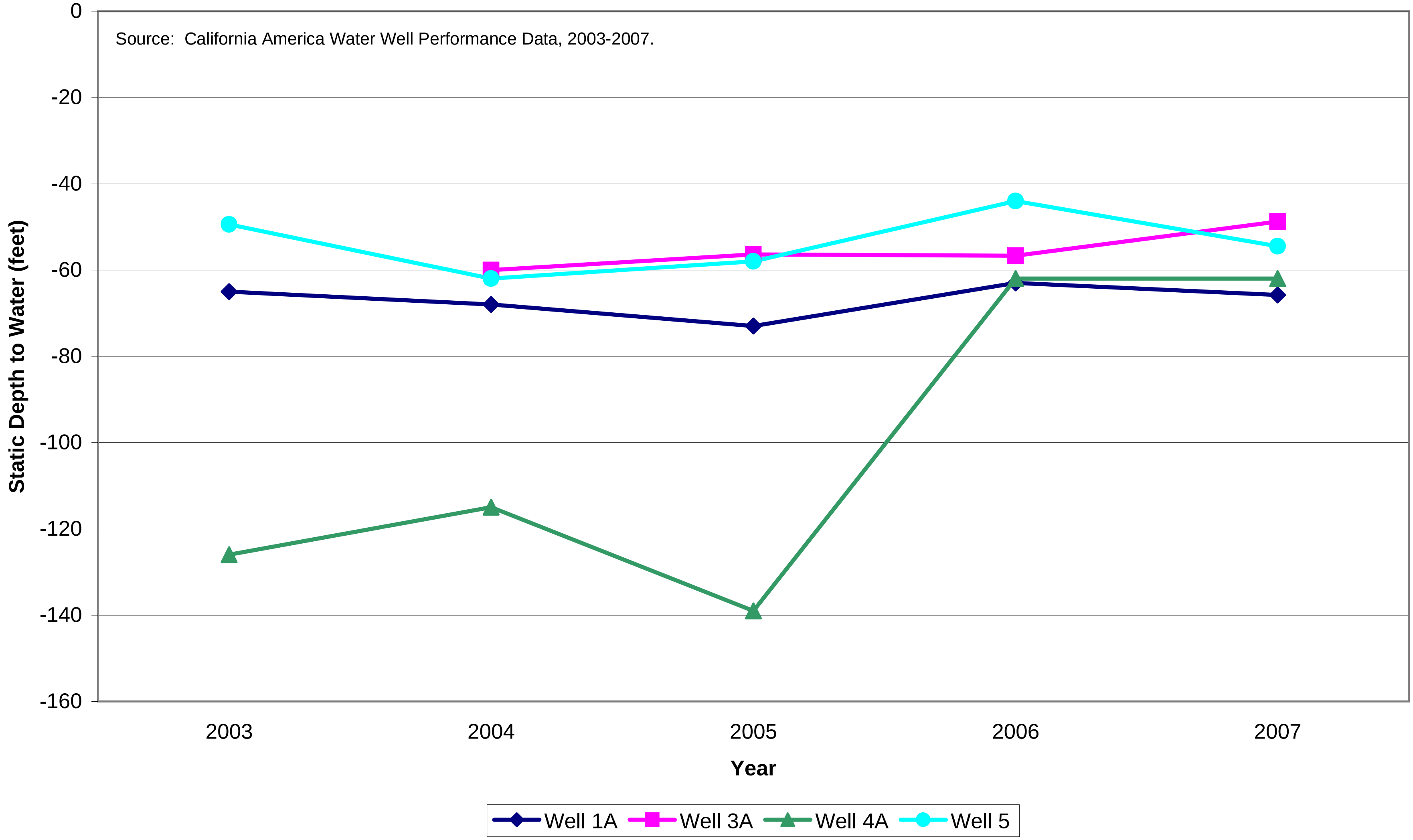
2006
2007
2008
2009
2010

California American Water--Larkfield District
Historical Water Levels



O:\Clients\405 City of Santa Rosa\02-06-19 General Plan Demand Update\CORR\Received\2008 GP WSA\Cal American data\CalAm Well Data.xls
Last Revised: 09/29/08

West Yost Associates

APPENDIX D

EDR Report

APPENDIX D

SMF Alternate Well Site
4728 Old Redwood Highway
Santa Rosa, CA 95403

Inquiry Number: 02407239.2r
January 23, 2009

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Physical Setting SSURGO Soil Map A-5
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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

4728 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 95403

COORDINATES

Latitude (North):	38.500100 - 38˚ 30' 0.4''
Longitude (West):	122.749700 - 122˚ 44' 58.9''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521826.2
UTM Y (Meters):	4261127.5
Elevation:	165 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
South Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
Southwest Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
West Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year:	2005

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL - National Priority List
Proposed NPL - - - - - - - - - - - - - - - Proposed National Priority List Sites
NPL LIENS - - - - - - - - - - - - - - - - - - Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL - - - - - - - - - - - - - - - - National Priority List Deletions

Federal CERCLIS list

CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System

Federal CERCLIS NFRAP site List

CERC-NFRAP - - - - - - - - - - - - - - - CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS - - - - - - - - - - - - - - - - - Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF - - - - - - - - - - - - - - - - RCRA - Transporters, Storage and Disposal

Federal RCRA generators list

RCRA-LQG - - - - - - - - - - - - - - - - - - RCRA - Large Quantity Generators
RCRA-CESQG - - - - - - - - - - - - - - - RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS - - - - - - - - - Engineering Controls Sites List
US INST CONTROL - - - - - - - - - - Sites with Institutional Controls

Federal ERNS list

ERNS - Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE - - - - - - - - - - - - - - - - - State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR - - - - - - - - - - - - - - - EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF .... Solid Waste Information System

State and tribal leaking storage tank lists

SLIC .... Statewide SLIC Cases
INDIAN LUST .... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

AST .... Aboveground Petroleum Storage Tank Facilities
INDIAN UST .... Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

VCP .... Voluntary Cleanup Program Properties
INDIAN VCP .... Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS .... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 .... Torres Martinez Reservation Illegal Dump Site Locations
ODI .... Open Dump Inventory
WMUDS/SWAT .... Waste Management Unit Database
SWRCY .... Recycler Database
HAULERS .... Registered Waste Tire Haulers Listing
INDIAN ODI .... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL .... Clandestine Drug Labs
HIST Cal-Sites .... Historical Calsites Database
SCH .... School Property Evaluation Program
Toxic Pits .... Toxic Pits Cleanup Act Sites
CDL .... Clandestine Drug Labs

Local Land Records

LIENS 2 .... CERCLA Lien Information
LUCIS .... Land Use Control Information System
LIENS .... Environmental Liens Listing
DEED .... Deed Restriction Listing

Records of Emergency Release Reports

HMIRS .... Hazardous Materials Information Reporting System
CHMIRS .... California Hazardous Material Incident Report System

EXECUTIVE SUMMARY

LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen	RCRA - Non Generators
DOT OPS	Incident and Accident Data
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
CA BOND EXP. PLAN	Bond Expenditure Plan
CA WDS	Waste Discharge System
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
HAZNET	Facility and Manifest Data
EMI	Emissions Inventory Data
INDIAN RESERV	Indian Reservations
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
PWS	Public Water System Data

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants	EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/10/2008 has revealed that there are 2 RCRA-SQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD AUTO CENTER	***601 LARKFIELD CTR***	***WNW 0 - 1/8 (0.017 mi.)***	***A2***	***7***

Lower Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD BODY AND PAINT	***15 LARK CENTER DR***	***WNW 0 - 1/8 (0.076 mi.)***	***B5***	***12***

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 11/04/2008 has revealed that there are 8 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
UNION 76 #5142 Status: Completed - Case Closed	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C9	15

Lower Elevation	Address	Direction / Distance	Map ID	Page
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***WNW 0 - 1/8 (0.096 mi.)***	***B6***	***13***
CHEVRON #9-8270	REDWOOD HIGHWAY, OLD 48	WNW 1/8 - 1/4 (0.154 mi.)	13	19
TEXACO Status: Completed - Case Closed	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD CHEVRON #9-8270 Status: Completed - Case Closed	4840 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.177 mi.)	D17	25
LARKFIELD BP Status: Open - Remediation	***4856 OLD REDWOOD HIGHWA***	***WNW 1/8 - 1/4 (0.179 mi.)***	***D18***	***25***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F22***	***30***
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F23***	***30***

EXECUTIVE SUMMARY

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 11/04/2008 has revealed that there are 4 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD UNION 76 #255142	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C12	19

Lower Elevation	Address	Direction / Distance	Map ID	Page
FACILITY 49-000-005546	4732 OLD REDWOOD HWY	WSW 0 - 1/8 (0.006 mi.)	1	7
LARKFIELD CHEVRON	4840 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.177 mi.)	D16	24
LARKFIELD BP STATION	4856 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.220 mi.)	E20	28

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 4 CA FID UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD B P	***4856 OLD REDWOOD HWY***	***WNW 1/8 - 1/4 (0.220 mi.)***	***E19***	***26***
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***WSW 1/8 - 1/4 (0.231 mi.)***	***21***	***28***

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 5 HIST UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
98270	668 LARKFIELD CTR	WNW 0 - 1/8 (0.021 mi.)	A4	11
UNION OIL SS# 5142	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C8	14
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C11***	***17***

Lower Elevation	Address	Direction / Distance	Map ID	Page
RINCON VALLEY FIRE ST 2	45-LARK CENTER DRIVE	WSW 1/8 - 1/4 (0.144 mi.)	7	14
TEXACO	4601 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.172 mi.)	C15	23

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 5 SWEEPS UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #8270	668 LARKFIELD CNTR	WNW 0 - 1/8 (0.021 mi.)	A3	10
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD B P	***4856 OLD REDWOOD HWY***	***WNW 1/8 - 1/4 (0.220 mi.)***	***E19***	***26***
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***WSW 1/8 - 1/4 (0.231 mi.)***	***21***	***28***

Other Ascertainable Records

Cortese: The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

A review of the Cortese list, as provided by EDR, and dated 04/01/2001 has revealed that there are 4 Cortese sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***WNW 0 - 1/8 (0.096 mi.)***	***B6***	***13***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F22***	***30***
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F23***	***30***
DAVIS, MAY L.	105 ETON	W 1/4 - 1/2 (0.318 mi.)	24	31

Notify 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, and dated 10/21/1993 has revealed that there is 1 Notify 65 site within approximately 1 mile of the target property.

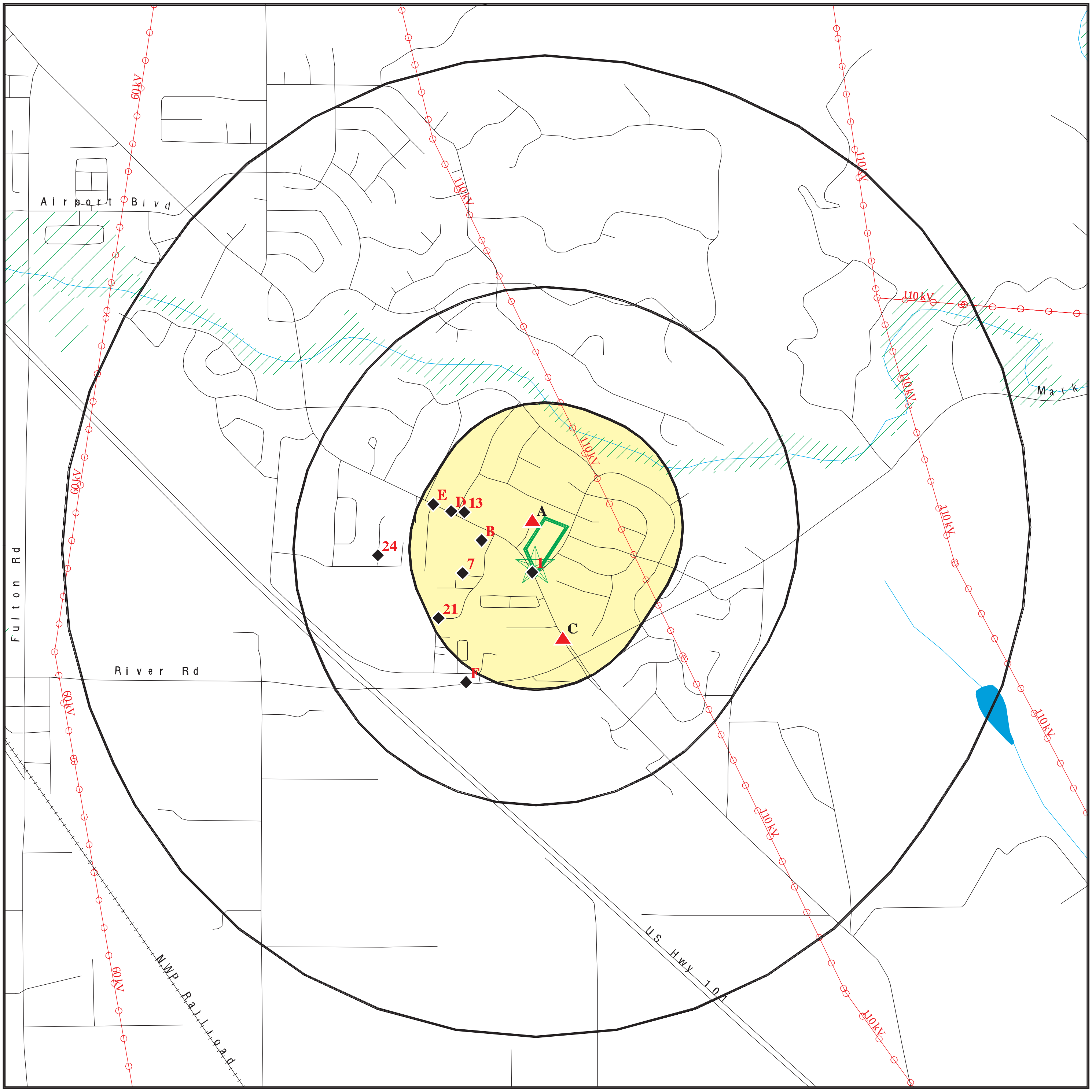
Lower Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD BP	***4856 OLD REDWOOD HIGHWA***	***WNW 1/8 - 1/4 (0.179 mi.)***	***D18***	***25***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
ADAMS, DOUG	SWEEPS UST
YOLO, DANIEL	LUST, Cortese
MISSION ARBORS	LUST
AUTO EXCHANGE	LUST
STEVENSON EQUIPMENT	LUST
FAST & EASY MART	LUST
FACILITY 49-000-005986	UST
FACILITY 49-000-005921	UST
FACILITY 49-000-005510	UST
FACILITY 49-000-002759	UST
FACILITY 49-000-000371	UST
FACILITY 49-000-000215	UST
APEX AVIATION (DRAGONFLY)	UST
SCDPW SANTA ROSA RD MAINTENANCE YA	UST
FACILITY 49-000-000092	UST
SONOMA 101 HIGHWAY WIDENING	RCRA-LQG
LOS GUILICOS	SLIC
REED, LILLIE	SLIC
UNITY CHURCH	SLIC
SCDPW LARKFIELD SEWER	SLIC

OVERVIEW MAP - 02407239.2r



Target Property
Sites at elevations higher than or equal to the target property
Sites at elevations lower than the target property
Manufactured Gas Plants
National Priority List Sites
Dept. Defense Sites

0 1/4 1/2 1 Miles

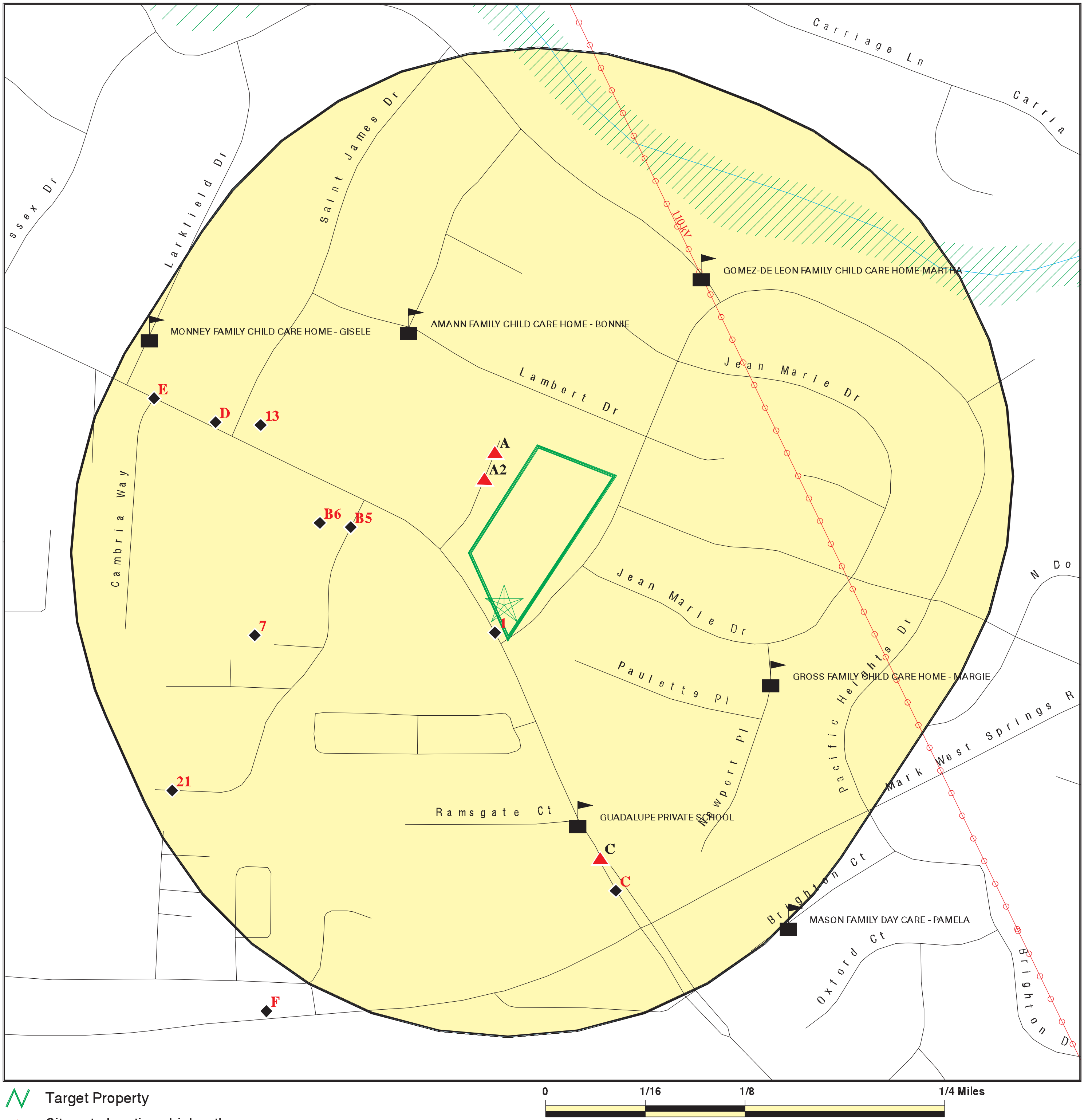
Indian Reservations BIA
Power transmission lines
Oil & Gas pipelines
100-year flood zone
500-year flood zone

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

DETAIL MAP - 02407239.2r



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Oil & Gas pipelines
- 100-year flood zone
- 500-year flood zone
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SMF Alternate Well Site	CLIENT: Engeo Inc.
ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403	CONTACT: Keith Nowell
	INQUIRY #: 02407239.2r
LAT/LONG: 38.5001 / 122.7497	DATE: January 23, 2009 7:19 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	2	0	NR	NR	NR	2
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	1	5	2	NR	NR	8
SLIC		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
State and tribal registered storage tank lists								
UST		0.250	1	3	NR	NR	NR	4
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP		0.500	0	0	0	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	4	NR	NR	NR	4
HIST UST		0.250	1	4	NR	NR	NR	5
SWEEPS UST		0.250	1	4	NR	NR	NR	5
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	1	0	3	NR	NR	4
Notify 65		1.000	0	1	0	0	NR	1
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
PWS		TP	NR	NR	NR	NR	NR	0

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1	**FACILITY 49-000-005546**	**UST**	**U004050346**
WSW	**4732 OLD REDWOOD HWY**		**N/A**
< 1/8	**SANTA ROSA, CA 95403**		
0.006 mi.			
32 ft.			

Relative: Lower

Actual: 164 ft.

UST:

Global ID: 11511
Latitude: 38.49991
Longitude: -122.74984
Case Type: PERMITTED UNDERGROUND STORAGE TANK (UST)

A2	**LARKFIELD AUTO CENTER**	**RCRA-SQG**	**1000270156**
WNW	**601 LARKFIELD CTR**	**FINDS**	**CAD982351314**
< 1/8	**SANTA ROSA, CA 95403**	**HAZNET**	
0.017 mi.			
92 ft.	**Site 1 of 3 in cluster A**		

Relative: Higher

Actual: 167 ft.

RCRA-SQG:

Date form received by agency: 11/04/1987
Facility name: LARKFIELD AUTO CENTER
Facility address: 601 LARKFIELD CTR
SANTA ROSA, CA 95403
EPA ID: CAD982351314
Contact: ENVIRONMENTAL MANAGER
Contact address: 601 LARKFIELD CTR
SANTA ROSA, CA 95403
Contact country: US
Contact telephone: (707) 546-6881
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name: NORMAN BLACKMORE
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

LARKFIELD AUTO CENTER (Continued) **1000270156**

Handler Activities Summary:

U.S. importer of hazardous waste:	Unknown
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	Unknown
Furnace exemption:	Unknown
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Violation Status: No violations found

FINDS:

Other Pertinent Environmental Activity Identified at Site

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZNET:

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAD982446866
TSD County:	Solano
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Recycler
Tons:	1.2093
Facility County:	Sonoma

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAL000161743
TSD County:	Santa Clara

LARKFIELD AUTO CENTER (Continued) **1000270156**

Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Transfer Station
Tons:	.3753
Facility County:	Sonoma

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAD980887418
TSD County:	1
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Transfer Station
Tons:	1.5429
Facility County:	Sonoma

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAD980887418
TSD County:	1
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Transfer Station
Tons:	.7297
Facility County:	Sonoma

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAD982446874
TSD County:	Yolo
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Transfer Station
Tons:	.3753
Facility County:	Sonoma

Click this hyperlink while viewing on your computer to access
11 additional CA_HAZNET: record(s) in the EDR Site Report.

A3
WNW
< 1/8
0.021 mi.
109 ft.

CHEVRON #8270
668 LARKFIELD CNTR
SANTA ROSA, CA 95401

Site 2 of 3 in cluster A

SWEEPS UST **S106924299**
N/A

Relative:
Higher

Actual:
167 ft.

SWEEPS UST:

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	1
Swrcb Tank Id:	49-000-001964-000001
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	4

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	2
Swrcb Tank Id:	49-000-001964-000002
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PLUS UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	3
Swrcb Tank Id:	49-000-001964-000003
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PRM UNLEADED
Number Of Tanks:	Not reported

Status:	A

CHEVRON #8270 (Continued) **S106924299**

Comp Number: 1964
Number: 1
Board Of Equalization: 44-031913
Ref Date: 12-30-92
Act Date: 06-07-93
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-000-001964-000004
Actv Date: 12-30-92
Capacity: 10000
Tank Use: M.V. FUEL
Stg: P
Content: DIESEL
Number Of Tanks: Not reported

A4
WNW
< 1/8
0.021 mi.
109 ft.

98270
668 LARKFIELD CTR
SANTA ROSA, CA 95401

HIST UST **U001609148**
N/A

Site 3 of 3 in cluster A

Relative:
Higher

Actual:
167 ft.

HIST UST:
Region: STATE
Facility ID: 00000063091
Facility Type: Gas Station
Other Type: Not reported
Total Tanks: 0004
Contact Name: MERTLE, THOMAS O.
Telephone: 7075427101
Owner Name: CHEVRON U.S.A. INC.
Owner Address: 575 MARKET
Owner City,St,Zip: SAN FRANCISCO, CA 94105

Tank Num: 001
Container Num: 1
Year Installed: Not reported
Tank Capacity: 00001000
Tank Used for: WASTE
Type of Fuel: Not reported
Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

Tank Num: 002
Container Num: 2
Year Installed: Not reported
Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

Tank Num: 003
Container Num: 3
Year Installed: Not reported
Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: Not reported

98270 (Continued) **U001609148**

Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

Tank Num: 004
Container Num: 4
Year Installed: Not reported
Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

B5
WNW
< 1/8
0.076 mi.
403 ft.

LARKFIELD BODY AND PAINT
15 LARK CENTER DR
SANTA ROSA, CA 95403

RCRA-SQG **1000270155**
FINDS **CAD982008336**

Site 1 of 2 in cluster B

Relative:
Lower

Actual:
163 ft.

RCRA-SQG:
Date form received by agency: 04/02/1996
Facility name: LARKFIELD BODY AND PAINT
Facility address: 15 LARK CENTER DR
SANTA ROSA, CA 95403
EPA ID: CAD982008336
Contact: NEAL BLAINE
Contact address: 15 LARK CENTER DR
SANTA ROSA, CA 95403
Contact country: US
Contact telephone: (707) 546-5717
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: DAVID HARTMAN
Owner/operator address: 15 LARK CENTER DR
SANTA ROSA, CA 95403
Owner/operator country: Not reported
Owner/operator telephone: (707) 546-5717
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported

LARKFIELD BODY AND PAINT (Continued) **1000270155**

Owner/Op end date: Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	Unknown
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	Unknown
Furnace exemption:	Unknown
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Violation Status: No violations found

FINDS:

Other Pertinent Environmental Activity Identified at Site

California - Hazardous Waste Tracking System - Datamart

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

B6
WNW
< 1/8
0.096 mi.
506 ft.

BP, LARKFIELD / REDWOOD OIL
REDWOOD HIGHWAY, OLD 4856
SANTA ROSA, CA

Site 2 of 2 in cluster B

LUST **S101304962**
Cortese **N/A**

Relative:
Lower

Actual:
163 ft.

LUST REG 1:

Region:	1
Facility ID:	1TSO344
Staff Initials:	HAZ

Cortese:

Region:	CORTESE
Facility Addr2:	Not reported

7
WSW
1/8-1/4
0.144 mi.
762 ft.

RINCON VALLEY FIRE ST 2
45-LARK CENTER DRIVE
SANTA ROSA, CA 95401

HIST UST **U001609282** **N/A**

Relative: **Lower**

Actual: **161 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000023741
Facility Type:	Other
Other Type:	FIRE DEPT.
Total Tanks:	0001
Contact Name:	CHIEF CARL-HARRISON
Telephone:	7075391801
Owner Name:	RINCON VALLEY FIRE DISTRICT
Owner Address:	91-MIDDLE RINCON ROAD
Owner City,St,Zip:	SANTA ROSA, CA 95405

Tank Num:	001
Container Num:	002
Year Installed:	1970
Tank Capacity:	00000550
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	None

C8
SSE
1/8-1/4
0.149 mi.
789 ft.

UNION OIL SS# 5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 1 of 7 in cluster C

HIST UST **U001609326** **N/A**

Relative: **Higher**

Actual: **165 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000057100
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0001
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST., SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111

Tank Num:	001
Container Num:	5142-10-1
Year Installed:	Not reported
Tank Capacity:	00000000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Tank Construction:	6 inches
Leak Detection:	Visual

C9 **UNION 76 #5142** **LUST** **S105124635**
SSE **4605 OLD REDWOOD HWY** **N/A**
1/8-1/4 **SANTA ROSA, CA 95401**
0.149 mi.
789 ft. **Site 2 of 7 in cluster C**

Relative: Higher

Actual: 165 ft.

LUST:

Region:	STATE
Global Id:	T0609700129
Latitude:	38.497296735
Longitude:	-122.748862148
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2003-05-06 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO165
LOC Case Number:	00001461
File Location:	Local Agency
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO165
Closed or Referred:	Y
Date:	5/6/2003
LOP Number:	00001461
Funding Fed / State:	Federal
Staff:	Not reported
Global ID:	T0609700129

C10 **UNION OIL SS #5142** **CA FID UST** **S101627228**
SSE **4605 OLD REDWOOD HWY** **SWEEPS UST** **N/A**
1/8-1/4 **SANTA ROSA, CA 95401**
0.149 mi.
789 ft. **Site 3 of 7 in cluster C**

Relative: Higher

Actual: 165 ft.

CA FID UST:

Facility ID:	49003529
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	2175 N CALIF BLVD
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

UNION OIL SS #5142 (Continued) **S101627228**

Facility ID:	49000740
Regulated By:	UTNKA
Regulated ID:	00033679
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	4605 OLD REDWOOD HWY
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-1-1
Swrcb Tank Id:	49-000-033679-000001
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	3

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-2-1
Swrcb Tank Id:	49-000-033679-000002
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051

UNION OIL SS #5142 (Continued) **S101627228**

Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-4-1
Swrcb Tank Id:	49-000-033679-000003
Actv Date:	07-01-85
Capacity:	280
Tank Use:	OIL
Stg:	W
Content:	WASTE OIL
Number Of Tanks:	Not reported

C11
SSE
1/8-1/4
0.149 mi.
789 ft.

UNION OIL SS #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

CHMIRS **U001609325**
HIST UST **N/A**

Site 4 of 7 in cluster C

Relative:
Higher

Actual:
165 ft.

CHMIRS:

OES Incident Number:	01-5581
OES notification:	10/2/200105:12:39 PM
OES Date:	Not reported
OES Time:	Not reported
Incident Date:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
Special Studies 1:	Not reported
Special Studies 2:	Not reported
Special Studies 3:	Not reported
Special Studies 4:	Not reported
Special Studies 5:	Not reported
Special Studies 6:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA/DOT/PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Comments:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No

UNION OIL SS #5142 (Continued) **U001609325**

Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	Responsible Party
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	2001
Agency:	TOSCO Marketing
Incident Date:	10/2/200112:00:00 AM
Admin Agency:	Santa Rosa Fire Department
Amount:	Not reported
Contained:	Yes
Site Type:	Refinery
E Date:	Not reported
Substance:	Gasoline
Quantity Released:	Not reported
BBLS:	0
Cups:	0
CUFT:	0
Gallons:	5
Grams:	0
Pounds:	0
Liters:	0
Ounces:	0
Pints:	0
Quarts:	0
Sheen:	0
Tons:	0
Unknown:	0.000000
Description:	Not reported
Evacuations:	0
Number of Injuries:	0
Number of Fatalities:	0
Description:	A fuel tanker truck was dispensing material and a hose connection failed.

HIST UST:

Region:	STATE
Facility ID:	00000033679
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0003
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST. SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111

Tank Num:	001
Container Num:	5142-1-1
Year Installed:	1965
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported

UNION OIL SS #5142 (Continued) **U001609325**

Leak Detection:	Stock Inventor
Tank Num:	002
Container Num:	5142-2-1
Year Installed:	1965
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	Stock Inventor
Tank Num:	003
Container Num:	5142-4-1
Year Installed:	Not reported
Tank Capacity:	00000280
Tank Used for:	WASTE
Type of Fuel:	WASTE OIL
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

C12
SSE
1/8-1/4
0.149 mi.
789 ft.

LARKFIELD UNION 76 #255142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95403

UST **U003981902**
N/A

Site 5 of 7 in cluster C

Relative:
Higher

Actual:
165 ft.

UST:

Global ID:	11133
Latitude:	38.49773
Longitude:	-122.7486
Case Type:	PERMITTED UNDERGROUND STORAGE TANK (UST)

13
WNW
1/8-1/4
0.154 mi.
811 ft.

CHEVRON #9-8270
REDWOOD HIGHWAY, OLD 4840
SANTA ROSA, CA

LUST **S101309833**
N/A

Relative:
Lower

Actual:
163 ft.

LUST REG 1:

Region:	1
Facility ID:	1TSO101
Staff Initials:	HAZ

C14
SSE
1/8-1/4
0.172 mi.
909 ft.

TEXACO
4601 OLD REDWOOD HWY
SANTA ROSA, CA 95401

LUST
CA FID UST
SWEEPS UST

S101595370
N/A

Site 6 of 7 in cluster C

Relative:
Lower

Actual:
164 ft.

LUST:

Region:	STATE
Global Id:	T0609700047
Latitude:	38.496737871
Longitude:	-122.748286288
Case Type:	LUST Cleanup Site

TEXACO (Continued) **S101595370**

Status:	Completed - Case Closed
Status Date:	2007-05-24 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO072
LOC Case Number:	00001435
File Location:	Local Agency Warehouse
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO072
Closed or Referred:	Y
Date:	5/24/2007
LOP Number:	00001435
Funding Fed / State:	Federal
Staff:	Not reported
Global ID:	T0609700047

CA FID UST:

Facility ID:	49001037
Regulated By:	UTNKI
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075789866
Mail To:	Not reported
Mailing Address:	P O BOX
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95403
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Inactive

Facility ID:	49001037
Regulated By:	UTNKA
Regulated ID:	00016174
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075789866
Mail To:	Not reported
Mailing Address:	4601 OLD REDWOOD HWY
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported

TEXACO (Continued) **S101595370**

Comments: Not reported
Status: Active

SWEEPS UST:
Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000001
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: 5

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000002
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000003
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435

TEXACO (Continued) **S101595370**

Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000004
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000005
Actv Date: Not reported
Capacity: 550
Tank Use: OIL
Stg: WASTE
Content: WASTE OIL
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #1
Swrcb Tank Id: 49-060-016174-000001
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: 4

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A

TEXACO (Continued) **S101595370**

Owner Tank Id: #2
Swrcb Tank Id: 49-060-016174-000002
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #3
Swrcb Tank Id: 49-060-016174-000003
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #4
Swrcb Tank Id: 49-060-016174-000004
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

C15 **TEXACO** **HIST UST** **U001609317**
SSE **4601 OLD REDWOOD HWY** **N/A**
1/8-1/4 **SANTA ROSA, CA 95401**
0.172 mi.
909 ft. **Site 7 of 7 in cluster C**

Relative:
Lower

Actual:
164 ft.

HIST UST:
Region: STATE
Facility ID: 00000016174
Facility Type: Gas Station
Other Type: Not reported
Total Tanks: 0004
Contact Name: HASSAN KAZEMINI
Telephone: 7075789866
Owner Name: TEXACO U.S.A.

TEXACO (Continued) **U001609317**

Owner Address: 3350 WILSHIRE BLVD.
Owner City,St,Zip: LOS ANGELES, CA 90010

Tank Num: 001
Container Num: #1
Year Installed: 1964
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: PREMIUM
Tank Construction: Not reported
Leak Detection: Stock Inventor, Sensor Instrument

Tank Num: 002
Container Num: #2
Year Installed: 1964
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: REGULAR
Tank Construction: Not reported
Leak Detection: Stock Inventor, Sensor Instrument

Tank Num: 003
Container Num: #3
Year Installed: 1964
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: UNLEADED
Tank Construction: Not reported
Leak Detection: Stock Inventor, Sensor Instrument

Tank Num: 004
Container Num: #4
Year Installed: 1964
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: REGULAR
Tank Construction: Not reported
Leak Detection: Stock Inventor

D16 **LARKFIELD CHEVRON** **UST** **U003659382**
WNW **4840 OLD REDWOOD HWY** **N/A**
1/8-1/4 **SANTA ROSA, CA 95403**
0.177 mi.
933 ft. **Site 1 of 3 in cluster D**

Relative:
Lower

Actual:
163 ft.

UST:
Global ID: 11188
Latitude: 38.50171
Longitude: -122.75307
Case Type: PERMITTED UNDERGROUND STORAGE TANK (UST)

D17 | **LARKFIELD CHEVRON #9-8270** | **LUST** | **S103817497**
WNW | **4840 OLD REDWOOD HWY** | | **N/A**
1/8-1/4 | **SANTA ROSA, CA 95403**
0.177 mi.
933 ft. | **Site 2 of 3 in cluster D**

Relative:
Lower

Actual:
163 ft.

LUST:

Region:	STATE
Global Id:	T0609700074
Latitude:	38.501765333
Longitude:	-122.752551367
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2007-10-29 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO101
LOC Case Number:	00001964
File Location:	Local Agency Warehouse
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline, Diesel
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO101
Closed or Referred:	Y
Date:	10/29/2007
LOP Number:	00001964
Funding Fed / State:	State
Staff:	Not reported
Global ID:	T0609700074

D18 | **LARKFIELD BP** | **Notify 65** | **S100179481**
WNW | **4856 OLD REDWOOD HIGHWAY** | **LUST** | **N/A**
1/8-1/4 | **SANTA ROSA, CA 93582**
0.179 mi.
946 ft. | **Site 3 of 3 in cluster D**

Relative:
Lower

Actual:
162 ft.

Notify 65:

Date Reported:	Not reported
Staff Initials:	Not reported
Board File Number:	Not reported
Facility Type:	Not reported
Discharge Date:	Not reported
Incident Description:	93582

LUST:

Region:	STATE
Global Id:	T0609700252
Latitude:	38.501947928
Longitude:	-122.753080642
Case Type:	LUST Cleanup Site
Status:	Open - Remediation
Status Date:	1992-09-30 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP

LARKFIELD BP (Continued) **S100179481**

RB Case Number: 1TSO344
LOC Case Number: 00002395
File Location: Local Agency
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO344
Closed or Referred: Not reported
Date: Not reported
LOP Number: 00002395
Funding Fed / State: State
Staff: CI
Global ID: T0609700252

E19
WNW
1/8-1/4
0.220 mi.
1163 ft.

LARKFIELD B P
4856 OLD REDWOOD HWY
SANTA ROSA, CA 95403

CA FID UST **S101595421**
SWEEPS UST **N/A**

Site 1 of 2 in cluster E

Relative:
Lower

Actual:
161 ft.

CA FID UST:
Facility ID: 49003110
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075751625
Mail To: Not reported
Mailing Address: 455 YOLANDA
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95403
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-000-002395-000001
Actv Date: 09-06-91
Capacity: 5000
Tank Use: M.V. FUEL
Stg: P

LARKFIELD B P (Continued) **S101595421**

Content: DIESEL
Number Of Tanks: 5

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 1
Swrcb Tank Id: 49-000-002395-000002
Actv Date: 09-06-91
Capacity: 8000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 3
Swrcb Tank Id: 49-000-002395-000003
Actv Date: 09-06-91
Capacity: 7500
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 2
Swrcb Tank Id: 49-000-002395-000004
Actv Date: 09-06-91
Capacity: 5000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3

LARKFIELD B P (Continued) **S101595421**

Board Of Equalization:	44-027727
Ref Date:	09-06-91
Act Date:	09-06-91
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	5
Swrcb Tank Id:	49-000-002395-000005
Actv Date:	09-06-91
Capacity:	500
Tank Use:	OIL
Stg:	W
Content:	WASTE OIL
Number Of Tanks:	Not reported

E20
WNW
1/8-1/4
0.220 mi.
1163 ft.

LARKFIELD BP STATION
4856 OLD REDWOOD HWY
SANTA ROSA, CA 95403

Site 2 of 2 in cluster E

UST **U004050088**
N/A

Relative:
Lower

Actual:
161 ft.

UST:

Global ID:	11234
Latitude:	38.50194
Longitude:	-122.75365
Case Type:	PERMITTED UNDERGROUND STORAGE TANK (UST)

21
WSW
1/8-1/4
0.231 mi.
1221 ft.

CHEVRON U.S.A. INC.
668 LARKFIELD CENTER
SANTA ROSA, CA 95401

CA FID UST **S101595415**
SWEEPS UST **N/A**

Relative:
Lower

Actual:
158 ft.

CA FID UST:

Facility ID:	49002401
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075427101
Mail To:	Not reported
Mailing Address:	2 ANNABEL LN
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

Facility ID:	49002401
Regulated By:	UTNKA
Regulated ID:	00063091
Cortese Code:	Not reported
SIC Code:	Not reported

CHEVRON U.S.A. INC. (Continued) **S101595415**

Facility Phone:	7075427101
Mail To:	Not reported
Mailing Address:	668 LARKFIELD CENTER
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	63091
Number:	9
Board Of Equalization:	44-028376
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	1
Swrcb Tank Id:	49-060-063091-000001
Actv Date:	07-01-85
Capacity:	1000
Tank Use:	UNKNOWN
Stg:	W
Content:	Not reported
Number Of Tanks:	4

Status:	A
Comp Number:	63091
Number:	9
Board Of Equalization:	44-028376
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	2
Swrcb Tank Id:	49-060-063091-000002
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	UNKNOWN
Stg:	P
Content:	Not reported
Number Of Tanks:	Not reported

Status:	A
Comp Number:	63091
Number:	9
Board Of Equalization:	44-028376
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	3

CHEVRON U.S.A. INC. (Continued) **S101595415**

Swrcb Tank Id: 49-060-063091-000003
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-060-063091-000004
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

F22 SSW 1/4-1/2 0.279 mi. 1471 ft.	**TEXACO (REDWOOD HIGHWAY, 4601) REDWOOD HIGHWAY, OLD 4601 SANTA ROSA, CA**	**LUST Cortese**	**S101304960 N/A**

Site 1 of 2 in cluster F

Relative: Lower

Actual: 159 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO072
Staff Initials: HAZ

Cortese:
Region: CORTESE
Facility Addr2: Not reported

F23 SSW 1/4-1/2 0.279 mi. 1471 ft.	**UNOCAL #5142 REDWOOD HIGHWAY, OLD 4605 SANTA ROSA, CA**	**LUST Cortese**	**S101304961 N/A**

Site 2 of 2 in cluster F

Relative: Lower

Actual: 159 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO165
Staff Initials: Closed

Cortese:
Region: CORTESE
Facility Addr2: 4605 REDWOOD HIGHWAY, OLD

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
24 West 1/4-1/2 0.318 mi. 1677 ft.	**DAVIS, MAY L. 105 ETON SANTA ROSA, CA 95403**	**Cortese**	**S105026497 N/A**

Relative: **Lower**

Actual: **156 ft.**

Cortese:

Region:	CORTESE
Facility Addr2:	Not reported

City	EDR ID	Site Name	Site Address	Zip	Database(s)
SANTA ROSA	1009398328	SONOMA 101 HIGHWAY WIDENING	ROUTE 101	95403	RCRA-LQG
SANTA ROSA	S106235093	LOS GUILICOS	HWY 12 / PYTHIAN RD		SLIC
SANTA ROSA	S104857240	MISSION ARBORS	MISSION BLVD AT HIGHWAY 12 100		LUST
SANTA ROSA	S104857236	AUTO EXCHANGE	OLD REDWOOD HIGHWAY 5352		LUST
SANTA ROSA	S104163195	STEVENSON EQUIPMENT	REDWOOD HIGHWAY, OLD 3975		LUST
SANTA ROSA	S104163196	YOLO, DANIEL	REDWOOD HIGHWAY, OLD 5807		LUST, Cortese
SANTA ROSA	S102429807	FAST & EASY MART	REDWOOD HIGHWAY, OLD 5321		LUST
SANTA ROSA	S105051166	REED, LILLIE	5716 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S105051009	UNITY CHURCH	4351 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S103393013	SCDPW LARKFIELD SEWER	REDWOOD HIGHWAY, OLD	95403	SLIC
LARKFIELD	S106922411	ADAMS, DOUG	5800 WIKKIUP BRIDGWAY	95403	SWEEPS UST
SANTA ROSA	U004050419	FACILITY 49-000-005986	2235 AIRPORT BLVD	95403	UST
SANTA ROSA	U004050405	FACILITY 49-000-005921	2240 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050345	FACILITY 49-000-005510	2240 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050215	FACILITY 49-000-002759	2254 AIRPORT RD	95403	UST
SANTA ROSA	U004050124	FACILITY 49-000-000371	2200 AIRPORT BLVD, STE SCA-ARM	95403	UST
SANTA ROSA	U004050057	FACILITY 49-000-000215	2240 AIRPORT	95403	UST
SANTA ROSA	U004050042	APEX AVIATION (DRAGONFLY)	2222 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050041	SCDPW SANTA ROSA RD MAINTENANCE YA	2175 AIRPORT BLVD	95403	UST
SANTA ROSA	U004049997	FACILITY 49-000-000092	2235 AIRPORT BLVD	95403	UST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/07/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 53

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/11/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Transporters, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/10/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/23/2008	Telephone: (415) 495-8895
Date Made Active in Reports: 10/16/2008	Last EDR Contact: 01/23/2009
Number of Days to Update: 23	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/23/2008	Telephone: (415) 495-8895
Date Made Active in Reports: 10/16/2008	Last EDR Contact: 01/23/2009
Number of Days to Update: 23	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/10/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/23/2008	Telephone: (415) 495-8895
Date Made Active in Reports: 10/16/2008	Last EDR Contact: 01/23/2009
Number of Days to Update: 23	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 09/23/2008	Telephone: (415) 495-8895
Date Made Active in Reports: 10/16/2008	Last EDR Contact: 01/23/2009
Number of Days to Update: 23	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 10/06/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/17/2008	Telephone: 703-603-0695
Date Made Active in Reports: 12/08/2008	Last EDR Contact: 12/29/2008
Number of Days to Update: 52	Next Scheduled EDR Contact: 03/30/2009
	Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 54

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control’s (DTSC’s) Site Mitigation and Brownfields Reuse Program’s (SMBRP’s) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/09/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 9

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 11/04/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/04/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 12/23/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/04/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/10/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/18/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 06/06/2008
Date Data Arrived at EDR: 10/09/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 41

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Semi-Annually

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 11/25/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 27

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/01/2008
Date Data Arrived at EDR: 12/03/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 20

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 11/19/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 12/02/2008
Date Data Arrived at EDR: 12/04/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 19

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/04/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 31

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 11/01/2007
Date Data Arrived at EDR: 11/27/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 79

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 10/27/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/06/2008
Date Data Arrived at EDR: 10/09/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 41

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/25/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 27

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 11/19/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/01/2008
Date Data Arrived at EDR: 12/04/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 19

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/18/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/05/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 11/14/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/08/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 49

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 09/22/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 7

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 10/31/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 11/04/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 10

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 08/19/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/06/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/03/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 09/30/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/30/2009
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 34

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/13/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 05/09/2008
Date Made Active in Reports: 06/20/2008
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 05/14/2008
Date Data Arrived at EDR: 05/28/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 72

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/15/2008
Date Data Arrived at EDR: 10/22/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 62

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 10/21/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 55

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Varies

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/07/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 12/23/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 12/04/2008
Next Scheduled EDR Contact: 01/12/2009
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 08/13/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 09/18/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/03/2008
Date Data Arrived at EDR: 10/15/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 35

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/30/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 05/29/2001
Date Made Active in Reports: 07/26/2001
Number of Days to Update: 58

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/23/2008
Date Data Arrived at EDR: 09/24/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 5

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 10/31/2008
Date Data Arrived at EDR: 11/03/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 23

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/04/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 34

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2008
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 41

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/10/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Varies

PWS: Public Water System Data

This Safe Drinking Water Information System (SDWIS) file contains public water systems name and address, population served and the primary source of water

Date of Government Version: 02/24/2000
Date Data Arrived at EDR: 04/27/2005
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA
Telephone: N/A
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: N/A

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: N/A

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 09/30/2008
Date Made Active in Reports: 10/07/2008
Number of Days to Update: 7

Source: EPA
Telephone: 202-564-6064
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR’s researchers. Manufactured gas sites were used in the United States from the 1800’s to 1950’s to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/30/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 27

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/30/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 36

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 09/03/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA’s are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/20/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 37

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/15/2009
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 09/15/2008
Date Data Arrived at EDR: 09/16/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 15

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 07/07/1999
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 40

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 08/12/2008
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 12

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 11/13/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/01/2008
Date Data Arrived at EDR: 03/20/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 25

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/14/2008
Date Data Arrived at EDR: 04/10/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 26

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 10

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Annually

City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 08/26/2008
Date Data Arrived at EDR: 09/11/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 20

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 12/11/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 08/04/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 17

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 10/27/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Semi-Annually

Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Annually

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/16/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 13

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/17/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 12

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/25/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 6

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 07/23/2007
Date Data Arrived at EDR: 07/23/2007
Date Made Active in Reports: 08/09/2007
Number of Days to Update: 17

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Date Data Arrived at EDR: 11/17/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 9

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/25/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 10

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Contaminated Sites

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 08/08/2008
Date Data Arrived at EDR: 08/08/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 26

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

ML - Regulatory Compliance Master List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 12/31/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 08/01/2007
Date Data Arrived at EDR: 02/05/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 9

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 08/07/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 26

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 12/30/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 12

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 08/26/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 19

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 11/19/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 7

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Annually

Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/07/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 6

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 09/24/2008
Date Data Arrived at EDR: 09/25/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 4

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 49

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 10/20/2008
Date Data Arrived at EDR: 10/20/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 37

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 05/04/2007
Date Data Arrived at EDR: 05/04/2007
Date Made Active in Reports: 05/24/2007
Number of Days to Update: 20

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 08/27/2008
Date Data Arrived at EDR: 10/14/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 43

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/10/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 10/08/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 08/11/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 17

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 06/15/2007
Date Made Active in Reports: 08/20/2007
Number of Days to Update: 66

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 12/11/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 09/30/2007
Date Data Arrived at EDR: 12/04/2007
Date Made Active in Reports: 12/31/2007
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 10/21/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/11/2008
Number of Days to Update: 15

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/11/2008
Date Made Active in Reports: 10/02/2008
Number of Days to Update: 21

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 10/07/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 10/28/2008
Number of Days to Update: 18

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/08/2008
Number of Days to Update: 17

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association’s annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5’ Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SMF ALTERNATE WELL SITE
4728 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 95403

TARGET PROPERTY COORDINATES

Latitude (North):	38.50010 - 38˚ 30’ 0.4’’
Longitude (West):	122.7497 - 122˚ 44’ 58.9’’
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521826.2
UTM Y (Meters):	4261127.5
Elevation:	165 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
South Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
Southwest Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
West Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

EDR’s GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

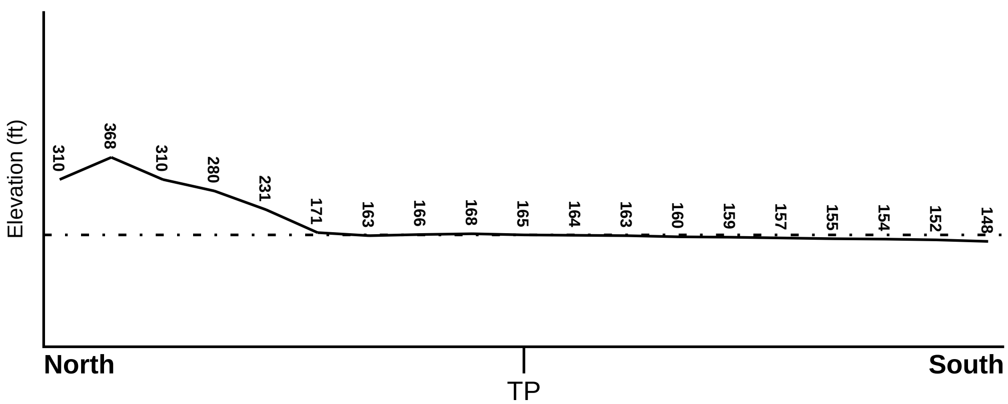
TOPOGRAPHIC INFORMATION

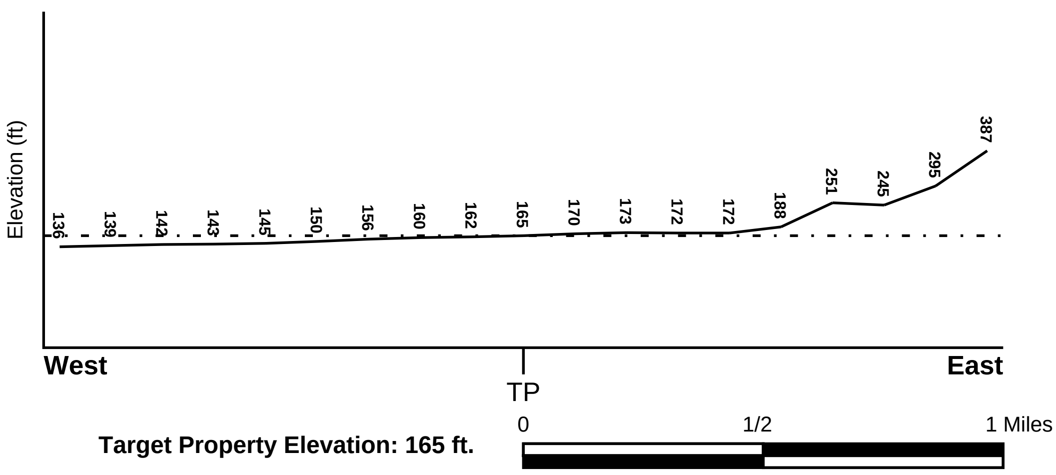
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General WSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 165 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
SONOMA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 0603750565B

Additional Panels in search area: 0603750545B
0603750685B
0603750725B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MARK WEST SPRINGS	Not Available

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
1	1/8 - 1/4 Mile WNW	SW
A2	1/8 - 1/4 Mile South	Varies
A3	1/8 - 1/4 Mile South	Not Reported
A4	1/8 - 1/4 Mile South	NNE
5	1/8 - 1/4 Mile WNW	Varies
A6	1/8 - 1/4 Mile SSE	NNE
23	1/2 - 1 Mile ENE	Not Reported

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

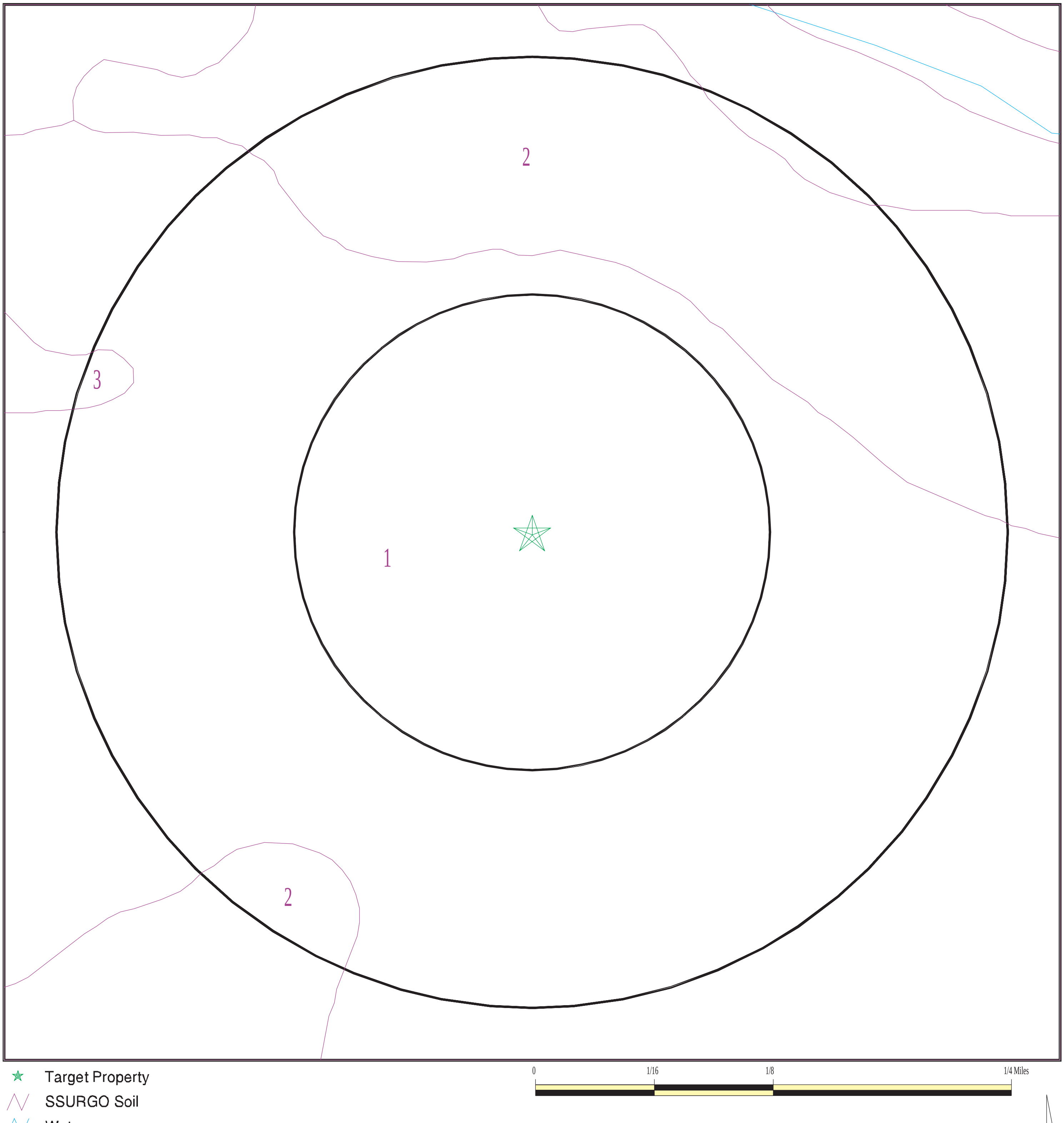
Era: Cenozoic
System: Quaternary
Series: Quaternary
Code: Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 02407239.2r



Target Property
SSURGO Soil
Water

SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: YOLO

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	7 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 2

Soil Component Name: YOLO

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 3

Soil Component Name: ZAMORA

Soil Surface Texture: silty clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	5 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
2	5 inches	29 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
3	29 inches	40 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
4	40 inches	55 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
5	55 inches	59 inches	gravelly clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6

Soil Map ID: 4

Soil Component Name: YOLO

Soil Surface Texture: loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	7 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
7	USGS3236507	1/4 - 1/2 Mile North
B9	USGS3236471	1/4 - 1/2 Mile South
C11	USGS3236492	1/4 - 1/2 Mile West
C12	USGS3236493	1/4 - 1/2 Mile West
E17	USGS3236508	1/2 - 1 Mile NW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

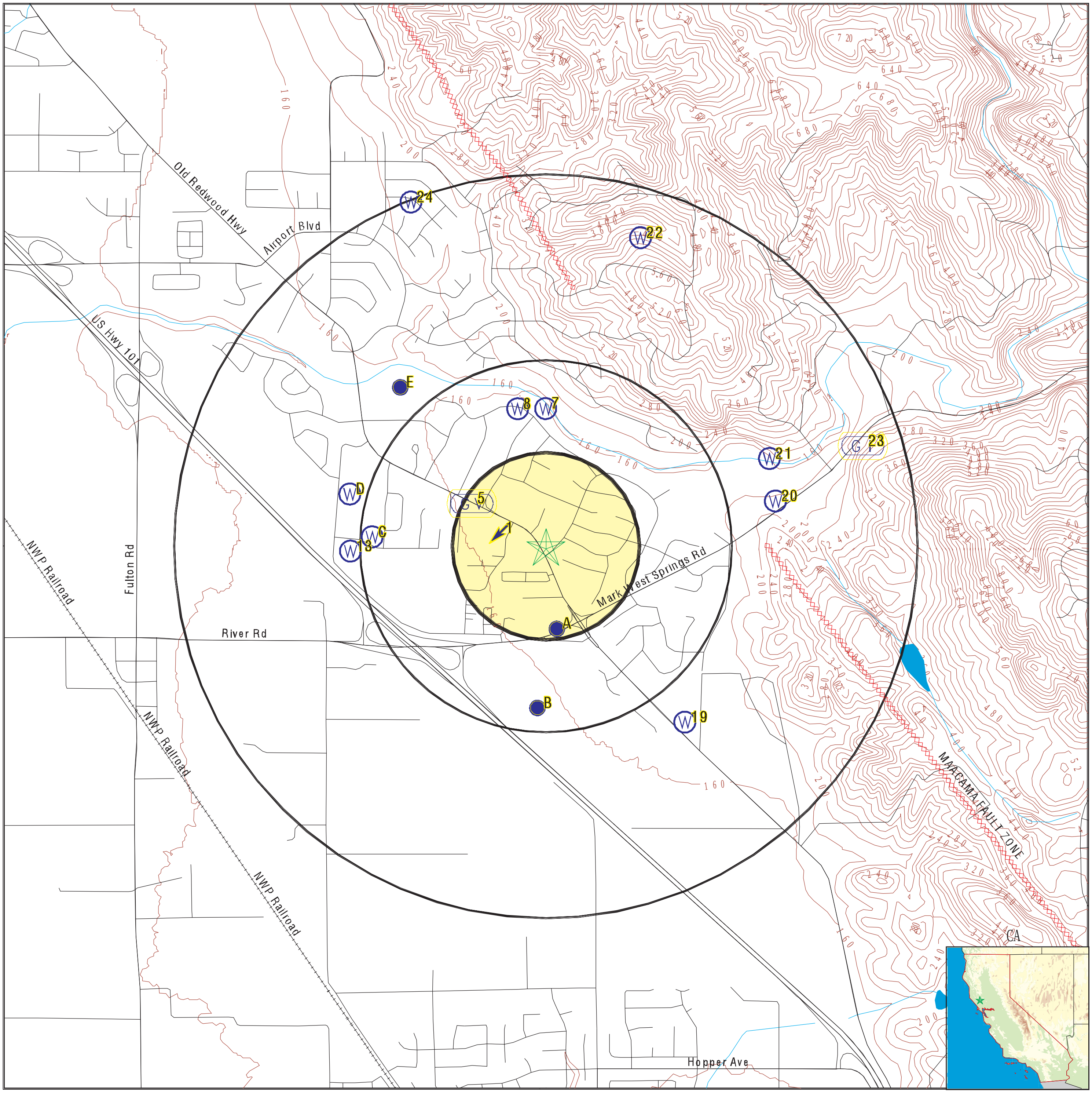
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
8	8400	1/4 - 1/2 Mile NNW
B10	8409	1/4 - 1/2 Mile South
13	20765	1/2 - 1 Mile West
D14	8407	1/2 - 1 Mile West
D15	8406	1/2 - 1 Mile WNW
D16	8401	1/2 - 1 Mile WNW
E18	8399	1/2 - 1 Mile NW
19	8408	1/2 - 1 Mile SE
20	8410	1/2 - 1 Mile East
21	20766	1/2 - 1 Mile ENE
22	7396	1/2 - 1 Mile NNE
24	8404	1/2 - 1 Mile NNW

PHYSICAL SETTING SOURCE MAP - 02407239.2r



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons
- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

Map ID / Direction / Distance / Elevation			Database	EDR ID Number
1 **WNW** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**54548**
	Groundwater Flow:	SW		
	Shallow Water Depth:	11		
	Deep Water Depth:	14		
	Average Water Depth:	Not Reported		
	Date:	04/26/1991		
A2 **South** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**54544**
	Groundwater Flow:	Varies		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	10		
	Date:	06/18/1999		
A3 **South** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**70934**
	Groundwater Flow:	Not Reported		
	Shallow Water Depth:	8.75		
	Deep Water Depth:	9		
	Average Water Depth:	Not Reported		
	Date:	04/30/1993		
A4 **South** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**54266**
	Groundwater Flow:	NNE		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	11/24/1998		
5 **WNW** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**54550**
	Groundwater Flow:	Varies		
	Shallow Water Depth:	8		
	Deep Water Depth:	11		
	Average Water Depth:	Not Reported		
	Date:	06/05/1996		
A6 **SSE** **1/8 - 1/4 Mile** **Lower**	Site ID:	Not Reported	**AQUIFLOW**	**54267**
	Groundwater Flow:	NNE		
	Shallow Water Depth:	Not Reported		
	Deep Water Depth:	Not Reported		
	Average Water Depth:	Not Reported		
	Date:	11/24/1998		
7 **North** **1/4 - 1/2 Mile** **Lower**			**FED USGS**	**USGS3236507**

Agency cd:	USGS	Site no:	383020122445501
Site name:	008N008W28Q001M		
Latitude:	383020		
Longitude:	1224455	Dec lat:	38.50546595
Dec lon:	-122.74970994	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWSWSES 28T 08NR 08WM
Location map:	MARK WEST SPRINGS	Map scale:	24000
Altitude:	160		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	20		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19590319
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	332	Hole depth:	332
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

8
NNW
1/4 - 1/2 Mile
Higher

CA WELLS 8400

Water System Information:

Prime Station Code:	08N/08W-28Q01 M	User ID:	RXR
FRDS Number:	4910023001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383020.5 1224500.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Map ID Direction Distance Elevation			Database	EDR ID Number
B9 **South** **1/4 - 1/2 Mile** **Lower**			**FED USGS**	**USGS3236471**

Agency cd:	USGS	Site no:	382938122445401
Site name:	008N008W33K001M		
Latitude:	382938		
Longitude:	1224454	Dec lat:	38.49379952
Dec lon:	-122.74943211	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWSES 33T 08NR 08WM
Location map:	SANTA ROSA	Map scale:	24000
Altitude:	155		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19731023
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	400	Hole depth:	400
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1973-10-01	Ground water data end date:	1973-10-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1973-10-01	15.00	

B10 **South** **1/4 - 1/2 Mile** **Lower**		**CA WELLS**	**8409**

Water System Information:

Prime Station Code:	08N/08W-33K01 M	User ID:	49C
FRDS Number:	4900685001	County:	Sonoma
District Number:	79	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382938.0 1224459.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		

System Number:	4900685		
System Name:	LUTHER BURBANK CENTER		
Organization That Operates System:	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		
Sample Collected:	08/10/2007 00:00:00	Findings:	320 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/10/2007 00:00:00	Findings:	6.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	08/10/2007 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/10/2007 00:00:00	Findings:	119 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/10/2007 00:00:00	Findings:	190 UG/L
Chemical:	IRON		
Sample Collected:	08/10/2007 00:00:00	Findings:	91 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/10/2007 00:00:00	Findings:	230 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/10/2007 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

C11
West
1/4 - 1/2 Mile
Lower

FED USGS **USGS3236492**

Agency cd:	USGS	Site no:	383002122452501
Site name:	008N008W33D004M		
Latitude:	383002		
Longitude:	1224525	Dec lat:	38.5004661
Dec lon:	-122.75804356	Coor meth:	M
Coor accr:	T	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000

Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	360	Hole depth:	484
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

C12
West
1/4 - 1/2 Mile
Lower

FED USGS **USGS3236493**

Agency cd:	USGS	Site no:	383002122452701
Site name:	008N008W33D003M		
Latitude:	383002		
Longitude:	1224527	Dec lat:	38.5004661
Dec lon:	-122.75859914	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19620601
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	380	Hole depth:	380
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00

Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

13
West
1/2 - 1 Mile
Lower

CA WELLS 20765

Water System Information:

Prime Station Code:	4910023-005	User ID:	RXR
FRDS Number:	4910023005	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383000.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 05		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	11/15/2007 00:00:00	Findings:	1360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2007 00:00:00	Findings:	2069 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	1829 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	1090 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1805 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1609 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1580 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	2093 UG/L
Chemical:	MANGANESE		

Sample Collected:	11/06/2006 00:00:00	Findings:	1370 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	15 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	26 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	310 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	114 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1020 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1873 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	33 MG/L
Chemical:	CALCIUM		

Sample Collected:	05/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	1697 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	900 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	1184 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/07/2005 00:00:00	Findings:	1257 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	340 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	1086 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	860 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	1596 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	1333 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	370 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	1306 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	470 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		

Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	200 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.29
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	25 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	34.5 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	82 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	159 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	112 UG/L
Chemical:	BORON		
Sample Collected:	07/20/2004 00:00:00	Findings:	560 UG/L
Chemical:	IRON		
Sample Collected:	07/20/2004 00:00:00	Findings:	1545 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	57 UG/L
Chemical:	ZINC		
Sample Collected:	07/08/2004 00:00:00	Findings:	620 UG/L
Chemical:	IRON		
Sample Collected:	07/08/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	1690 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		

Sample Collected:	05/04/2004 00:00:00	Findings:	570 UG/L
Chemical:	IRON		
Sample Collected:	05/04/2004 00:00:00	Findings:	1578 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/10/2004 00:00:00	Findings:	990 UG/L
Chemical:	IRON		
Sample Collected:	02/10/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/10/2004 00:00:00	Findings:	1814 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	942 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	.63 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/07/2003 00:00:00	Findings:	.61 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	864 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/27/2003 00:00:00	Findings:	4 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	.49 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	320 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/2003 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	22 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	240 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	- .4
Chemical:	LANGELIER INDEX @ 60 C		

Sample Collected:	02/25/2003 00:00:00	Findings:	.2 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	.6 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	19 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	15 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	15.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	89 MG/L
Chemical:	SILICA		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/2003 00:00:00	Findings:	102 UG/L
Chemical:	BARIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	156 UG/L
Chemical:	BORON		
Sample Collected:	02/25/2003 00:00:00	Findings:	1115 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	.16 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	02/06/2003 00:00:00	Findings:	6.2 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	118 UG/L
Chemical:	BARIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	22 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	12.3 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		

Sample Collected:	12/17/2002 00:00:00	Findings:	.16 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	15 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1589 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

D14
West
1/2 - 1 Mile
Lower

CA WELLS 8407

Water System Information:

Prime Station Code:	08N/08W-33D04 M	User ID:	RXR
FRDS Number:	4910023003	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383006.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 03		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

D15
WNW
1/2 - 1 Mile
Lower

CA WELLS 8406

Water System Information:

Prime Station Code:	08N/08W-33D01 M	User ID:	RXR
FRDS Number:	4901048001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Untreated
Source Lat/Long:	383009.0 1224529.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4901048		
System Name:	MARK WEST SCHOOL		
Organization That Operates System:			
	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

Map ID Direction Distance Elevation	Database	EDR ID Number
D16 **WNW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**8401**

Water System Information:

Prime Station Code:	08N/08W-28Q02 M	User ID:	RXR
FRDS Number:	4910023002	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383009.9 1224531.1	Precision:	100 Feet (one Second)
Source Name:	WELL 02		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

E17 **NW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS3236508**

Agency cd:	USGS	Site no:	383023122452001
Site name:	008N008W28N001M		
Latitude:	383023		
Longitude:	1224520	Dec lat:	38.50629934
Dec lon:	-122.75665469	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NESWSWS 28T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19741120
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	410	Hole depth:	462
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
E18 **NW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**8399**

Water System Information:

Prime Station Code:	08N/08W-28N01 M	User ID:	RXR
FRDS Number:	4910023004	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383023.0 1224522.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 04A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	12/11/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/11/2007 00:00:00	Findings:	720 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	688 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	150 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	697 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	682 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	160 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	130 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	300 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.9
Chemical:	PH, LABORATORY		

Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.11 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .22 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	13.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	82 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	124 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	781 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	747 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .21 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	02/14/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

Sample Collected:	02/14/2006 00:00:00	Findings:	650 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	729 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	833 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	873 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	120 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	586 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	712 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.7
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		

Sample Collected:	07/20/2004 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	13.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	81 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	121 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	151 UG/L
Chemical:	BORON		
Sample Collected:	07/20/2004 00:00:00	Findings:	696 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/08/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	709 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	721 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/10/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/10/2004 00:00:00	Findings:	705 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	11/04/2003 00:00:00	Findings:	695 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	616 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/27/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

Sample Collected:	02/25/2003 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/2003 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	24 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	23 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	.087
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/25/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	19 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	12.3 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	86 MG/L
Chemical:	SILICA		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/2003 00:00:00	Findings:	115 UG/L
Chemical:	BARIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 UG/L
Chemical:	BORON		
Sample Collected:	02/25/2003 00:00:00	Findings:	743 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYBDENUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	.13 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		

Sample Collected:	02/06/2003 00:00:00	Findings:	5.4 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	158 UG/L
Chemical:	BARIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	119 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1722 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	548 UG/L
Chemical:	ZINC		
Sample Collected:	12/17/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	33.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.61 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.68 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	06/18/2002 00:00:00	Findings:	.69 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .49
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	100 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	02/26/2002 00:00:00	Findings:	4 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.42 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/26/2002 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	25 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	24 MG/L
Chemical:	SODIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	13 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	120 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	860 UG/L
Chemical:	MANGANESE		

19
SE
1/2 - 1 Mile
Lower

CA WELLS 8408

Water System Information:

Prime Station Code:	08N/08W-33J01 M	User ID:	RXR
FRDS Number:	4900869001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382936.0 1224430.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4900869		
System Name:	LA MANCHA APARTMENTS		
Organization That Operates System:			
	P.O. BOX 11427		
	SANTA ROSA, CA 95406		
Pop Served:	140	Connections:	1
Area Served:	Not Reported		
Sample Collected:	02/13/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	02/13/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		
Sample Collected:	02/12/2003 00:00:00	Findings:	5 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/12/2003 00:00:00	Findings:	9 UG/L
Chemical:	VANADIUM		
Sample Collected:	02/12/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

Sample Collected:	02/12/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		

20
East
1/2 - 1 Mile
Higher

CA WELLS 8410

Water System Information:

Prime Station Code:	08N/08W-34D01 M	User ID:	RXR
FRDS Number:	4900890001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383007.0 1224414.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		
System Number:	4900890		
System Name:	REDWOOD JUNIOR ACADEMY		
Organization That Operates System:			
	385 MARK WEST SPRINGS RD.		
	SANTA ROSA, CA 95404		
Pop Served:	300	Connections:	1
Area Served:	Not Reported		
Sample Collected:	09/21/2005 00:00:00	Findings:	6.9 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	06/23/2004 00:00:00	Findings:	5.8 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.8 UG/L
Chemical:	BROMODICHLORMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	1.9 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.1 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	6.8 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	01/31/2002 00:00:00	Findings:	3.1 MG/L
Chemical:	NITRATE (AS NO3)		

21
ENE
1/2 - 1 Mile
Lower

CA WELLS 20766

Water System Information:

Prime Station Code:	4910023-006	User ID:	RXR
FRDS Number:	4910023006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383013.0 1224415.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Collected:	11/12/2007 00:00:00	Findings:	770 UG/L
Chemical:	IRON		
Sample Collected:	11/12/2007 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/12/2007 00:00:00	Findings:	858 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	680 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	410 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	320 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	716 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	300 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	735 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	350 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	5 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	8.1
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	190 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	230 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	160 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		

Sample Collected:	08/08/2006 00:00:00	Findings:	.72
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.81 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	11.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	161 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	213 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	380 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	819 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	490 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	827 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/26/2006 00:00:00	Findings:	805 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	03/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/14/2006 00:00:00	Findings:	2040 UG/L
Chemical:	IRON		

Sample Collected:	03/14/2006 00:00:00	Findings:	928 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/14/2006 00:00:00	Findings:	771 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	1930 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	940 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	782 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	893 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	07/07/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	17 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	882 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	04/12/2005 00:00:00	Findings:	874 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/12/2005 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/12/2005 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	560 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	724 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/08/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/13/2004 00:00:00	Findings:	1130 UG/L
Chemical:	IRON		
Sample Collected:	12/13/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/13/2004 00:00:00	Findings:	739 UG/L
Chemical:	MANGANESE		

Sample Collected:	11/08/2004 00:00:00	Findings:	749 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/08/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	11/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	480 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	804 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/07/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	09/07/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/07/2004 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	719 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	500 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	590 UG/L
Chemical:	IRON		
Sample Collected:	07/20/2004 00:00:00	Findings:	768 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	170 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.52
Chemical:	LANGELIER INDEX @ 60 C		

Sample Collected:	07/20/2004 00:00:00	Findings:	4.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	33 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	12.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	83 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	142 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	216 UG/L
Chemical:	BORON		
Sample Collected:	07/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	764 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/08/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	06/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	06/08/2004 00:00:00	Findings:	759 UG/L
Chemical:	MANGANESE		
Sample Collected:	06/08/2004 00:00:00	Findings:	580 UG/L
Chemical:	IRON		
Sample Collected:	05/04/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	891 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	1850 UG/L
Chemical:	IRON		
Sample Collected:	03/24/2004 00:00:00	Findings:	.55 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	01/12/2004 00:00:00	Findings:	1371 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	914 UG/L
Chemical:	MANGANESE		

Sample Collected:	01/12/2004 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	7120 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	1783 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	3770 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	7.2 UG/L
Chemical:	XYLENES (TOTAL)		
Sample Collected:	12/08/2003 00:00:00	Findings:	4.7 UG/L
Chemical:	M,P-XYLENE		
Sample Collected:	12/08/2003 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/08/2003 00:00:00	Findings:	7300 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	1293 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/08/2003 00:00:00	Findings:	2.5 UG/L
Chemical:	O-XYLENE		
Sample Collected:	12/08/2003 00:00:00	Findings:	1.2 UG/L
Chemical:	1,2,4-TRIMETHYLBENZENE		
Sample Collected:	11/04/2003 00:00:00	Findings:	757 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.65 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	10/07/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/07/2003 00:00:00	Findings:	681 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/10/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/07/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	760 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/04/2003 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	06/24/2003 00:00:00	Findings:	.52 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/28/2003 00:00:00	Findings:	.7 UG/L
Chemical:	STYRENE		
Sample Collected:	05/27/2003 00:00:00	Findings:	27 UG/L
Chemical:	ARSENIC		

Sample Collected:	05/12/2003 00:00:00	Findings:	28 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	23 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	34 MG/L
Chemical:	SODIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	11.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	05/12/2003 00:00:00	Findings:	91 MG/L
Chemical:	SILICA		
Sample Collected:	05/12/2003 00:00:00	Findings:	51 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	209 UG/L
Chemical:	BORON		
Sample Collected:	05/12/2003 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	05/12/2003 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	05/12/2003 00:00:00	Findings:	1093 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/12/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	.32 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	05/12/2003 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	24 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	05/12/2003 00:00:00	Findings:	- .21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	05/12/2003 00:00:00	Findings:	4.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	05/12/2003 00:00:00	Findings:	10 UNITS
Chemical:	COLOR		
Sample Collected:	05/12/2003 00:00:00	Findings:	460 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	05/12/2003 00:00:00	Findings:	7.5
Chemical:	PH, LABORATORY		
Sample Collected:	12/17/2002 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		

Sample Collected:	12/17/2002 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	740 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	20 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	224 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	35 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	11.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	143 UG/L
Chemical:	BARIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.47 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	.7 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/30/2002 00:00:00	Findings:	450 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/18/2002 00:00:00	Findings:	.64 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .058
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.49 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		

Sample Collected:	02/26/2002 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	37 MG/L
Chemical:	SODIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	12 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	150 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	200 UG/L
Chemical:	BORON		
Sample Collected:	02/26/2002 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		

22
NNE
1/2 - 1 Mile
Higher

CA WELLS 7396

Water System Information:

Prime Station Code:	07N/08W-04J02 M	User ID:	RXR
FRDS Number:	4910009006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Standby Raw
Source Lat/Long:	383044.9 1224438.5	Precision:	100 Feet (one Second)
Source Name:	SHARON PARK WELL - STANDBY		
System Number:	4910009		
System Name:	Santa Rosa, City of		
Organization That Operates System:			
	P.O. BOX 1658		
	SANTA ROSA, CA 95403		
Pop Served:	113313	Connections:	38388
Area Served:	SANTA ROSA		

23
ENE
1/2 - 1 Mile
Higher

AQUIFLOW 71020

Site ID:	Not Reported
Groundwater Flow:	Not Reported
Shallow Water Depth:	11
Deep Water Depth:	13
Average Water Depth:	Not Reported
Date:	08/13/1990

Map ID Direction Distance Elevation	Database	EDR ID Number
24 **NNW** **1/2 - 1 Mile** **Higher**	**CA WELLS**	**8404**

Water System Information:

Prime Station Code:	08N/08W-29G09 M	User ID:	RXR
FRDS Number:	4900726001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383049.0 1224519.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		
System Number:	4900726		
System Name:	ORCHARD MOBILE HOME PARK		
Organization That Operates System:			
	P.O. BOX 839 WINDSOR, CA 95492		
Pop Served:	45	Connections:	35
Area Served:	Not Reported		

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
95403	8	0	0.00

Federal EPA Radon Zone for SONOMA County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 95403

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.575 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^R Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

SMF Alternate Well Site

4728 Old Redwood Highway

Santa Rosa, CA 95403

Inquiry Number: 2407239.4

January 26, 2009

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography January 26, 2009

Target Property:
4728 Old Redwood Highway
Santa Rosa, CA 95403

Year	***Scale***	***Details***	***Source***
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Pacific Air
1965	Aerial Photograph. Scale: 1"=333'	Flight Year: 1965	Cartwright
1974	Aerial Photograph. Scale: 1"=541'	Flight Year: 1974	NASA
1982	Aerial Photograph. Scale: 1"=690'	Flight Year: 1982	USGS
1993	Aerial Photograph. Scale: 1"=666'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=666'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=484'	Flight Year: 2005	EDR


INQUIRY #: 2407239.4
YEAR: 1953
= 555'
N
EDR Environmental Data Resources Inc

INQUIRY #: 2407239.4

YEAR: 1965

= 333'

N

INQUIRY #: 2407239.4

YEAR: 1974

= 541'

N

EDR Environmental Data Resources Inc


INQUIRY #: 2407239.4
YEAR: 1982
= 690'
N
EDR Environmental Data Resources Inc


INQUIRY #: 2407239.4
YEAR: 1993
= 666'
N
EDR Environmental Data Resources Inc

INQUIRY #: 2407239.4

YEAR: 1998

= 666'

N

INQUIRY #: 2407239.4

YEAR: 2005

= 484'

N

SMF Alternate Well Site
4728 Old Redwood Highway
Santa Rosa, CA 95403

Inquiry Number: 02407239.2r
January 23, 2009

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-05) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

4728 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 95403

COORDINATES

Latitude (North):	38.500100 - 38˚ 30' 0.4''
Longitude (West):	122.749700 - 122˚ 44' 58.9''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521826.2
UTM Y (Meters):	4261127.5
Elevation:	165 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
South Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
Southwest Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
West Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year: 2005

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

EXECUTIVE SUMMARY

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL - National Priority List
Proposed NPL - Proposed National Priority List Sites
NPL LIENS - Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL - National Priority List Deletions

Federal CERCLIS list

CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System

Federal CERCLIS NFRAP site List

CERC-NFRAP - CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS - Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF - RCRA - Transporters, Storage and Disposal

Federal RCRA generators list

RCRA-LQG - RCRA - Large Quantity Generators
RCRA-CESQG - RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS - Engineering Controls Sites List
US INST CONTROL - Sites with Institutional Controls

Federal ERNS list

ERNS - Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE - State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR - EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF ---------- Solid Waste Information System

State and tribal leaking storage tank lists

SLIC ---------- Statewide SLIC Cases
INDIAN LUST ---------- Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

AST ---------- Aboveground Petroleum Storage Tank Facilities
INDIAN UST ---------- Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

VCP ---------- Voluntary Cleanup Program Properties
INDIAN VCP ---------- Voluntary Cleanup Priority Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS ---------- A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
ODI ---------- Open Dump Inventory
WMUDS/SWAT ---------- Waste Management Unit Database
SWRCY ---------- Recycler Database
HAULERS ---------- Registered Waste Tire Haulers Listing
INDIAN ODI ---------- Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL ---------- Clandestine Drug Labs
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
CDL ---------- Clandestine Drug Labs

Local Land Records

LIENS 2 ---------- CERCLA Lien Information
LUCIS ---------- Land Use Control Information System
LIENS ---------- Environmental Liens Listing
DEED ---------- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
CHMIRS ---------- California Hazardous Material Incident Report System

EXECUTIVE SUMMARY

LDS - Land Disposal Sites Listing
MCS - Military Cleanup Sites Listing

Other Ascertainable Records

RCRA-NonGen - RCRA - Non Generators
DOT OPS - Incident and Accident Data
DOD - Department of Defense Sites
FUDS - Formerly Used Defense Sites
CONSENT - Superfund (CERCLA) Consent Decrees
ROD - Records Of Decision
UMTRA - Uranium Mill Tailings Sites
MINES - Mines Master Index File
TRIS - Toxic Chemical Release Inventory System
TSCA - Toxic Substances Control Act
FTTS - FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS - FIFRA/TSCA Tracking System Administrative Case Listing
SSTS - Section 7 Tracking Systems
ICIS - Integrated Compliance Information System
PADS - PCB Activity Database System
MLTS - Material Licensing Tracking System
RADINFO - Radiation Information Database
FINDS - Facility Index System/Facility Registry System
RAATS - RCRA Administrative Action Tracking System
CA BOND EXP. PLAN - Bond Expenditure Plan
CA WDS - Waste Discharge System
DRYCLEANERS - Cleaner Facilities
WIP - Well Investigation Program Case List
HAZNET - Facility and Manifest Data
EMI - Emissions Inventory Data
INDIAN RESERV - Indian Reservations
SCRD DRYCLEANERS - State Coalition for Remediation of Drycleaners Listing
PWS - Public Water System Data

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants - EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA generators list

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/10/2008 has revealed that there are 2 RCRA-SQG sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD AUTO CENTER	***601 LARKFIELD CTR***	***WNW 0 - 1/8 (0.017 mi.)***	***A2***	***7***

Lower Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD BODY AND PAINT	***15 LARK CENTER DR***	***WNW 0 - 1/8 (0.076 mi.)***	***B5***	***12***

State and tribal leaking storage tank lists

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 11/04/2008 has revealed that there are 8 LUST sites within approximately 0.5 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
UNION 76 #5142 Status: Completed - Case Closed	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C9	15

Lower Elevation	Address	Direction / Distance	Map ID	Page
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***WNW 0 - 1/8 (0.096 mi.)***	***B6***	***13***
CHEVRON #9-8270	REDWOOD HIGHWAY, OLD 48	WNW 1/8 - 1/4 (0.154 mi.)	13	19
TEXACO Status: Completed - Case Closed	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD CHEVRON #9-8270 Status: Completed - Case Closed	4840 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.177 mi.)	D17	25
LARKFIELD BP Status: Open - Remediation	***4856 OLD REDWOOD HIGHWA***	***WNW 1/8 - 1/4 (0.179 mi.)***	***D18***	***25***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F22***	***30***
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F23***	***30***

EXECUTIVE SUMMARY

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 11/04/2008 has revealed that there are 4 UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD UNION 76 #255142	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C12	19

Lower Elevation	Address	Direction / Distance	Map ID	Page
FACILITY 49-000-005546	4732 OLD REDWOOD HWY	WSW 0 - 1/8 (0.006 mi.)	1	7
LARKFIELD CHEVRON	4840 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.177 mi.)	D16	24
LARKFIELD BP STATION	4856 OLD REDWOOD HWY	WNW 1/8 - 1/4 (0.220 mi.)	E20	28

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 4 CA FID UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD B P	***4856 OLD REDWOOD HWY***	***WNW 1/8 - 1/4 (0.220 mi.)***	***E19***	***26***
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***WSW 1/8 - 1/4 (0.231 mi.)***	***21***	***28***

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 5 HIST UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
98270	668 LARKFIELD CTR	WNW 0 - 1/8 (0.021 mi.)	A4	11
UNION OIL SS# 5142	4605 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.149 mi.)	C8	14
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C11***	***17***

Lower Elevation	Address	Direction / Distance	Map ID	Page
RINCON VALLEY FIRE ST 2	45-LARK CENTER DRIVE	WSW 1/8 - 1/4 (0.144 mi.)	7	14
TEXACO	4601 OLD REDWOOD HWY	SSE 1/8 - 1/4 (0.172 mi.)	C15	23

EXECUTIVE SUMMARY

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 5 SWEEPS UST sites within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
CHEVRON #8270	668 LARKFIELD CNTR	WNW 0 - 1/8 (0.021 mi.)	A3	10
UNION OIL SS #5142	***4605 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.149 mi.)***	***C10***	***15***

Lower Elevation	Address	Direction / Distance	Map ID	Page
TEXACO	***4601 OLD REDWOOD HWY***	***SSE 1/8 - 1/4 (0.172 mi.)***	***C14***	***19***
LARKFIELD B P	***4856 OLD REDWOOD HWY***	***WNW 1/8 - 1/4 (0.220 mi.)***	***E19***	***26***
CHEVRON U.S.A. INC.	***668 LARKFIELD CENTER***	***WSW 1/8 - 1/4 (0.231 mi.)***	***21***	***28***

Other Ascertainable Records

Cortese: The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

A review of the Cortese list, as provided by EDR, and dated 04/01/2001 has revealed that there are 4 Cortese sites within approximately 0.5 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
BP, LARKFIELD / REDWOOD OIL	***REDWOOD HIGHWAY, OLD 48***	***WNW 0 - 1/8 (0.096 mi.)***	***B6***	***13***
TEXACO (REDWOOD HIGHWAY, 4601)	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F22***	***30***
UNOCAL #5142	***REDWOOD HIGHWAY, OLD 46***	***SSW 1/4 - 1/2 (0.279 mi.)***	***F23***	***30***
DAVIS, MAY L.	105 ETON	W 1/4 - 1/2 (0.318 mi.)	24	31

Notify 65: Notify 65 records contain facility notifications about any release that could impact drinking water and thereby expose the public to a potential health risk. The data come from the State Water Resources Control Board's Proposition 65 database.

A review of the Notify 65 list, as provided by EDR, and dated 10/21/1993 has revealed that there is 1 Notify 65 site within approximately 1 mile of the target property.

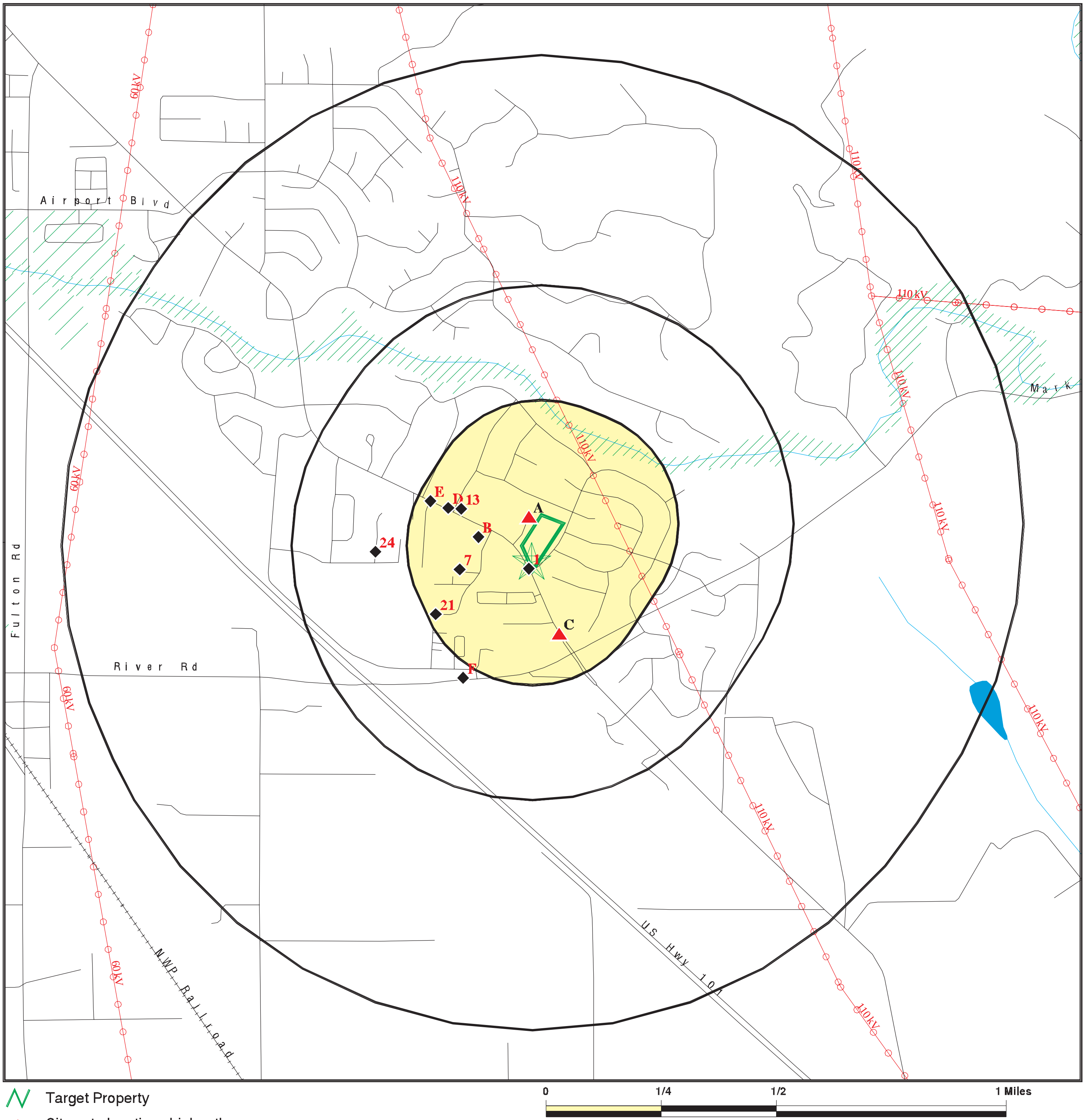
Lower Elevation	Address	Direction / Distance	Map ID	Page
LARKFIELD BP	***4856 OLD REDWOOD HIGHWA***	***WNW 1/8 - 1/4 (0.179 mi.)***	***D18***	***25***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped:

Site Name	Database(s)
ADAMS, DOUG	SWEEPS UST
YOLO, DANIEL	LUST, Cortese
MISSION ARBORS	LUST
AUTO EXCHANGE	LUST
STEVENSON EQUIPMENT	LUST
FAST & EASY MART	LUST
FACILITY 49-000-005986	UST
FACILITY 49-000-005921	UST
FACILITY 49-000-005510	UST
FACILITY 49-000-002759	UST
FACILITY 49-000-000371	UST
FACILITY 49-000-000215	UST
APEX AVIATION (DRAGONFLY)	UST
SCDPW SANTA ROSA RD MAINTENANCE YA	UST
FACILITY 49-000-000092	UST
SONOMA 101 HIGHWAY WIDENING	RCRA-LQG
LOS GUILICOS	SLIC
REED, LILLIE	SLIC
UNITY CHURCH	SLIC
SCDPW LARKFIELD SEWER	SLIC

OVERVIEW MAP - 02407239.2r



Target Property
Sites at elevations higher than or equal to the target property
Sites at elevations lower than the target property
Manufactured Gas Plants
National Priority List Sites
Dept. Defense Sites

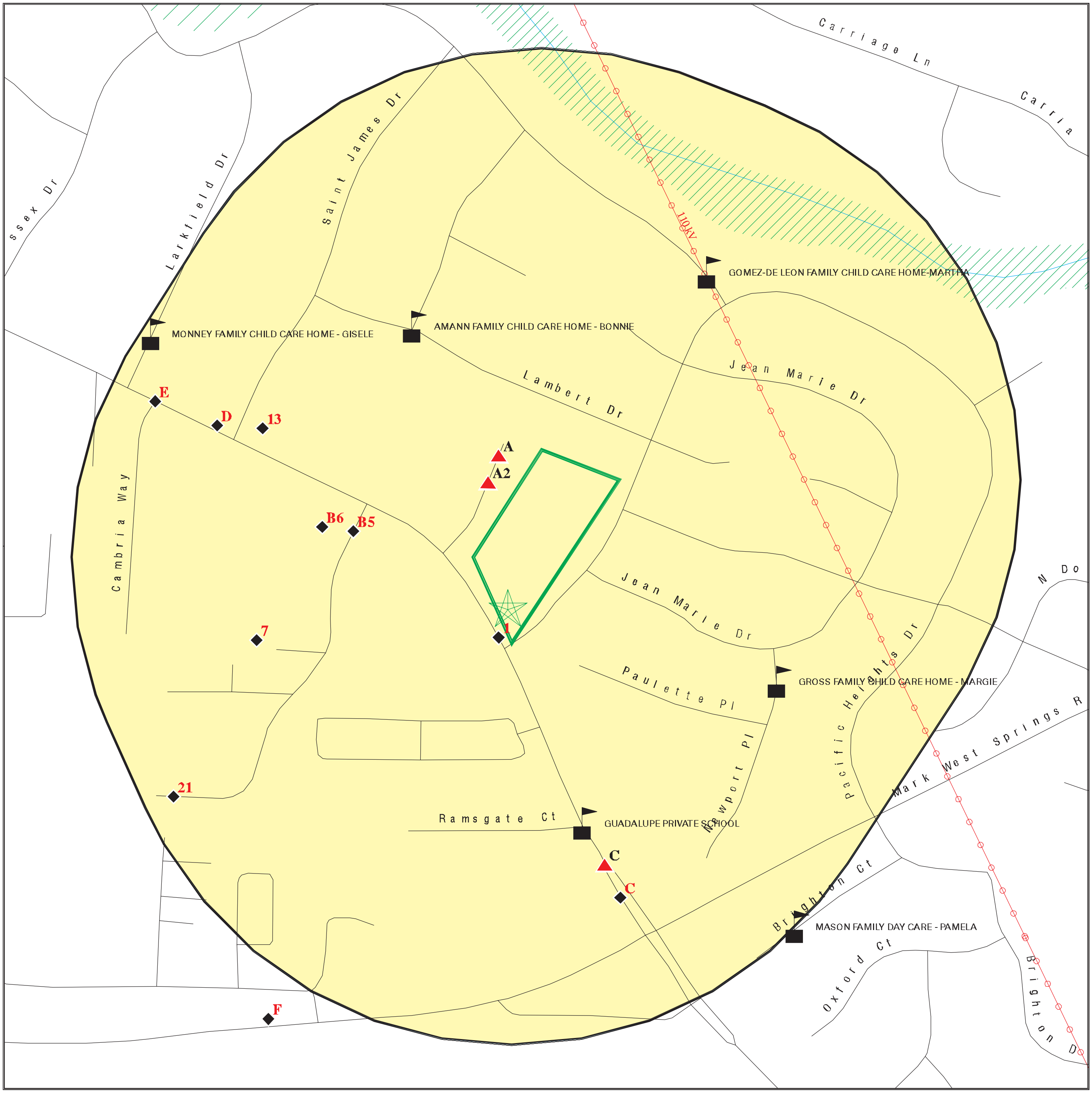
Indian Reservations BIA
Power transmission lines
Oil & Gas pipelines
100-year flood zone
500-year flood zone

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

DETAIL MAP - 02407239.2r



Target Property
Sites at elevations higher than or equal to the target property
Sites at elevations lower than the target property
Manufactured Gas Plants
Sensitive Receptors
National Priority List Sites
Dept. Defense Sites

0 1/16 1/8 1/4 Miles

Indian Reservations BIA
Power transmission lines
Oil & Gas pipelines
100-year flood zone
500-year flood zone

Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL		1.000	0	0	0	0	NR	0
Proposed NPL		1.000	0	0	0	0	NR	0
NPL LIENS		TP	NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL		1.000	0	0	0	0	NR	0
Federal CERCLIS list								
CERCLIS		0.500	0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERC-NFRAP		0.500	0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS		1.000	0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF		0.500	0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG		0.250	0	0	NR	NR	NR	0
RCRA-SQG		0.250	2	0	NR	NR	NR	2
RCRA-CESQG		0.250	0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
US ENG CONTROLS		0.500	0	0	0	NR	NR	0
US INST CONTROL		0.500	0	0	0	NR	NR	0
Federal ERNS list								
ERNS		TP	NR	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE		1.000	0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR		1.000	0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF		0.500	0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST		0.500	1	5	2	NR	NR	8
SLIC		0.500	0	0	0	NR	NR	0
INDIAN LUST		0.500	0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
State and tribal registered storage tank lists								
UST		0.250	1	3	NR	NR	NR	4
AST		0.250	0	0	NR	NR	NR	0
INDIAN UST		0.250	0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
VCP		0.500	0	0	0	NR	NR	0
INDIAN VCP		0.500	0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS		0.500	0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
DEBRIS REGION 9		0.500	0	0	0	NR	NR	0
ODI		0.500	0	0	0	NR	NR	0
WMUDS/SWAT		0.500	0	0	0	NR	NR	0
SWRCY		0.500	0	0	0	NR	NR	0
HAULERS		TP	NR	NR	NR	NR	NR	0
INDIAN ODI		0.500	0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US CDL		TP	NR	NR	NR	NR	NR	0
HIST Cal-Sites		1.000	0	0	0	0	NR	0
SCH		0.250	0	0	NR	NR	NR	0
Toxic Pits		1.000	0	0	0	0	NR	0
CDL		TP	NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
CA FID UST		0.250	0	4	NR	NR	NR	4
HIST UST		0.250	1	4	NR	NR	NR	5
SWEEPS UST		0.250	1	4	NR	NR	NR	5
Local Land Records								
LIENS 2		TP	NR	NR	NR	NR	NR	0
LUCIS		0.500	0	0	0	NR	NR	0
LIENS		TP	NR	NR	NR	NR	NR	0
DEED		0.500	0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS		TP	NR	NR	NR	NR	NR	0
CHMIRS		TP	NR	NR	NR	NR	NR	0
LDS		TP	NR	NR	NR	NR	NR	0
MCS		TP	NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA-NonGen		0.250	0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOT OPS		TP	NR	NR	NR	NR	NR	0
DOD		1.000	0	0	0	0	NR	0
FUDS		1.000	0	0	0	0	NR	0
CONSENT		1.000	0	0	0	0	NR	0
ROD		1.000	0	0	0	0	NR	0
UMTRA		0.500	0	0	0	NR	NR	0
MINES		0.250	0	0	NR	NR	NR	0
TRIS		TP	NR	NR	NR	NR	NR	0
TSCA		TP	NR	NR	NR	NR	NR	0
FTTS		TP	NR	NR	NR	NR	NR	0
HIST FTTS		TP	NR	NR	NR	NR	NR	0
SSTS		TP	NR	NR	NR	NR	NR	0
ICIS		TP	NR	NR	NR	NR	NR	0
PADS		TP	NR	NR	NR	NR	NR	0
MLTS		TP	NR	NR	NR	NR	NR	0
RADINFO		TP	NR	NR	NR	NR	NR	0
FINDS		TP	NR	NR	NR	NR	NR	0
RAATS		TP	NR	NR	NR	NR	NR	0
CA BOND EXP. PLAN		1.000	0	0	0	0	NR	0
CA WDS		TP	NR	NR	NR	NR	NR	0
Cortese		0.500	1	0	3	NR	NR	4
Notify 65		1.000	0	1	0	0	NR	1
DRYCLEANERS		0.250	0	0	NR	NR	NR	0
WIP		0.250	0	0	NR	NR	NR	0
HAZNET		TP	NR	NR	NR	NR	NR	0
EMI		TP	NR	NR	NR	NR	NR	0
INDIAN RESERV		1.000	0	0	0	0	NR	0
SCRD DRYCLEANERS		0.500	0	0	0	NR	NR	0
PWS		TP	NR	NR	NR	NR	NR	0

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Database	Target Property	Search Distance (Miles)	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
Manufactured Gas Plants		1.000	0	0	0	0	NR	0

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

1 **WSW** **< 1/8** **0.006 mi.** **32 ft.**

FACILITY 49-000-005546
4732 OLD REDWOOD HWY
SANTA ROSA, CA 95403

UST **U004050346** **N/A**

Relative: Lower
Actual: 164 ft.

UST:
- Global ID: 11511
- Latitude: 38.49991
- Longitude: -122.74984
- Case Type: PERMITTED UNDERGROUND STORAGE TANK (UST)

A2 **WNW** **< 1/8** **0.017 mi.** **92 ft.**

LARKFIELD AUTO CENTER
601 LARKFIELD CTR
SANTA ROSA, CA 95403

RCRA-SQG **FINDS** **HAZNET** **1000270156** **CAD982351314**

Site 1 of 3 in cluster A

Relative: Higher
Actual: 167 ft.

RCRA-SQG:

Date form received by agency:	11/04/1987
Facility name:	LARKFIELD AUTO CENTER
Facility address:	601 LARKFIELD CTR SANTA ROSA, CA 95403
EPA ID:	CAD982351314
Contact:	ENVIRONMENTAL MANAGER
Contact address:	601 LARKFIELD CTR SANTA ROSA, CA 95403
Contact country:	US
Contact telephone:	(707) 546-6881
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	NORMAN BLACKMORE
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

LARKFIELD AUTO CENTER (Continued) **1000270156**

Handler Activities Summary:

U.S. importer of hazardous waste:	Unknown
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	Unknown
Furnace exemption:	Unknown
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Violation Status: No violations found

FINDS:

Other Pertinent Environmental Activity Identified at Site

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZNET:

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAD982446866
TSD County:	Solano
Waste Category:	Aqueous solution with less than 10% total organic residues
Disposal Method:	Recycler
Tons:	1.2093
Facility County:	Sonoma

Gepaid:	CAD982351314
Contact:	LARKFIELD AUTO CENTER
Telephone:	7075466881
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	4809 OLD REDWOOD HWY
Mailing City,St,Zip:	SANTA ROSA, CA 954031415
Gen County:	Sonoma
TSD EPA ID:	CAL000161743
TSD County:	Santa Clara

LARKFIELD AUTO CENTER (Continued) **1000270156**

Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: .3753
Facility County: Sonoma

Gepaid: CAD982351314
Contact: LARKFIELD AUTO CENTER
Telephone: 7075466881
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4809 OLD REDWOOD HWY
Mailing City,St,Zip: SANTA ROSA, CA 954031415
Gen County: Sonoma
TSD EPA ID: CAD980887418
TSD County: 1
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 1.5429
Facility County: Sonoma

Gepaid: CAD982351314
Contact: LARKFIELD AUTO CENTER
Telephone: 7075466881
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4809 OLD REDWOOD HWY
Mailing City,St,Zip: SANTA ROSA, CA 954031415
Gen County: Sonoma
TSD EPA ID: CAD980887418
TSD County: 1
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: .7297
Facility County: Sonoma

Gepaid: CAD982351314
Contact: LARKFIELD AUTO CENTER
Telephone: 7075466881
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4809 OLD REDWOOD HWY
Mailing City,St,Zip: SANTA ROSA, CA 954031415
Gen County: Sonoma
TSD EPA ID: CAD982446874
TSD County: Yolo
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: .3753
Facility County: Sonoma

Click this hyperlink while viewing on your computer to access
11 additional CA_HAZNET: record(s) in the EDR Site Report.

A3
WNW
< 1/8
0.021 mi.
109 ft.

CHEVRON #8270
668 LARKFIELD CNTR
SANTA ROSA, CA 95401

Site 2 of 3 in cluster A

SWEEPS UST **S106924299**
N/A

Relative:
Higher

Actual:
167 ft.

SWEEPS UST:

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	1
Swrcb Tank Id:	49-000-001964-000001
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	4

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	2
Swrcb Tank Id:	49-000-001964-000002
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PLUS UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	3
Swrcb Tank Id:	49-000-001964-000003
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PRM UNLEADED
Number Of Tanks:	Not reported

Status:	A

CHEVRON #8270 (Continued) **S106924299**

Comp Number:	1964
Number:	1
Board Of Equalization:	44-031913
Ref Date:	12-30-92
Act Date:	06-07-93
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	4
Swrcb Tank Id:	49-000-001964-000004
Actv Date:	12-30-92
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	DIESEL
Number Of Tanks:	Not reported

A4 **98270** **HIST UST** **U001609148**
WNW **668 LARKFIELD CTR** **N/A**
< 1/8 **SANTA ROSA, CA 95401**
0.021 mi.
109 ft. **Site 3 of 3 in cluster A**

Relative:
Higher

Actual:
167 ft.

HIST UST:

Region:	STATE
Facility ID:	00000063091
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0004
Contact Name:	MERTLE, THOMAS O.
Telephone:	7075427101
Owner Name:	CHEVRON U.S.A. INC.
Owner Address:	575 MARKET
Owner City,St,Zip:	SAN FRANCISCO, CA 94105

Tank Num:	001
Container Num:	1
Year Installed:	Not reported
Tank Capacity:	00001000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor

Tank Num:	002
Container Num:	2
Year Installed:	Not reported
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	Not reported
Tank Construction:	0000370 unknown
Leak Detection:	Stock Inventor

Tank Num:	003
Container Num:	3
Year Installed:	Not reported
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	Not reported

98270 (Continued) **U001609148**

Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

Tank Num: 004
Container Num: 4
Year Installed: Not reported
Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 0000370 unknown
Leak Detection: Stock Inventor

B5	**LARKFIELD BODY AND PAINT**	**RCRA-SQG**	**1000270155**
WNW	**15 LARK CENTER DR**	**FINDS**	**CAD982008336**
< 1/8	**SANTA ROSA, CA 95403**		
0.076 mi.			
403 ft.	**Site 1 of 2 in cluster B**		

Relative:
Lower

Actual:
163 ft.

RCRA-SQG:

Date form received by agency:	04/02/1996
Facility name:	LARKFIELD BODY AND PAINT
Facility address:	15 LARK CENTER DR SANTA ROSA, CA 95403
EPA ID:	CAD982008336
Contact:	NEAL BLAINE
Contact address:	15 LARK CENTER DR SANTA ROSA, CA 95403
Contact country:	US
Contact telephone:	(707) 546-5717
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	NOT REQUIRED
Owner/operator address:	NOT REQUIRED NOT REQUIRED, ME 99999
Owner/operator country:	Not reported
Owner/operator telephone:	(415) 555-1212
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported
Owner/operator name:	DAVID HARTMAN
Owner/operator address:	15 LARK CENTER DR SANTA ROSA, CA 95403
Owner/operator country:	Not reported
Owner/operator telephone:	(707) 546-5717
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported

LARKFIELD BODY AND PAINT (Continued) **1000270155**

Owner/Op end date: Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	Unknown
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	Unknown
Furnace exemption:	Unknown
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Violation Status: No violations found

FINDS:

Other Pertinent Environmental Activity Identified at Site

California - Hazardous Waste Tracking System - Datamart

The NEI (National Emissions Inventory) database contains information on stationary and mobile sources that emit criteria air pollutants and their precursors, as well as hazardous air pollutants (HAPs).

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

B6
WNW
< 1/8
0.096 mi.
506 ft.

BP, LARKFIELD / REDWOOD OIL
REDWOOD HIGHWAY, OLD 4856
SANTA ROSA, CA

LUST **S101304962**
Cortese **N/A**

Site 2 of 2 in cluster B

Relative:
Lower

Actual:
163 ft.

LUST REG 1:

Region:	1
Facility ID:	1TSO344
Staff Initials:	HAZ

Cortese:

Region:	CORTESE
Facility Addr2:	Not reported

7 **WSW** **1/8-1/4** **0.144 mi.** **762 ft.**	**RINCON VALLEY FIRE ST 2** **45-LARK CENTER DRIVE** **SANTA ROSA, CA 95401**	**HIST UST**	**U001609282** **N/A**

Relative: **Lower**

Actual: **161 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000023741
Facility Type:	Other
Other Type:	FIRE DEPT.
Total Tanks:	0001
Contact Name:	CHIEF CARL-HARRISON
Telephone:	7075391801
Owner Name:	RINCON VALLEY FIRE DISTRICT
Owner Address:	91-MIDDLE RINCON ROAD
Owner City,St,Zip:	SANTA ROSA, CA 95405
Tank Num:	001
Container Num:	002
Year Installed:	1970
Tank Capacity:	00000550
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	None

C8 **SSE** **1/8-1/4** **0.149 mi.** **789 ft.**	**UNION OIL SS# 5142** **4605 OLD REDWOOD HWY** **SANTA ROSA, CA 95401** **Site 1 of 7 in cluster C**	**HIST UST**	**U001609326** **N/A**

Relative: **Higher**

Actual: **165 ft.**

HIST UST:

Region:	STATE
Facility ID:	00000057100
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0001
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST., SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111
Tank Num:	001
Container Num:	5142-10-1
Year Installed:	Not reported
Tank Capacity:	00000000
Tank Used for:	WASTE
Type of Fuel:	Not reported
Tank Construction:	6 inches
Leak Detection:	Visual

C9 **SSE** **1/8-1/4** **0.149 mi.** **789 ft.**

UNION 76 #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 2 of 7 in cluster C

LUST **S105124635** **N/A**

Relative: Higher

Actual: 165 ft.

LUST:

Region:	STATE
Global Id:	T0609700129
Latitude:	38.497296735
Longitude:	-122.748862148
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2003-05-06 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO165
LOC Case Number:	00001461
File Location:	Local Agency
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO165
Closed or Referred:	Y
Date:	5/6/2003
LOP Number:	00001461
Funding Fed / State:	Federal
Staff:	Not reported
Global ID:	T0609700129

C10 **SSE** **1/8-1/4** **0.149 mi.** **789 ft.**

UNION OIL SS #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 3 of 7 in cluster C

CA FID UST **SWEEPS UST** **S101627228** **N/A**

Relative: Higher

Actual: 165 ft.

CA FID UST:

Facility ID:	49003529
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	2175 N CALIF BLVD
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

UNION OIL SS #5142 (Continued) **S101627228**

Facility ID:	49000740
Regulated By:	UTNKA
Regulated ID:	00033679
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075454254
Mail To:	Not reported
Mailing Address:	4605 OLD REDWOOD HWY
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-1-1
Swrcb Tank Id:	49-000-033679-000001
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	3

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051
Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-2-1
Swrcb Tank Id:	49-000-033679-000002
Actv Date:	07-01-85
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	33679
Number:	9
Board Of Equalization:	44-000051

UNION OIL SS #5142 (Continued) **S101627228**

Ref Date:	07-01-85
Act Date:	Not reported
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	5142-4-1
Swrcb Tank Id:	49-000-033679-000003
Actv Date:	07-01-85
Capacity:	280
Tank Use:	OIL
Stg:	W
Content:	WASTE OIL
Number Of Tanks:	Not reported

C11
SSE
1/8-1/4
0.149 mi.
789 ft.

UNION OIL SS #5142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 4 of 7 in cluster C

CHMIRS **U001609325**
HIST UST **N/A**

Relative:
Higher

Actual:
165 ft.

CHMIRS:

OES Incident Number:	01-5581
OES notification:	10/2/200105:12:39 PM
OES Date:	Not reported
OES Time:	Not reported
Incident Date:	Not reported
Date Completed:	**Not reported**
Property Use:	Not reported
Agency Id Number:	Not reported
Agency Incident Number:	Not reported
Time Notified:	Not reported
Time Completed:	Not reported
Surrounding Area:	Not reported
Estimated Temperature:	Not reported
Property Management:	Not reported
Special Studies 1:	Not reported
Special Studies 2:	Not reported
Special Studies 3:	Not reported
Special Studies 4:	Not reported
Special Studies 5:	Not reported
Special Studies 6:	Not reported
More Than Two Substances Involved?:	Not reported
Resp Agncy Personel # Of Decontaminated:	Not reported
Responding Agency Personel # Of Injuries:	Not reported
Responding Agency Personel # Of Fatalities:	Not reported
Others Number Of Decontaminated:	Not reported
Others Number Of Injuries:	Not reported
Others Number Of Fatalities:	Not reported
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA/DOT/PUC/ICC Number:	Not reported
Company Name:	Not reported
Reporting Officer Name/ID:	Not reported
Report Date:	Not reported
Comments:	Not reported
Facility Telephone:	Not reported
Waterway Involved:	No

UNION OIL SS #5142 (Continued) **U001609325**

Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	Responsible Party
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	2001
Agency:	TOSCO Marketing
Incident Date:	10/2/200112:00:00 AM
Admin Agency:	Santa Rosa Fire Department
Amount:	Not reported
Contained:	Yes
Site Type:	Refinery
E Date:	Not reported
Substance:	Gasoline
Quantity Released:	Not reported
BBLS:	0
Cups:	0
CUFT:	0
Gallons:	5
Grams:	0
Pounds:	0
Liters:	0
Ounces:	0
Pints:	0
Quarts:	0
Sheen:	0
Tons:	0
Unknown:	0.000000
Description:	Not reported
Evacuations:	0
Number of Injuries:	0
Number of Fatalities:	0
Description:	A fuel tanker truck was dispensing material and a hose connection failed.

HIST UST:

Region:	STATE
Facility ID:	00000033679
Facility Type:	Gas Station
Other Type:	Not reported
Total Tanks:	0003
Contact Name:	ROD W. FERGUSON
Telephone:	7075454254
Owner Name:	UNION OIL CO.
Owner Address:	1 CALIFORNIA ST. SUITE 2700
Owner City,St,Zip:	SAN FRANCISCO, CA 94111

Tank Num:	001
Container Num:	5142-1-1
Year Installed:	1965
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported

UNION OIL SS #5142 (Continued) **U001609325**

Leak Detection: Stock Inventor

Tank Num: 002
Container Num: 5142-2-1
Year Installed: 1965
Tank Capacity: 00010000
Tank Used for: PRODUCT
Type of Fuel: PREMIUM
Tank Construction: Not reported
Leak Detection: Stock Inventor

Tank Num: 003
Container Num: 5142-4-1
Year Installed: Not reported
Tank Capacity: 00000280
Tank Used for: WASTE
Type of Fuel: WASTE OIL
Tank Construction: Not reported
Leak Detection: Stock Inventor

C12
SSE
1/8-1/4
0.149 mi.
789 ft.

LARKFIELD UNION 76 #255142
4605 OLD REDWOOD HWY
SANTA ROSA, CA 95403

Site 5 of 7 in cluster C

UST **U003981902** **N/A**

Relative: **Higher**

Actual: **165 ft.**

UST:
Global ID: 11133
Latitude: 38.49773
Longitude: -122.7486
Case Type: PERMITTED UNDERGROUND STORAGE TANK (UST)

13
WNW
1/8-1/4
0.154 mi.
811 ft.

CHEVRON #9-8270
REDWOOD HIGHWAY, OLD 4840
SANTA ROSA, CA

LUST **S101309833** **N/A**

Relative: **Lower**

Actual: **163 ft.**

LUST REG 1:
Region: 1
Facility ID: 1TSO101
Staff Initials: HAZ

C14
SSE
1/8-1/4
0.172 mi.
909 ft.

TEXACO
4601 OLD REDWOOD HWY
SANTA ROSA, CA 95401

Site 6 of 7 in cluster C

LUST **S101595370** **N/A**
CA FID UST
SWEEPS UST

Relative: **Lower**

Actual: **164 ft.**

LUST:
Region: STATE
Global Id: T0609700047
Latitude: 38.496737871
Longitude: -122.748286288
Case Type: LUST Cleanup Site

TEXACO (Continued) **S101595370**

Status: Completed - Case Closed
Status Date: 2007-05-24 00:00:00
Lead Agency: SONOMA COUNTY LOP
Case Worker: Not reported
Local Agency: SONOMA COUNTY LOP
RB Case Number: 1TSO072
LOC Case Number: 00001435
File Location: Local Agency Warehouse
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO072
Closed or Referred: Y
Date: 5/24/2007
LOP Number: 00001435
Funding Fed / State: Federal
Staff: Not reported
Global ID: T0609700047

CA FID UST:
Facility ID: 49001037
Regulated By: UTNKI
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075789866
Mail To: Not reported
Mailing Address: P O BOX
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95403
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Inactive

Facility ID: 49001037
Regulated By: UTNKA
Regulated ID: 00016174
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075789866
Mail To: Not reported
Mailing Address: 4601 OLD REDWOOD HWY
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95401
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported

TEXACO (Continued) **S101595370**

Comments: Not reported
Status: Active

SWEEPS UST:

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000001
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: 5

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000002
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000003
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435

TEXACO (Continued) **S101595370**

Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000004
Actv Date: Not reported
Capacity: 6000
Tank Use: M.V. FUEL
Stg: PRODUCT
Content: LEADED
Number Of Tanks: Not reported

Status: Not reported
Comp Number: 1435
Number: Not reported
Board Of Equalization: 44-000217
Ref Date: Not reported
Act Date: Not reported
Created Date: Not reported
Tank Status: Not reported
Owner Tank Id: Not reported
Swrcb Tank Id: 49-000-001435-000005
Actv Date: Not reported
Capacity: 550
Tank Use: OIL
Stg: WASTE
Content: WASTE OIL
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #1
Swrcb Tank Id: 49-060-016174-000001
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: 4

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A

TEXACO (Continued) **S101595370**

Owner Tank Id: #2
Swrcb Tank Id: 49-060-016174-000002
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #3
Swrcb Tank Id: 49-060-016174-000003
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 16174
Number: 9
Board Of Equalization: 44-000217
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: #4
Swrcb Tank Id: 49-060-016174-000004
Actv Date: 07-01-85
Capacity: 6000
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

C15 **TEXACO** **HIST UST** **U001609317**
SSE **4601 OLD REDWOOD HWY** **N/A**
1/8-1/4 **SANTA ROSA, CA 95401**
0.172 mi.
909 ft. **Site 7 of 7 in cluster C**

Relative:
Lower

Actual:
164 ft.

HIST UST:
Region: STATE
Facility ID: 00000016174
Facility Type: Gas Station
Other Type: Not reported
Total Tanks: 0004
Contact Name: HASSAN KAZEMINI
Telephone: 7075789866
Owner Name: TEXACO U.S.A.

TEXACO (Continued) **U001609317**

Owner Address:	3350 WILSHIRE BLVD.
Owner City,St,Zip:	LOS ANGELES, CA 90010

Tank Num:	001
Container Num:	#1
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	PREMIUM
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	002
Container Num:	#2
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	003
Container Num:	#3
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported
Leak Detection:	Stock Inventor, Sensor Instrument

Tank Num:	004
Container Num:	#4
Year Installed:	1964
Tank Capacity:	00006000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

D16 **LARKFIELD CHEVRON** **UST** **U003659382**
WNW **4840 OLD REDWOOD HWY** **N/A**
1/8-1/4 **SANTA ROSA, CA 95403**
0.177 mi.
933 ft. **Site 1 of 3 in cluster D**

Relative:
Lower

Actual:
163 ft.

UST:

Global ID:	11188
Latitude:	38.50171
Longitude:	-122.75307
Case Type:	PERMITTED UNDERGROUND STORAGE TANK (UST)

D17
WNW
1/8-1/4
0.177 mi.
933 ft.

LARKFIELD CHEVRON #9-8270
4840 OLD REDWOOD HWY
SANTA ROSA, CA 95403

Site 2 of 3 in cluster D

LUST **S103817497**
N/A

Relative:
Lower

Actual:
163 ft.

LUST:

Region:	STATE
Global Id:	T0609700074
Latitude:	38.501765333
Longitude:	-122.752551367
Case Type:	LUST Cleanup Site
Status:	Completed - Case Closed
Status Date:	2007-10-29 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP
RB Case Number:	1TSO101
LOC Case Number:	00001964
File Location:	Local Agency Warehouse
Potential Media Affect:	Aquifer used for drinking water supply
Potential Contaminats of Concern:	Gasoline, Diesel
Site History:	Not reported

LUST:

Region:	SONOMA
Regional Board:	1TSO101
Closed or Referred:	Y
Date:	10/29/2007
LOP Number:	00001964
Funding Fed / State:	State
Staff:	Not reported
Global ID:	T0609700074

D18
WNW
1/8-1/4
0.179 mi.
946 ft.

LARKFIELD BP
4856 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 93582

Site 3 of 3 in cluster D

Notify 65 **S100179481**
LUST **N/A**

Relative:
Lower

Actual:
162 ft.

Notify 65:

Date Reported:	Not reported
Staff Initials:	Not reported
Board File Number:	Not reported
Facility Type:	Not reported
Discharge Date:	Not reported
Incident Description:	93582

LUST:

Region:	STATE
Global Id:	T0609700252
Latitude:	38.501947928
Longitude:	-122.753080642
Case Type:	LUST Cleanup Site
Status:	Open - Remediation
Status Date:	1992-09-30 00:00:00
Lead Agency:	SONOMA COUNTY LOP
Case Worker:	Not reported
Local Agency:	SONOMA COUNTY LOP

LARKFIELD BP (Continued) **S100179481**

RB Case Number: 1TSO344
LOC Case Number: 00002395
File Location: Local Agency
Potential Media Affect: Aquifer used for drinking water supply
Potential Contaminats of Concern: Gasoline
Site History: Not reported

LUST:
Region: SONOMA
Regional Board: 1TSO344
Closed or Referred: Not reported
Date: Not reported
LOP Number: 00002395
Funding Fed / State: State
Staff: CI
Global ID: T0609700252

E19 **LARKFIELD B P** **CA FID UST** **S101595421**
WNW **4856 OLD REDWOOD HWY** **SWEEPS UST** **N/A**
1/8-1/4 **SANTA ROSA, CA 95403**
0.220 mi.
1163 ft. **Site 1 of 2 in cluster E**

Relative:
Lower

Actual:
161 ft.

CA FID UST:
Facility ID: 49003110
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7075751625
Mail To: Not reported
Mailing Address: 455 YOLANDA
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95403
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-000-002395-000001
Actv Date: 09-06-91
Capacity: 5000
Tank Use: M.V. FUEL
Stg: P

LARKFIELD B P (Continued) **S101595421**

Content: DIESEL
Number Of Tanks: 5

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 1
Swrcb Tank Id: 49-000-002395-000002
Actv Date: 09-06-91
Capacity: 8000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 3
Swrcb Tank Id: 49-000-002395-000003
Actv Date: 09-06-91
Capacity: 7500
Tank Use: M.V. FUEL
Stg: P
Content: LEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3
Board Of Equalization: 44-027727
Ref Date: 09-06-91
Act Date: 09-06-91
Created Date: 03-31-89
Tank Status: A
Owner Tank Id: 2
Swrcb Tank Id: 49-000-002395-000004
Actv Date: 09-06-91
Capacity: 5000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: Not reported

Status: A
Comp Number: 2395
Number: 3

LARKFIELD B P (Continued) **S101595421**

Board Of Equalization:	44-027727
Ref Date:	09-06-91
Act Date:	09-06-91
Created Date:	03-31-89
Tank Status:	A
Owner Tank Id:	5
Swrcb Tank Id:	49-000-002395-000005
Actv Date:	09-06-91
Capacity:	500
Tank Use:	OIL
Stg:	W
Content:	WASTE OIL
Number Of Tanks:	Not reported

E20
WNW
1/8-1/4
0.220 mi.
1163 ft.

LARKFIELD BP STATION
4856 OLD REDWOOD HWY
SANTA ROSA, CA 95403

UST **U004050088**
N/A

Site 2 of 2 in cluster E

Relative:
Lower

Actual:
161 ft.

UST:

Global ID:	11234
Latitude:	38.50194
Longitude:	-122.75365
Case Type:	PERMITTED UNDERGROUND STORAGE TANK (UST)

21
WSW
1/8-1/4
0.231 mi.
1221 ft.

CHEVRON U.S.A. INC.
668 LARKFIELD CENTER
SANTA ROSA, CA 95401

CA FID UST **S101595415**
SWEEPS UST **N/A**

Relative:
Lower

Actual:
158 ft.

CA FID UST:

Facility ID:	49002401
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	7075427101
Mail To:	Not reported
Mailing Address:	2 ANNABEL LN
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SANTA ROSA 95401
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

Facility ID:	49002401
Regulated By:	UTNKA
Regulated ID:	00063091
Cortese Code:	Not reported
SIC Code:	Not reported

CHEVRON U.S.A. INC. (Continued) **S101595415**

Facility Phone: 7075427101
Mail To: Not reported
Mailing Address: 668 LARKFIELD CENTER
Mailing Address 2: Not reported
Mailing City,St,Zip: SANTA ROSA 95401
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 1
Swrcb Tank Id: 49-060-063091-000001
Actv Date: 07-01-85
Capacity: 1000
Tank Use: UNKNOWN
Stg: W
Content: Not reported
Number Of Tanks: 4

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 2
Swrcb Tank Id: 49-060-063091-000002
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 3

CHEVRON U.S.A. INC. (Continued) **S101595415**

Swrcb Tank Id: 49-060-063091-000003
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

Status: A
Comp Number: 63091
Number: 9
Board Of Equalization: 44-028376
Ref Date: 07-01-85
Act Date: Not reported
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 4
Swrcb Tank Id: 49-060-063091-000004
Actv Date: 07-01-85
Capacity: 10000
Tank Use: UNKNOWN
Stg: P
Content: Not reported
Number Of Tanks: Not reported

F22 **TEXACO (REDWOOD HIGHWAY, 4601)** **LUST** **S101304960**
SSW **REDWOOD HIGHWAY, OLD 4601** **Cortese** **N/A**
1/4-1/2 **SANTA ROSA, CA**
0.279 mi.
1471 ft. **Site 1 of 2 in cluster F**

Relative: Lower

Actual: 159 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO072
Staff Initials: HAZ

Cortese:
Region: CORTESE
Facility Addr2: Not reported

F23 **UNOCAL #5142** **LUST** **S101304961**
SSW **REDWOOD HIGHWAY, OLD 4605** **Cortese** **N/A**
1/4-1/2 **SANTA ROSA, CA**
0.279 mi.
1471 ft. **Site 2 of 2 in cluster F**

Relative: Lower

Actual: 159 ft.

LUST REG 1:
Region: 1
Facility ID: 1TSO165
Staff Initials: Closed

Cortese:
Region: CORTESE
Facility Addr2: 4605 REDWOOD HIGHWAY, OLD

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number
24 **West** **1/4-1/2** **0.318 mi.** **1677 ft.**	**DAVIS, MAY L.** **105 ETON** **SANTA ROSA, CA 95403**	**Cortese**	**S105026497** **N/A**

Relative: **Lower**

Actual: **156 ft.**

Cortese:

Region:	CORTESE
Facility Addr2:	Not reported

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
SANTA ROSA	1009398328	SONOMA 101 HIGHWAY WIDENING	ROUTE 101	95403	RCRA-LQG
SANTA ROSA	S106235093	LOS GUILICOS	HWY 12 / PYTHIAN RD		SLIC
SANTA ROSA	S104857240	MISSION ARBORS	MISSION BLVD AT HIGHWAY 12 100		LUST
SANTA ROSA	S104857236	AUTO EXCHANGE	OLD REDWOOD HIGHWAY 5352		LUST
SANTA ROSA	S104163195	STEVENSON EQUIPMENT	REDWOOD HIGHWAY, OLD 3975		LUST
SANTA ROSA	S104163196	YOLO, DANIEL	REDWOOD HIGHWAY, OLD 5807		LUST, Cortese
SANTA ROSA	S102429807	FAST & EASY MART	REDWOOD HIGHWAY, OLD 5321		LUST
SANTA ROSA	S105051166	REED, LILLIE	5716 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S105051009	UNITY CHURCH	4351 REDWOOD HIGHWAY, OLD	95403	SLIC
SANTA ROSA	S103393013	SCDPW LARKFIELD SEWER	REDWOOD HIGHWAY, OLD	95403	SLIC
LARKFIELD	S106922411	ADAMS, DOUG	5800 WIKKIUP BRIDGWAY	95403	SWEEPS UST
SANTA ROSA	U004050419	FACILITY 49-000-005986	2235 AIRPORT BLVD	95403	UST
SANTA ROSA	U004050405	FACILITY 49-000-005921	2240 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050345	FACILITY 49-000-005510	2240 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050215	FACILITY 49-000-002759	2254 AIRPORT RD	95403	UST
SANTA ROSA	U004050124	FACILITY 49-000-000371	2200 AIRPORT BLVD, STE SCA-ARM	95403	UST
SANTA ROSA	U004050057	FACILITY 49-000-000215	2240 AIRPORT	95403	UST
SANTA ROSA	U004050042	APEX AVIATION (DRAGONFLY)	2222 AIRPORT BLVD.	95403	UST
SANTA ROSA	U004050041	SCDPW SANTA ROSA RD MAINTENANCE YA	2175 AIRPORT BLVD	95403	UST
SANTA ROSA	U004049997	FACILITY 49-000-000092	2235 AIRPORT BLVD	95403	UST

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/29/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 09/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

Federal CERCLIS list

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/07/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 53

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/11/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Transporters, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

Federal institutional controls / engineering controls registries

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 10/06/2008	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/17/2008	Telephone: 703-603-0695
Date Made Active in Reports: 12/08/2008	Last EDR Contact: 12/29/2008
Number of Days to Update: 52	Next Scheduled EDR Contact: 03/30/2009
	Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2007	Source: National Response Center, United States Coast Guard
Date Data Arrived at EDR: 01/23/2008	Telephone: 202-267-2180
Date Made Active in Reports: 03/17/2008	Last EDR Contact: 01/23/2009
Number of Days to Update: 54	Next Scheduled EDR Contact: 04/19/2009
	Data Release Frequency: Annually

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 08/25/2008	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 08/27/2008	Telephone: 916-323-3400
Date Made Active in Reports: 09/03/2008	Last EDR Contact: 11/26/2008
Number of Days to Update: 7	Next Scheduled EDR Contact: 02/23/2009
	Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 08/25/2008	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 08/27/2008	Telephone: 916-323-3400
Date Made Active in Reports: 09/03/2008	Last EDR Contact: 11/26/2008
Number of Days to Update: 7	Next Scheduled EDR Contact: 02/23/2009
	Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/09/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 9

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 11/04/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/04/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 12/23/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/04/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 22

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Annually

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 10/10/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/18/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008	Source: EPA Region 1
Date Data Arrived at EDR: 03/14/2008	Telephone: 617-918-1313
Date Made Active in Reports: 03/20/2008	Last EDR Contact: 11/17/2008
Number of Days to Update: 6	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 06/06/2008	Source: EPA Region 4
Date Data Arrived at EDR: 10/09/2008	Telephone: 404-562-8677
Date Made Active in Reports: 11/19/2008	Last EDR Contact: 11/17/2008
Number of Days to Update: 41	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Semi-Annually

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 11/25/2008	Source: EPA Region 6
Date Data Arrived at EDR: 11/26/2008	Telephone: 214-665-6597
Date Made Active in Reports: 12/23/2008	Last EDR Contact: 11/17/2008
Number of Days to Update: 27	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/01/2008	Source: EPA Region 7
Date Data Arrived at EDR: 12/03/2008	Telephone: 913-551-7003
Date Made Active in Reports: 12/23/2008	Last EDR Contact: 11/19/2008
Number of Days to Update: 20	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 12/02/2008	Source: EPA Region 8
Date Data Arrived at EDR: 12/04/2008	Telephone: 303-312-6271
Date Made Active in Reports: 12/23/2008	Last EDR Contact: 11/17/2008
Number of Days to Update: 19	Next Scheduled EDR Contact: 02/16/2009
	Data Release Frequency: Quarterly

State and tribal registered storage tank lists

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 11/04/2008	Source: SWRCB
Date Data Arrived at EDR: 11/04/2008	Telephone: 916-480-1028
Date Made Active in Reports: 12/05/2008	Last EDR Contact: 01/08/2009
Number of Days to Update: 31	Next Scheduled EDR Contact: 04/06/2009
	Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 11/01/2007	Source: State Water Resources Control Board
Date Data Arrived at EDR: 11/27/2007	Telephone: 916-341-5712
Date Made Active in Reports: 02/14/2008	Last EDR Contact: 10/27/2008
Number of Days to Update: 79	Next Scheduled EDR Contact: 01/26/2009
	Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 03/12/2008
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 03/20/2008
Number of Days to Update: 6

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/06/2008
Date Data Arrived at EDR: 10/09/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 41

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/25/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 27

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 06/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 11/19/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/01/2008
Date Data Arrived at EDR: 12/04/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 19

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/18/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 34

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/05/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 27

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Quarterly

State and tribal voluntary cleanup sites

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 04/02/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC’s costs.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 11/14/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 03/25/2008
Date Data Arrived at EDR: 04/17/2008
Date Made Active in Reports: 05/15/2008
Number of Days to Update: 28

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/08/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 49

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 09/22/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 7

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 10/31/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 08/25/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 11/04/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: No Update Planned

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 10

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 08/19/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 11

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 11/06/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/03/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Varies

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 09/30/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 13

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/30/2009
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 34

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/13/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Annually

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 05/09/2008
Date Made Active in Reports: 06/20/2008
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 11/04/2008
Date Data Arrived at EDR: 11/07/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 19

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

Other Ascertainable Records

RCRA-NonGen: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/10/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Varies

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 05/14/2008
Date Data Arrived at EDR: 05/28/2008
Date Made Active in Reports: 08/08/2008
Number of Days to Update: 72

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/05/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 18

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/15/2008
Date Data Arrived at EDR: 10/22/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 62

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 10/21/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 55

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Varies

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/07/2008
Date Data Arrived at EDR: 09/23/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 23

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 12/23/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 09/19/2008
Next Scheduled EDR Contact: 12/15/2008
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 10/08/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 52

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 03/14/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 12/04/2008
Next Scheduled EDR Contact: 01/12/2009
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 08/13/2008
Date Made Active in Reports: 09/09/2008
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 12/04/2007
Date Data Arrived at EDR: 02/07/2008
Date Made Active in Reports: 03/17/2008
Number of Days to Update: 39

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 09/18/2008
Next Scheduled EDR Contact: 11/03/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/03/2008
Date Data Arrived at EDR: 10/15/2008
Date Made Active in Reports: 11/19/2008
Number of Days to Update: 35

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 12/08/2008
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/30/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 12/23/2008
Number of Days to Update: 53

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Biennially

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CA WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 05/29/2001
Date Made Active in Reports: 07/26/2001
Number of Days to Update: 58

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: No Update Planned

NOTIFY 65: Proposition 65 Records

Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 09/23/2008
Date Data Arrived at EDR: 09/24/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 5

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 10/31/2008
Date Data Arrived at EDR: 11/03/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 23

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 01/23/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/04/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 34

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2008
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/16/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 41

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 01/16/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 09/10/2008
Date Made Active in Reports: 09/23/2008
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Varies

PWS: Public Water System Data

This Safe Drinking Water Information System (SDWIS) file contains public water systems name and address, population served and the primary source of water

Date of Government Version: 02/24/2000
Date Data Arrived at EDR: 04/27/2005
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA
Telephone: N/A
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: N/A

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: N/A

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 09/30/2008
Date Made Active in Reports: 10/07/2008
Number of Days to Update: 7

Source: EPA
Telephone: 202-564-6064
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

EDR PROPRIETARY RECORDS

EDR Proprietary Records

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/30/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 27

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/28/2008
Date Data Arrived at EDR: 10/30/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 36

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 09/03/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 11/24/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Semi-Annually

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 09/30/2008
Date Data Arrived at EDR: 10/20/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 37

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/15/2009
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 09/15/2008
Date Data Arrived at EDR: 09/16/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 15

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 07/07/1999
Date Made Active in Reports: N/A
Number of Days to Update: 0

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: No Update Planned

HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 07/31/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 40

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 08/12/2008
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 12

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 11/13/2008
Next Scheduled EDR Contact: 02/09/2009
Data Release Frequency: Varies

City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/01/2008
Date Data Arrived at EDR: 03/20/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 25

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Varies

Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 02/14/2008
Date Data Arrived at EDR: 04/10/2008
Date Made Active in Reports: 05/06/2008
Number of Days to Update: 26

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 10

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 11/10/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 03/28/2003
Date Data Arrived at EDR: 10/23/2003
Date Made Active in Reports: 11/26/2003
Number of Days to Update: 34

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 08/26/2008
Date Data Arrived at EDR: 09/11/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 20

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 12/11/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Semi-Annually

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 08/04/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 17

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 10/27/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Semi-Annually

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 07/09/2008
Date Data Arrived at EDR: 07/09/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 22

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Semi-Annually

Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Annually

ORANGE COUNTY:

List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/16/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 13

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/17/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 12

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/25/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 6

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 07/23/2007
Date Data Arrived at EDR: 07/23/2007
Date Made Active in Reports: 08/09/2007
Number of Days to Update: 17

Source: Placer County Health and Human Services
Telephone: 530-889-7312
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/06/2008
Date Data Arrived at EDR: 11/17/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 9

Source: Department of Public Health
Telephone: 951-358-5055
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 11/12/2008
Date Data Arrived at EDR: 11/25/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 10

Source: Health Services Agency
Telephone: 951-358-5055
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Contaminated Sites

List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 08/08/2008
Date Data Arrived at EDR: 08/08/2008
Date Made Active in Reports: 09/03/2008
Number of Days to Update: 26

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

ML - Regulatory Compliance Master List

Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 09/08/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/29/2008
Next Scheduled EDR Contact: 01/26/2009
Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 07/16/2008
Date Data Arrived at EDR: 10/29/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 28

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 12/31/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 08/01/2007
Date Data Arrived at EDR: 02/05/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 9

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 12/02/2008
Next Scheduled EDR Contact: 11/17/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 08/07/2008
Date Data Arrived at EDR: 10/31/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 26

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 12/30/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 10/01/2008
Number of Days to Update: 12

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 08/26/2008
Date Data Arrived at EDR: 08/27/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 19

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 11/19/2008
Date Data Arrived at EDR: 11/19/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 7

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Annually

Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 10/06/2008
Date Data Arrived at EDR: 10/07/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 6

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 09/24/2008
Date Data Arrived at EDR: 09/25/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 4

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Varies

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 09/02/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 12/01/2008
Next Scheduled EDR Contact: 03/02/2009
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 10/06/2008
Date Made Active in Reports: 10/13/2008
Number of Days to Update: 7

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 09/22/2008
Date Data Arrived at EDR: 10/17/2008
Date Made Active in Reports: 12/05/2008
Number of Days to Update: 49

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/22/2008
Next Scheduled EDR Contact: 03/23/2009
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 10/20/2008
Date Data Arrived at EDR: 10/20/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 37

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 05/04/2007
Date Data Arrived at EDR: 05/04/2007
Date Made Active in Reports: 05/24/2007
Number of Days to Update: 20

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 12/29/2008
Next Scheduled EDR Contact: 03/30/2009
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 08/27/2008
Date Data Arrived at EDR: 10/14/2008
Date Made Active in Reports: 11/26/2008
Number of Days to Update: 43

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/10/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2008
Date Data Arrived at EDR: 09/04/2008
Date Made Active in Reports: 09/18/2008
Number of Days to Update: 14

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/17/2008
Next Scheduled EDR Contact: 02/16/2009
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/09/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 10/01/2008
Date Data Arrived at EDR: 10/08/2008
Date Made Active in Reports: 10/16/2008
Number of Days to Update: 8

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/08/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 08/11/2008
Date Data Arrived at EDR: 08/29/2008
Date Made Active in Reports: 09/15/2008
Number of Days to Update: 17

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 01/12/2009
Next Scheduled EDR Contact: 04/13/2009
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 06/15/2007
Date Made Active in Reports: 08/20/2007
Number of Days to Update: 66

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 12/11/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 09/30/2007
Date Data Arrived at EDR: 12/04/2007
Date Made Active in Reports: 12/31/2007
Number of Days to Update: 27

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 11/07/2008
Next Scheduled EDR Contact: 02/02/2009
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 10/21/2008
Date Data Arrived at EDR: 11/26/2008
Date Made Active in Reports: 12/11/2008
Number of Days to Update: 15

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 11/26/2008
Next Scheduled EDR Contact: 02/23/2009
Data Release Frequency: Annually

PA MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 09/11/2008
Date Made Active in Reports: 10/02/2008
Number of Days to Update: 21

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 12/08/2008
Next Scheduled EDR Contact: 03/09/2009
Data Release Frequency: Annually

RI MANIFEST: Manifest information

Hazardous waste manifest information

Date of Government Version: 10/07/2008
Date Data Arrived at EDR: 10/10/2008
Date Made Active in Reports: 10/28/2008
Number of Days to Update: 18

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 12/15/2008
Next Scheduled EDR Contact: 03/16/2009
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2007
Date Data Arrived at EDR: 08/22/2008
Date Made Active in Reports: 09/08/2008
Number of Days to Update: 17

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 01/05/2009
Next Scheduled EDR Contact: 04/06/2009
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Electric Power Transmission Line Data
Source: PennWell Corporation
Telephone: (800) 823-6277
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association’s annual survey of hospitals.
Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.
Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on private school locations in the United States.
Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

Scanned Digital USGS 7.5’ Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

STREET AND ADDRESS INFORMATION

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

SMF ALTERNATE WELL SITE
4728 OLD REDWOOD HIGHWAY
SANTA ROSA, CA 95403

TARGET PROPERTY COORDINATES

Latitude (North):	38.50010 - 38˚ 30' 0.4''
Longitude (West):	122.7497 - 122˚ 44' 58.9''
Universal Tranverse Mercator:	Zone 10
UTM X (Meters):	521826.2
UTM Y (Meters):	4261127.5
Elevation:	165 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	38122-E6 MARK WEST SPRINGS, CA
Most Recent Revision:	1993
South Map:	38122-D6 SANTA ROSA, CA
Most Recent Revision:	1999
Southwest Map:	38122-D7 SEBASTOPOL, CA
Most Recent Revision:	1980
West Map:	38122-E7 HEALDSBURG, CA
Most Recent Revision:	1993

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

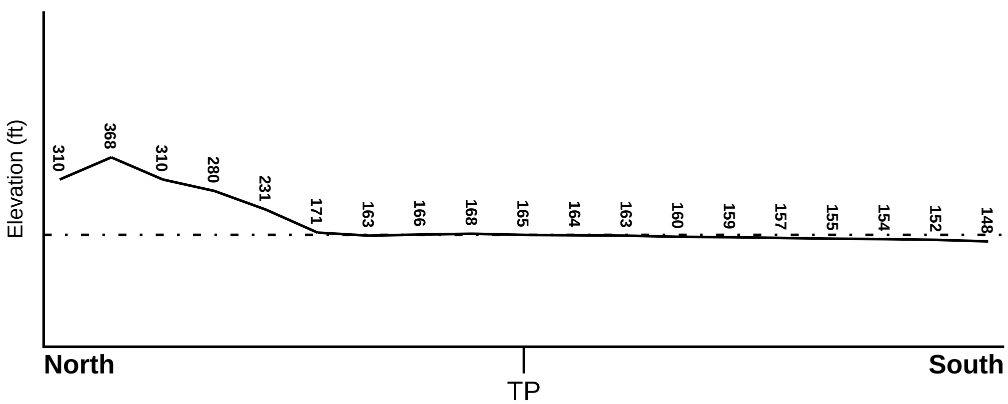
TOPOGRAPHIC INFORMATION

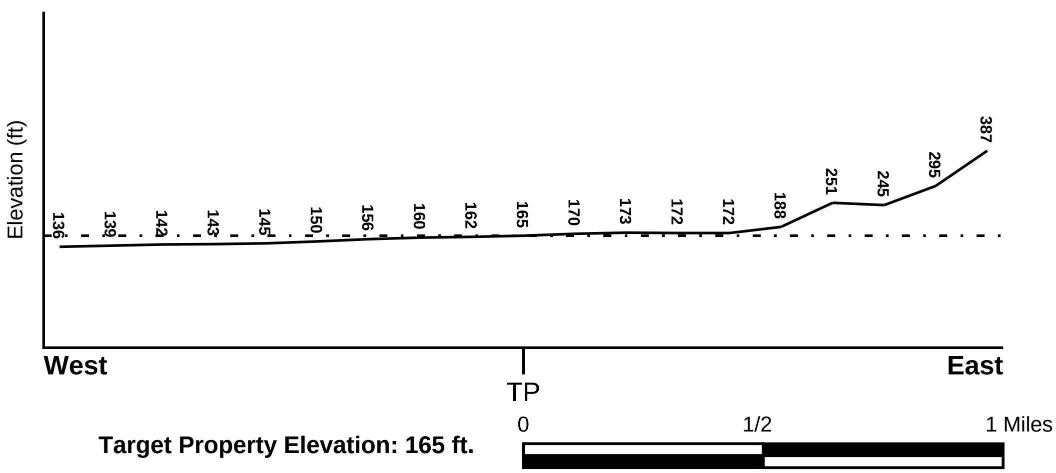
Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General WSW

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES





Target Property Elevation: 165 ft.

Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
SONOMA, CA	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 0603750565B

Additional Panels in search area: 0603750545B
0603750685B
0603750725B

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
MARK WEST SPRINGS	Not Available

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius: 1.25 miles
Status: Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
1	1/8 - 1/4 Mile WNW	SW
A2	1/8 - 1/4 Mile South	Varies
A3	1/8 - 1/4 Mile South	Not Reported
A4	1/8 - 1/4 Mile South	NNE
5	1/8 - 1/4 Mile WNW	Varies
A6	1/8 - 1/4 Mile SSE	NNE
23	1/2 - 1 Mile ENE	Not Reported

For additional site information, refer to Physical Setting Source Map Findings.

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

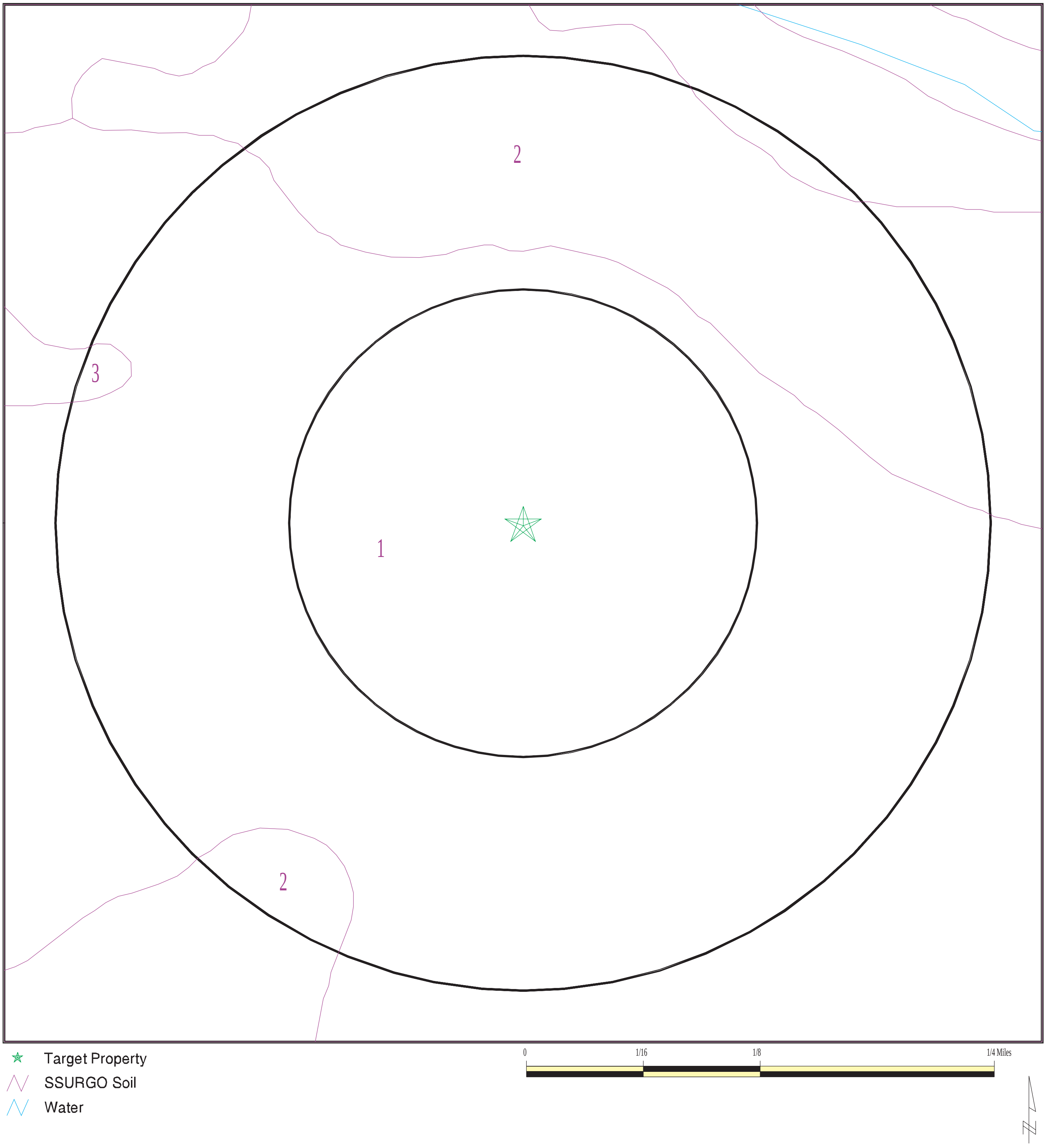
Era: Cenozoic
System: Quaternary
Series: Quaternary
Code: Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 02407239.2r



SITE NAME: SMF Alternate Well Site ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403 LAT/LONG: 38.5001 / 122.7497	CLIENT: Engeo Inc. CONTACT: Keith Nowell INQUIRY #: 02407239.2r DATE: January 23, 2009 7:19 pm

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: YOLO

Soil Surface Texture: silt loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Unknown

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	7 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 2

Soil Component Name: YOLO

Soil Surface Texture: clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

Soil Map ID: 3

Soil Component Name: ZAMORA

Soil Surface Texture: silty clay loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Moderate

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		Soil Reaction (pH)
1	0 inches	5 inches	silty clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
2	5 inches	29 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
3	29 inches	40 inches	clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
4	40 inches	55 inches	sandy clay loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6
5	55 inches	59 inches	gravelly clay	Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 7.3 Min: 6.6

Soil Map ID: 4

Soil Component Name: YOLO

Soil Surface Texture: loam

Hydrologic Group: Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

Soil Drainage Class: Well drained

Hydric Status: Not hydric

Corrosion Potential - Uncoated Steel: Low

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	7 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1
2	7 inches	59 inches	loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 14 Min: 4	Max: 8.4 Min: 6.1

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
7	USGS3236507	1/4 - 1/2 Mile North
B9	USGS3236471	1/4 - 1/2 Mile South
C11	USGS3236492	1/4 - 1/2 Mile West
C12	USGS3236493	1/4 - 1/2 Mile West
E17	USGS3236508	1/2 - 1 Mile NW

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

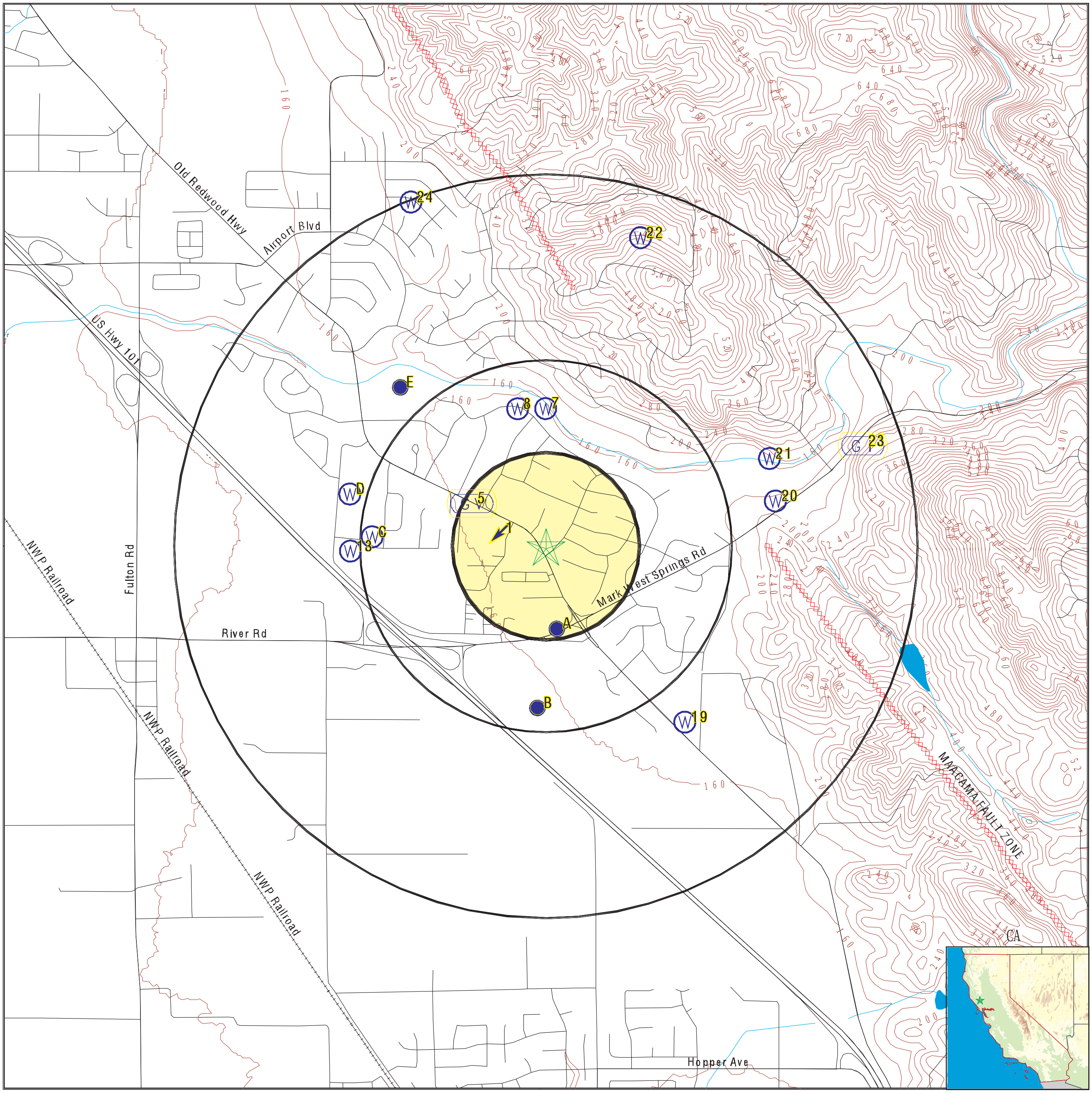
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
8	8400	1/4 - 1/2 Mile NNW
B10	8409	1/4 - 1/2 Mile South
13	20765	1/2 - 1 Mile West
D14	8407	1/2 - 1 Mile West
D15	8406	1/2 - 1 Mile WNW
D16	8401	1/2 - 1 Mile WNW
E18	8399	1/2 - 1 Mile NW
19	8408	1/2 - 1 Mile SE
20	8410	1/2 - 1 Mile East
21	20766	1/2 - 1 Mile ENE
22	7396	1/2 - 1 Mile NNE
24	8404	1/2 - 1 Mile NNW

PHYSICAL SETTING SOURCE MAP - 02407239.2r



0 1/4 1/2 1 Miles

- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- Indeterminate Groundwater Flow at Location
- Groundwater Flow Varies at Location
- Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME: SMF Alternate Well Site	CLIENT: Engeo Inc.
ADDRESS: 4728 Old Redwood Highway Santa Rosa CA 95403	CONTACT: Keith Nowell INQUIRY #: 02407239.2r
LAT/LONG: 38.5001 / 122.7497	DATE: January 23, 2009 7:19 pm

Map ID / Direction / Distance / Elevation			Database	EDR ID Number
1 **WNW** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported SW 11 14 Not Reported 04/26/1991	**AQUIFLOW**	**54548**
A2 **South** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Varies Not Reported Not Reported 10 06/18/1999	**AQUIFLOW**	**54544**
A3 **South** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Not Reported 8.75 9 Not Reported 04/30/1993	**AQUIFLOW**	**70934**
A4 **South** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported NNE Not Reported Not Reported Not Reported 11/24/1998	**AQUIFLOW**	**54266**
5 **WNW** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported Varies 8 11 Not Reported 06/05/1996	**AQUIFLOW**	**54550**
A6 **SSE** **1/8 - 1/4 Mile** **Lower**	Site ID: Groundwater Flow: Shallow Water Depth: Deep Water Depth: Average Water Depth: Date:	Not Reported NNE Not Reported Not Reported Not Reported 11/24/1998	**AQUIFLOW**	**54267**
7 **North** **1/4 - 1/2 Mile** **Lower**			**FED USGS**	**USGS3236507**

Agency cd:	USGS	Site no:	383020122445501
Site name:	008N008W28Q001M		
Latitude:	383020		
Longitude:	1224455	Dec lat:	38.50546595
Dec lon:	-122.74970994	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWSWSES 28T 08NR 08WM
Location map:	MARK WEST SPRINGS	Map scale:	24000
Altitude:	160		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	20		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19590319
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	332	Hole depth:	332
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

8
NNW
1/4 - 1/2 Mile
Higher

CA WELLS 8400

Water System Information:

Prime Station Code:	08N/08W-28Q01 M	User ID:	RXR
FRDS Number:	4910023001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383020.5 1224500.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Map ID Direction Distance Elevation	Database	EDR ID Number
B9 **South** **1/4 - 1/2 Mile** **Lower**	**FED USGS**	**USGS3236471**

Agency cd:	USGS	Site no:	382938122445401
Site name:	008N008W33K001M		
Latitude:	382938		
Longitude:	1224454	Dec lat:	38.49379952
Dec lon:	-122.74943211	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWSES 33T 08NR 08WM
Location map:	SANTA ROSA	Map scale:	24000
Altitude:	155		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19731023
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	400	Hole depth:	400
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00
Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	1973-10-01	Ground water data end date:	1973-10-01
Ground water data count:	1		

Ground-water levels, Number of Measurements: 1

Date	Feet below Surface	Feet to Sealevel
1973-10-01	15.00	

Map ID Direction Distance Elevation	Database	EDR ID Number
B10 **South** **1/4 - 1/2 Mile** **Lower**	**CA WELLS**	**8409**

Water System Information:

Prime Station Code:	08N/08W-33K01 M	User ID:	49C
FRDS Number:	4900685001	County:	Sonoma
District Number:	79	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382938.0 1224459.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		

System Number: 4900685
System Name: LUTHER BURBANK CENTER
Organization That Operates System:
Not Reported

Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		
Sample Collected:	08/10/2007 00:00:00	Findings:	320 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/10/2007 00:00:00	Findings:	6.4 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	08/10/2007 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/10/2007 00:00:00	Findings:	119 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	08/10/2007 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	08/10/2007 00:00:00	Findings:	190 UG/L
Chemical:	IRON		
Sample Collected:	08/10/2007 00:00:00	Findings:	91 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/10/2007 00:00:00	Findings:	230 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/10/2007 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

C11
West
1/4 - 1/2 Mile
Lower

FED USGS **USGS3236492**

Agency cd:	USGS	Site no:	383002122452501
Site name:	008N008W33D004M		
Latitude:	383002		
Longitude:	1224525	Dec lat:	38.5004661
Dec lon:	-122.75804356	Coor meth:	M
Coor accr:	T	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000

Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	Not Reported
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	360	Hole depth:	484
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

C12
West
1/4 - 1/2 Mile
Lower

FED USGS USGS3236493

Agency cd:	USGS	Site no:	383002122452701
Site name:	008N008W33D003M		
Latitude:	383002		
Longitude:	1224527	Dec lat:	38.5004661
Dec lon:	-122.75859914	Coor meth:	M
Coor accr:	S	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	SWNWNWS 33T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Valley flat		
Site type:	Ground-water other than Spring	Date construction:	19620601
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	380	Hole depth:	380
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	0	Daily flow data begin date:	0000-00-00
Daily flow data end date:	0000-00-00	Daily flow data count:	0
Peak flow data begin date:	0000-00-00	Peak flow data end date:	0000-00-00

Peak flow data count:	0	Water quality data begin date:	0000-00-00
Water quality data end date:	0000-00-00	Water quality data count:	0
Ground water data begin date:	0000-00-00	Ground water data end date:	0000-00-00
Ground water data count:	0		

Ground-water levels, Number of Measurements: 0

13
West
1/2 - 1 Mile
Lower

CA WELLS 20765

Water System Information:

Prime Station Code:	4910023-005	User ID:	RXR
FRDS Number:	4910023005	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383000.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 05		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	11/15/2007 00:00:00	Findings:	1360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2007 00:00:00	Findings:	2069 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	1829 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	1090 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	1805 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1609 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	1580 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	2093 UG/L
Chemical:	MANGANESE		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Sample Collected:	11/06/2006 00:00:00	Findings:	1370 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	15 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	26 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	310 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	114 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1020 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	1873 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	33 MG/L
Chemical:	CALCIUM		

Sample Collected:	05/08/2006 00:00:00	Findings:	- .28 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	1697 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	900 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	1184 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/07/2005 00:00:00	Findings:	1257 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	340 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	1086 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	05/03/2005 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	860 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	1596 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	1333 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	370 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	1306 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	470 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		

Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	200 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.29
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	4.7 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	25 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	16 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	34.5 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	82 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	159 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	112 UG/L
Chemical:	BORON		
Sample Collected:	07/20/2004 00:00:00	Findings:	560 UG/L
Chemical:	IRON		
Sample Collected:	07/20/2004 00:00:00	Findings:	1545 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	57 UG/L
Chemical:	ZINC		
Sample Collected:	07/08/2004 00:00:00	Findings:	620 UG/L
Chemical:	IRON		
Sample Collected:	07/08/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	1690 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		

Sample Collected:	05/04/2004 00:00:00	Findings:	570 UG/L
Chemical:	IRON		
Sample Collected:	05/04/2004 00:00:00	Findings:	1578 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/10/2004 00:00:00	Findings:	990 UG/L
Chemical:	IRON		
Sample Collected:	02/10/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/10/2004 00:00:00	Findings:	1814 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	942 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	.63 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/07/2003 00:00:00	Findings:	.61 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	864 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/27/2003 00:00:00	Findings:	4 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	.49 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	320 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/2003 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	130 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	22 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	240 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	- .4
Chemical:	LANGELIER INDEX @ 60 C		

Sample Collected: 02/25/2003 00:00:00 Findings: .2 NTU
Chemical: TURBIDITY, LABORATORY

Sample Collected: 02/25/2003 00:00:00 Findings: .6 PCI/L
Chemical: GROSS ALPHA COUNTING ERROR

Sample Collected: 02/25/2003 00:00:00 Findings: 19 MG/L
Chemical: CALCIUM

Sample Collected: 02/25/2003 00:00:00 Findings: 15 MG/L
Chemical: MAGNESIUM

Sample Collected: 02/25/2003 00:00:00 Findings: 16 MG/L
Chemical: SODIUM

Sample Collected: 02/25/2003 00:00:00 Findings: 7 MG/L
Chemical: POTASSIUM

Sample Collected: 02/25/2003 00:00:00 Findings: 15.4 MG/L
Chemical: CHLORIDE

Sample Collected: 02/25/2003 00:00:00 Findings: 89 MG/L
Chemical: SILICA

Sample Collected: 02/25/2003 00:00:00 Findings: 7 UG/L
Chemical: ARSENIC

Sample Collected: 02/25/2003 00:00:00 Findings: 102 UG/L
Chemical: BARIUM

Sample Collected: 02/25/2003 00:00:00 Findings: 156 UG/L
Chemical: BORON

Sample Collected: 02/25/2003 00:00:00 Findings: 1115 UG/L
Chemical: MANGANESE

Sample Collected: 02/25/2003 00:00:00 Findings: 2 UG/L
Chemical: MOLYDBENDUM

Sample Collected: 02/25/2003 00:00:00 Findings: .16 MG/L
Chemical: FLUORIDE (TREATMENT RELATED-DISTRIBUTION)

Sample Collected: 02/06/2003 00:00:00 Findings: 6.2 UG/L
Chemical: ARSENIC

Sample Collected: 12/17/2002 00:00:00 Findings: 118 UG/L
Chemical: BARIUM

Sample Collected: 12/17/2002 00:00:00 Findings: 2 UG/L
Chemical: MOLYDBENDUM

Sample Collected: 12/17/2002 00:00:00 Findings: 23 MG/L
Chemical: CALCIUM

Sample Collected: 12/17/2002 00:00:00 Findings: 19 MG/L
Chemical: MAGNESIUM

Sample Collected: 12/17/2002 00:00:00 Findings: 22 MG/L
Chemical: SODIUM

Sample Collected: 12/17/2002 00:00:00 Findings: 7 MG/L
Chemical: POTASSIUM

Sample Collected: 12/17/2002 00:00:00 Findings: 12.3 MG/L
Chemical: CHLORIDE

Sample Collected: 12/17/2002 00:00:00 Findings: .2 MG/L
Chemical: FLUORIDE (F) (NATURAL-SOURCE)

Sample Collected: 12/17/2002 00:00:00 Findings: 85 MG/L
Chemical: SILICA

Sample Collected: 12/17/2002 00:00:00 Findings: 5 UG/L
Chemical: ARSENIC

Sample Collected:	12/17/2002 00:00:00	Findings:	.16 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	15 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1589 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

D14
West
1/2 - 1 Mile
Lower

CA WELLS 8407

Water System Information:

Prime Station Code:	08N/08W-33D04 M	User ID:	RXR
FRDS Number:	4910023003	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383006.0 1224530.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 03		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

D15
WNW
1/2 - 1 Mile
Lower

CA WELLS 8406

Water System Information:

Prime Station Code:	08N/08W-33D01 M	User ID:	RXR
FRDS Number:	4901048001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Untreated
Source Lat/Long:	383009.0 1224529.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4901048		
System Name:	MARK WEST SCHOOL		
Organization That Operates System:			
	Not Reported		
Pop Served:	Unknown, Small System	Connections:	Unknown, Small System
Area Served:	Not Reported		

Map ID Direction Distance Elevation	Database	EDR ID Number
D16 **WNW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**8401**

Water System Information:

Prime Station Code:	08N/08W-28Q02 M	User ID:	RXR
FRDS Number:	4910023002	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383009.9 1224531.1	Precision:	100 Feet (one Second)
Source Name:	WELL 02		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Map ID Direction Distance Elevation	Database	EDR ID Number
E17 **NW** **1/2 - 1 Mile** **Lower**	**FED USGS**	**USGS3236508**

Agency cd:	USGS	Site no:	383023122452001
Site name:	008N008W28N001M		
Latitude:	383023		
Longitude:	1224520	Dec lat:	38.50629934
Dec lon:	-122.75665469	Coor meth:	M
Coor accr:	F	Latlong datum:	NAD27
Dec latlong datum:	NAD83	District:	06
State:	06	County:	097
Country:	US	Land net:	NESWSWS 28T 08NR 08WM
Location map:	HEALDSBURG	Map scale:	24000
Altitude:	150		
Altitude method:	Interpolated from topographic map		
Altitude accuracy:	10		
Altitude datum:	National Geodetic Vertical Datum of 1929		
Hydrologic:	Russian. California. Area = 1470 sq.mi.		
Topographic:	Stream channel		
Site type:	Ground-water other than Spring	Date construction:	19741120
Date inventoried:	Not Reported	Mean greenwich time offset:	PST
Local standard time flag:	Y		
Type of ground water site:	Single well, other than collector or Ranney type		
Aquifer Type:	Not Reported		
Aquifer:	Not Reported		
Well depth:	410	Hole depth:	462
Source of depth data:	Not Reported		
Project number:	CA-9-358M		
Real time data flag:	Not Reported	Daily flow data begin date:	Not Reported
Daily flow data end date:	Not Reported	Daily flow data count:	Not Reported
Peak flow data begin date:	Not Reported	Peak flow data end date:	Not Reported
Peak flow data count:	Not Reported	Water quality data begin date:	Not Reported
Water quality data end date:	Not Reported	Water quality data count:	Not Reported
Ground water data begin date:	Not Reported	Ground water data end date:	Not Reported
Ground water data count:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID Direction Distance Elevation	Database	EDR ID Number
E18 **NW** **1/2 - 1 Mile** **Lower**	**CA WELLS**	**8399**

Water System Information:

Prime Station Code:	08N/08W-28N01 M	User ID:	RXR
FRDS Number:	4910023004	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383023.0 1224522.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 04A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		
Sample Collected:	12/11/2007 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/11/2007 00:00:00	Findings:	720 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	688 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	7 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	150 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	697 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	682 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	160 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	130 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	300 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	7.9
Chemical:	PH, LABORATORY		

Sample Collected:	08/08/2006 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	180 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	08/08/2006 00:00:00	Findings:	.38
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.11 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .22 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	13.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	82 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	124 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	164 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	781 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	747 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/08/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .21 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	02/14/2006 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		

Sample Collected:	02/14/2006 00:00:00	Findings:	650 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/15/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	729 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	833 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	873 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	120 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	586 UG/L
Chemical:	MANGANESE		
Sample Collected:	10/11/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	712 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/13/2004 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	340 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.7
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	23 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	19 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	07/20/2004 00:00:00	Findings:	.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		

Sample Collected:	07/20/2004 00:00:00	Findings:	18 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	21 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	13.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	81 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	121 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	151 UG/L
Chemical:	BORON		
Sample Collected:	07/20/2004 00:00:00	Findings:	696 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/08/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	709 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	721 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/10/2004 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/10/2004 00:00:00	Findings:	705 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	11/04/2003 00:00:00	Findings:	695 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	616 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/27/2003 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		

Sample Collected:	02/25/2003 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/25/2003 00:00:00	Findings:	7.6
Chemical:	PH, LABORATORY		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/25/2003 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/25/2003 00:00:00	Findings:	24 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	23 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	14 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/25/2003 00:00:00	Findings:	.087
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/25/2003 00:00:00	Findings:	.57 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/25/2003 00:00:00	Findings:	21 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	17 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	19 MG/L
Chemical:	SODIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	12.3 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/25/2003 00:00:00	Findings:	86 MG/L
Chemical:	SILICA		
Sample Collected:	02/25/2003 00:00:00	Findings:	6 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/25/2003 00:00:00	Findings:	115 UG/L
Chemical:	BARIUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	150 UG/L
Chemical:	BORON		
Sample Collected:	02/25/2003 00:00:00	Findings:	743 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/25/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	02/25/2003 00:00:00	Findings:	.13 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		

Sample Collected:	02/06/2003 00:00:00	Findings:	5.4 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	158 UG/L
Chemical:	BARIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	119 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	12/17/2002 00:00:00	Findings:	1722 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	548 UG/L
Chemical:	ZINC		
Sample Collected:	12/17/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	33.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	8 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	18 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	27 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.61 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.68 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	06/18/2002 00:00:00	Findings:	.69 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	260 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .49
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	100 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	02/26/2002 00:00:00	Findings:	4 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.42 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	350 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	02/26/2002 00:00:00	Findings:	7
Chemical:	PH, LABORATORY		

Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	160 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	140 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	25 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	24 MG/L
Chemical:	SODIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	13 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	5 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	120 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	860 UG/L
Chemical:	MANGANESE		

19
SE
1/2 - 1 Mile
Lower

CA WELLS 8408

Water System Information:

Prime Station Code:	08N/08W-33J01 M	User ID:	RXR
FRDS Number:	4900869001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	382936.0 1224430.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01		
System Number:	4900869		
System Name:	LA MANCHA APARTMENTS		
Organization That Operates System:			
	P.O. BOX 11427		
	SANTA ROSA, CA 95406		
Pop Served:	140	Connections:	1
Area Served:	Not Reported		
Sample Collected:	02/13/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	02/13/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		
Sample Collected:	02/12/2003 00:00:00	Findings:	5 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/12/2003 00:00:00	Findings:	9 UG/L
Chemical:	VANADIUM		
Sample Collected:	02/12/2003 00:00:00	Findings:	10.6
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		

Sample Collected:	02/12/2003 00:00:00	Findings:	- .8
Chemical:	LANGELIER INDEX AT SOURCE TEMP.		

20
East
1/2 - 1 Mile
Higher

CA WELLS 8410

Water System Information:

Prime Station Code:	08N/08W-34D01 M	User ID:	RXR
FRDS Number:	4900890001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383007.0 1224414.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		
System Number:	4900890		
System Name:	REDWOOD JUNIOR ACADEMY		
Organization That Operates System:			
	385 MARK WEST SPRINGS RD.		
	SANTA ROSA, CA 95404		
Pop Served:	300	Connections:	1
Area Served:	Not Reported		
Sample Collected:	09/21/2005 00:00:00	Findings:	6.9 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	06/23/2004 00:00:00	Findings:	5.8 MG/L
Chemical:	NITRATE (AS NO3)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.8 UG/L
Chemical:	BROMODICHLORMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	1.9 UG/L
Chemical:	DIBROMOCHLOROMETHANE (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	2.1 UG/L
Chemical:	CHLOROFORM (THM)		
Sample Collected:	07/09/2002 00:00:00	Findings:	6.8 UG/L
Chemical:	TOTAL TRIHALOMETHANES		
Sample Collected:	01/31/2002 00:00:00	Findings:	3.1 MG/L
Chemical:	NITRATE (AS NO3)		

21
ENE
1/2 - 1 Mile
Lower

CA WELLS 20766

Water System Information:

Prime Station Code:	4910023-006	User ID:	RXR
FRDS Number:	4910023006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383013.0 1224415.0	Precision:	1,000 Feet (10 Seconds)
Source Name:	WELL 01A		
System Number:	4910023		
System Name:	Citizens Utilities-Larkfield District		
Organization That Operates System:			
	909 E. LAS COLINAS BLVD		
	Santa Rosa, CA 94306		
Pop Served:	7055	Connections:	2138
Area Served:	LARKFIELD		

Sample Collected:	11/12/2007 00:00:00	Findings:	770 UG/L
Chemical:	IRON		
Sample Collected:	11/12/2007 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/12/2007 00:00:00	Findings:	858 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	680 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/07/2007 00:00:00	Findings:	410 UG/L
Chemical:	IRON		
Sample Collected:	08/07/2007 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	320 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2007 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	716 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/06/2007 00:00:00	Findings:	300 UG/L
Chemical:	IRON		
Sample Collected:	02/06/2007 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/06/2006 00:00:00	Findings:	735 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/06/2006 00:00:00	Findings:	350 UG/L
Chemical:	IRON		
Sample Collected:	08/08/2006 00:00:00	Findings:	12
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)		
Sample Collected:	08/08/2006 00:00:00	Findings:	5 UNITS
Chemical:	COLOR		
Sample Collected:	08/08/2006 00:00:00	Findings:	360 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	08/08/2006 00:00:00	Findings:	8.1
Chemical:	PH, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	190 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	230 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	08/08/2006 00:00:00	Findings:	160 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	08/08/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	08/08/2006 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		

Sample Collected:	08/08/2006 00:00:00	Findings:	.72
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	08/08/2006 00:00:00	Findings:	.81 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	08/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	07/11/2006 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	32 MG/L
Chemical:	SODIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	11.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/11/2006 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/11/2006 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	07/11/2006 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/11/2006 00:00:00	Findings:	161 UG/L
Chemical:	BARIUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	213 UG/L
Chemical:	BORON		
Sample Collected:	07/11/2006 00:00:00	Findings:	380 UG/L
Chemical:	IRON		
Sample Collected:	07/11/2006 00:00:00	Findings:	819 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/11/2006 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/11/2006 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/08/2006 00:00:00	Findings:	490 UG/L
Chemical:	IRON		
Sample Collected:	05/08/2006 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/08/2006 00:00:00	Findings:	- .24 PCI/L
Chemical:	RADIUM 228 COUNTING ERROR		
Sample Collected:	05/08/2006 00:00:00	Findings:	827 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/26/2006 00:00:00	Findings:	805 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/26/2006 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	03/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	03/14/2006 00:00:00	Findings:	2040 UG/L
Chemical:	IRON		

Sample Collected:	03/14/2006 00:00:00	Findings:	928 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	8 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/14/2006 00:00:00	Findings:	771 UG/L
Chemical:	MANGANESE		
Sample Collected:	02/14/2006 00:00:00	Findings:	1930 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	940 UG/L
Chemical:	IRON		
Sample Collected:	11/15/2005 00:00:00	Findings:	9 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/15/2005 00:00:00	Findings:	782 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	893 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/07/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	07/07/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	17 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/03/2005 00:00:00	Findings:	882 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/03/2005 00:00:00	Findings:	360 UG/L
Chemical:	IRON		
Sample Collected:	04/12/2005 00:00:00	Findings:	874 UG/L
Chemical:	MANGANESE		
Sample Collected:	04/12/2005 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	04/12/2005 00:00:00	Findings:	1320 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	560 UG/L
Chemical:	IRON		
Sample Collected:	03/08/2005 00:00:00	Findings:	724 UG/L
Chemical:	MANGANESE		
Sample Collected:	03/08/2005 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	02/09/2005 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/09/2005 00:00:00	Findings:	658 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/13/2004 00:00:00	Findings:	1130 UG/L
Chemical:	IRON		
Sample Collected:	12/13/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/13/2004 00:00:00	Findings:	739 UG/L
Chemical:	MANGANESE		

Sample Collected:	11/08/2004 00:00:00	Findings:	749 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/08/2004 00:00:00	Findings:	440 UG/L
Chemical:	IRON		
Sample Collected:	11/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	13 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/11/2004 00:00:00	Findings:	480 UG/L
Chemical:	IRON		
Sample Collected:	10/11/2004 00:00:00	Findings:	804 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/07/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	09/07/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/07/2004 00:00:00	Findings:	677 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	719 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/13/2004 00:00:00	Findings:	500 UG/L
Chemical:	IRON		
Sample Collected:	08/13/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	590 UG/L
Chemical:	IRON		
Sample Collected:	07/20/2004 00:00:00	Findings:	768 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/20/2004 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 UNITS
Chemical:	COLOR		
Sample Collected:	07/20/2004 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	07/20/2004 00:00:00	Findings:	7.8
Chemical:	PH, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	220 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	07/20/2004 00:00:00	Findings:	170 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	07/20/2004 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	07/20/2004 00:00:00	Findings:	.52
Chemical:	LANGELIER INDEX @ 60 C		

Sample Collected:	07/20/2004 00:00:00	Findings:	4.4 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	07/20/2004 00:00:00	Findings:	29 MG/L
Chemical:	CALCIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	20 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	33 MG/L
Chemical:	SODIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	12.2 MG/L
Chemical:	CHLORIDE		
Sample Collected:	07/20/2004 00:00:00	Findings:	.2 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	07/20/2004 00:00:00	Findings:	83 MG/L
Chemical:	SILICA		
Sample Collected:	07/20/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/20/2004 00:00:00	Findings:	142 UG/L
Chemical:	BARIUM		
Sample Collected:	07/20/2004 00:00:00	Findings:	216 UG/L
Chemical:	BORON		
Sample Collected:	07/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	07/08/2004 00:00:00	Findings:	764 UG/L
Chemical:	MANGANESE		
Sample Collected:	07/08/2004 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	06/08/2004 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	06/08/2004 00:00:00	Findings:	759 UG/L
Chemical:	MANGANESE		
Sample Collected:	06/08/2004 00:00:00	Findings:	580 UG/L
Chemical:	IRON		
Sample Collected:	05/04/2004 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/04/2004 00:00:00	Findings:	891 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/04/2004 00:00:00	Findings:	1850 UG/L
Chemical:	IRON		
Sample Collected:	03/24/2004 00:00:00	Findings:	.55 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	01/12/2004 00:00:00	Findings:	1371 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	1910 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	914 UG/L
Chemical:	MANGANESE		

Sample Collected:	01/12/2004 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	7120 UG/L
Chemical:	IRON		
Sample Collected:	01/12/2004 00:00:00	Findings:	1783 UG/L
Chemical:	MANGANESE		
Sample Collected:	01/12/2004 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	01/12/2004 00:00:00	Findings:	3770 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	7.2 UG/L
Chemical:	XYLENES (TOTAL)		
Sample Collected:	12/08/2003 00:00:00	Findings:	4.7 UG/L
Chemical:	M,P-XYLENE		
Sample Collected:	12/08/2003 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/08/2003 00:00:00	Findings:	7300 UG/L
Chemical:	IRON		
Sample Collected:	12/08/2003 00:00:00	Findings:	1293 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/08/2003 00:00:00	Findings:	2.5 UG/L
Chemical:	O-XYLENE		
Sample Collected:	12/08/2003 00:00:00	Findings:	1.2 UG/L
Chemical:	1,2,4-TRIMETHYLBENZENE		
Sample Collected:	11/04/2003 00:00:00	Findings:	757 UG/L
Chemical:	MANGANESE		
Sample Collected:	11/04/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	11/04/2003 00:00:00	Findings:	.65 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	10/07/2003 00:00:00	Findings:	14 UG/L
Chemical:	ARSENIC		
Sample Collected:	10/07/2003 00:00:00	Findings:	681 UG/L
Chemical:	MANGANESE		
Sample Collected:	09/10/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/07/2003 00:00:00	Findings:	.56 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	08/04/2003 00:00:00	Findings:	15 UG/L
Chemical:	ARSENIC		
Sample Collected:	08/04/2003 00:00:00	Findings:	760 UG/L
Chemical:	MANGANESE		
Sample Collected:	08/04/2003 00:00:00	Findings:	200 UG/L
Chemical:	IRON		
Sample Collected:	06/24/2003 00:00:00	Findings:	.52 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	05/28/2003 00:00:00	Findings:	.7 UG/L
Chemical:	STYRENE		
Sample Collected:	05/27/2003 00:00:00	Findings:	27 UG/L
Chemical:	ARSENIC		

Sample Collected:	05/12/2003 00:00:00	Findings:	28 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	23 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	34 MG/L
Chemical:	SODIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	11.4 MG/L
Chemical:	CHLORIDE		
Sample Collected:	05/12/2003 00:00:00	Findings:	91 MG/L
Chemical:	SILICA		
Sample Collected:	05/12/2003 00:00:00	Findings:	51 UG/L
Chemical:	ARSENIC		
Sample Collected:	05/12/2003 00:00:00	Findings:	209 UG/L
Chemical:	BORON		
Sample Collected:	05/12/2003 00:00:00	Findings:	18 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	05/12/2003 00:00:00	Findings:	600 UG/L
Chemical:	IRON		
Sample Collected:	05/12/2003 00:00:00	Findings:	1093 UG/L
Chemical:	MANGANESE		
Sample Collected:	05/12/2003 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	.32 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	78 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	05/12/2003 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	05/12/2003 00:00:00	Findings:	31 MG/L
Chemical:	CALCIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	24 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	05/12/2003 00:00:00	Findings:	320 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	05/12/2003 00:00:00	Findings:	- .21
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	05/12/2003 00:00:00	Findings:	4.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	05/12/2003 00:00:00	Findings:	10 UNITS
Chemical:	COLOR		
Sample Collected:	05/12/2003 00:00:00	Findings:	460 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	05/12/2003 00:00:00	Findings:	7.5
Chemical:	PH, LABORATORY		
Sample Collected:	12/17/2002 00:00:00	Findings:	30 MG/L
Chemical:	CALCIUM		

Sample Collected:	12/17/2002 00:00:00	Findings:	21 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (TREATMENT RELATED-DISTRIBUTION)		
Sample Collected:	12/17/2002 00:00:00	Findings:	2 UG/L
Chemical:	MOLYDBENDUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	740 UG/L
Chemical:	MANGANESE		
Sample Collected:	12/17/2002 00:00:00	Findings:	20 UG/L
Chemical:	CHROMIUM (TOTAL)		
Sample Collected:	12/17/2002 00:00:00	Findings:	224 UG/L
Chemical:	BORON		
Sample Collected:	12/17/2002 00:00:00	Findings:	35 MG/L
Chemical:	SODIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	7 MG/L
Chemical:	POTASSIUM		
Sample Collected:	12/17/2002 00:00:00	Findings:	11.6 MG/L
Chemical:	CHLORIDE		
Sample Collected:	12/17/2002 00:00:00	Findings:	.14 MG/L
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)		
Sample Collected:	12/17/2002 00:00:00	Findings:	85 MG/L
Chemical:	SILICA		
Sample Collected:	12/17/2002 00:00:00	Findings:	12 UG/L
Chemical:	ARSENIC		
Sample Collected:	12/17/2002 00:00:00	Findings:	143 UG/L
Chemical:	BARIUM		
Sample Collected:	11/07/2002 00:00:00	Findings:	.47 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	09/19/2002 00:00:00	Findings:	10 UG/L
Chemical:	ARSENIC		
Sample Collected:	09/19/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	09/19/2002 00:00:00	Findings:	.7 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	07/30/2002 00:00:00	Findings:	450 US
Chemical:	SPECIFIC CONDUCTANCE		
Sample Collected:	06/18/2002 00:00:00	Findings:	.64 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	250 MG/L
Chemical:	TOTAL DISSOLVED SOLIDS		
Sample Collected:	02/26/2002 00:00:00	Findings:	- .058
Chemical:	LANGELIER INDEX @ 60 C		
Sample Collected:	02/26/2002 00:00:00	Findings:	.1 NTU
Chemical:	TURBIDITY, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	7 UG/L
Chemical:	CHROMIUM (TOTAL CR-CRVI SCREEN)		
Sample Collected:	02/26/2002 00:00:00	Findings:	.49 PCI/L
Chemical:	GROSS ALPHA COUNTING ERROR		
Sample Collected:	02/26/2002 00:00:00	Findings:	440 US
Chemical:	SPECIFIC CONDUCTANCE		

Sample Collected:	02/26/2002 00:00:00	Findings:	7.2
Chemical:	PH, LABORATORY		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	ALKALINITY (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	210 MG/L
Chemical:	BICARBONATE ALKALINITY		
Sample Collected:	02/26/2002 00:00:00	Findings:	180 MG/L
Chemical:	HARDNESS (TOTAL) AS CACO3		
Sample Collected:	02/26/2002 00:00:00	Findings:	34 MG/L
Chemical:	CALCIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	22 MG/L
Chemical:	MAGNESIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	37 MG/L
Chemical:	SODIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	6 MG/L
Chemical:	POTASSIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	12 MG/L
Chemical:	CHLORIDE		
Sample Collected:	02/26/2002 00:00:00	Findings:	11 UG/L
Chemical:	ARSENIC		
Sample Collected:	02/26/2002 00:00:00	Findings:	150 UG/L
Chemical:	BARIUM		
Sample Collected:	02/26/2002 00:00:00	Findings:	200 UG/L
Chemical:	BORON		
Sample Collected:	02/26/2002 00:00:00	Findings:	780 UG/L
Chemical:	MANGANESE		

22
NNE
1/2 - 1 Mile
Higher

CA WELLS 7396

Water System Information:

Prime Station Code:	07N/08W-04J02 M	User ID:	RXR
FRDS Number:	4910009006	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Standby Raw
Source Lat/Long:	383044.9 1224438.5	Precision:	100 Feet (one Second)
Source Name:	SHARON PARK WELL - STANDBY		
System Number:	4910009		
System Name:	Santa Rosa, City of		
Organization That Operates System:			
	P.O. BOX 1658		
	SANTA ROSA, CA 95403		
Pop Served:	113313	Connections:	38388
Area Served:	SANTA ROSA		

23
ENE
1/2 - 1 Mile
Higher

AQUIFLOW 71020

Site ID:	Not Reported
Groundwater Flow:	Not Reported
Shallow Water Depth:	11
Deep Water Depth:	13
Average Water Depth:	Not Reported
Date:	08/13/1990

Map ID Direction Distance Elevation	Database	EDR ID Number
24 **NNW** **1/2 - 1 Mile** **Higher**	**CA WELLS**	**8404**

Water System Information:

Prime Station Code:	08N/08W-29G09 M	User ID:	RXR
FRDS Number:	4900726001	County:	Sonoma
District Number:	03	Station Type:	WELL/AMBNT/MUN/INTAKE
Water Type:	Well/Groundwater	Well Status:	Active Raw
Source Lat/Long:	383049.0 1224519.0	Precision:	100 Feet (one Second)
Source Name:	WELL 01		
System Number:	4900726		
System Name:	ORCHARD MOBILE HOME PARK		
Organization That Operates System:			
	P.O. BOX 839 WINDSOR, CA 95492		
Pop Served:	45	Connections:	35
Area Served:	Not Reported		

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zip	Total Sites	> 4 Pci/L	Pct. > 4 Pci/L
95403	8	0	0.00

Federal EPA Radon Zone for SONOMA County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 95403

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.575 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Scanned Digital USGS 7.5' Topographic Map (DRG)
Source: United States Geologic Survey
A digital raster graphic (DRG) is a scanned image of a U.S. Geological Survey topographic map. The map images are made by scanning published paper maps on high-resolution scanners. The raster image is georeferenced and fit to the Universal Transverse Mercator (UTM) projection.

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Services (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Services, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Health Services
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

OTHER STATE DATABASE INFORMATION

California Oil and Gas Well Locations
Source: Department of Conservation
Telephone: 916-323-1779

RADON

State Database: CA Radon
Source: Department of Health Services
Telephone: 916-324-2208
Radon Database for California

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

SMF Alternate Well Site
4728 Old Redwood Highway
Santa Rosa, CA 95403

Inquiry Number: 2407239.4
January 26, 2009

The EDR Aerial Photo Decade Package

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDRs professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography January 26, 2009

Target Property:
4728 Old Redwood Highway
Santa Rosa, CA 95403

Year	***Scale***	***Details***	***Source***
1953	Aerial Photograph. Scale: 1"=555'	Flight Year: 1953	Pacific Air
1965	Aerial Photograph. Scale: 1"=333'	Flight Year: 1965	Cartwright
1974	Aerial Photograph. Scale: 1"=541'	Flight Year: 1974	NASA
1982	Aerial Photograph. Scale: 1"=690'	Flight Year: 1982	USGS
1993	Aerial Photograph. Scale: 1"=666'	Flight Year: 1993	USGS
1998	Aerial Photograph. Scale: 1"=666'	Flight Year: 1998	USGS
2005	Aerial Photograph. Scale: 1"=484'	Flight Year: 2005	EDR

INQUIRY #: 2407239.4

YEAR: 1953

= 555'

N

EDR Environmental Data Resources Inc


INQUIRY #: 2407239.4
YEAR: 1965
= 333'
N


INQUIRY #: 2407239.4
YEAR: 1974
= 541'
N
EDR Environmental Data Resources Inc


INQUIRY #: 2407239.4
YEAR: 1982
= 690'
N
EDR Environmental Data Resources Inc

INQUIRY #: 2407239.4

YEAR: 1993

= 666'

N

EDR Environmental Data Resources Inc

INQUIRY #: 2407239.4

YEAR: 1998

= 666'

N


INQUIRY #: 2407239.4
YEAR: 2005
= 484'
N

APPENDIX E

ENGEO Incorporated
Groundwater Aquifer Test and Water Quality Analysis Report
Sutter Medical Center of Santa Rosa
February 21, 2006

APPENDIX E

Project No.
6486.2.005.01

February 21, 2006

Ms. Nadin Sponamore
Sponamore Associates
1205 McDonald Avenue
Santa Rosa, CA 95404

Subject: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Santa Rosa, California

GROUNDWATER AQUIFER TEST AND WATER QUALITY ANALYSIS

Dear Ms. Sponamore:

At your request and with your authorization, ENGEO Incorporated has performed aquifer testing analyses and has as evaluated groundwater quality for the subject site. The purpose of the study was to determine the well pumping characteristics, perform limited water quality testing, and predict aquifer capability for future land use.

SITE LOCATION AND DESCRIPTION

The site where the existing well is located at 50 Mark West Springs Road in Santa Rosa, California, as shown on the Site Vicinity Map (Figure 1). The property encompasses approximately 78 acres, including the Luther Burbank Center for the Arts (LBC) which is approximately 52 acres in size. In addition to the LBC, a rural residence with barn, out-buildings and undeveloped pasture land, as well as a single-family home that is currently used as law offices, are present within the property boundary.

The Luther Burbank Center (LBC) and associated parking areas are currently located at the center of the site. The LBC structure is a cultural and performing arts event center, and a part of the property is leased to the Sonoma Academy, an independent college-preparatory high school. This portion of the Property includes approximately 39 acres that are occupied by asphalt-covered parking areas, an athletic field, and an existing waste water treatment facility. Two ponds associated with the wastewater treatment facility are located along the main access road that connects to Mark West Springs Road. The athletic field is located opposite to the wastewater treatment facility at the north side of the site along Mark West Springs Road. A vineyard exists at the south and southeast corner of the site. The remainder of the site is currently vacant and covered with seasonal grasses.

GEOLOGIC CONDITIONS

The site is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Locally, the site is mapped as underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). This alluvium consists of unconsolidated deposits of sand, silt, gravel and clay likely derived from the bedrock uplands and older unconsolidated deposits. Regional geology and information from the well driller's log (located in Appendix D) indicate that the alluvial deposits in this area may be greater than 400 feet in thickness.

FAULTS

The site is located in a region that contains numerous active[1] and potentially-active earthquake faults. The site is not located within the State of California Fault Hazard Zone. The active Rodgers Creek fault is located approximately 0.7 mile to the east of the project area. The Maacama Fault is located 6.3 miles to the east and the San Andreas Fault is located 19.5 miles to the west of the site. Regional faulting and seismicity is shown on Figure 4, which shows regional proximity to major active faults and significant historic earthquakes with in proximity to the site. No faults have been mapped that run through the subject site indicating that aquifers beneath the property are not fault controlled.

WATER DEMAND

Information provided to us by Brejle & Race Consulting Civil Engineers of Santa Rosa, California, indicates the planned construction of the proposed hospital will result in water demand of approximately 73,460 gallons per day. The daily demand equates to a yield of roughly 50 gallons per minute for a continuous 24-hour pumping period.

WELL AND PUMP INFORMATION

An existing agriculture groundwater supply well, W-LBC, is located near the center of the property at an elevation of approximately 160 feet above msl (mean sea level). The location of well W-LBC is presented on Figure 2. Reportedly, the LBC well was installed by Les Petersen Drilling and Pump, Inc., of Santa Rosa, California, in August 2000. The well was installed using rotary wash methods and is approximately 400 feet deep. The well consists of 10-inch diameter 200-guage PVC (polyvinyl chloride) casing and screen. The well screen is mill-slot casing with 0.032-inch slot openings. Three screened intervals were installed at 100 to 160 feet, 180 to 320 feet, and 360 to 400 feet. The completed State of California Well Completion Report was furnished to us and is included in Appendix D.

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[1] An active fault is defined by the State Mining and Geology Board as one that has had surface displacement within Holocene era (about the last 11,000 years) (Hart, 1997).

The existing agriculture groundwater supply well, W-LBC, served as the pumping well for the aquifer test. Drawdown during pumping and recovery after pumping ceased were recorded. A second existing agriculture groundwater supply well, W-SV, is located offsite near the southern end of the property, approximately 1,200 feet from W-LBC. The location of the well W-SV is also presented on Figure 2. Information about the construction details of this well had not been provided. The drawdown and recovery tests of W-SV during and after pumping of W-LBC were documented to serve as a monitoring well.

The following table summarizes well construction data related to the subject LBC and Sutter Vineyard wells:

Table 1 – Well Construction Data

Well Name	Date Constructed	Total Depth	Casing Type and Diameter	Perforation Intervals (ft bgs)
LBC Well (W-LBC)	2000	400 feet	10-inch PVC	100 to 160 160 to 320 360 to 400
Sutter Vineyard Well (W-SV)	unknown	unknown	10-inch PVC	unknown

Reportedly, the pump within the LBC well was installed by Bartley Pump of Santa Rosa, California, and consists of a Berkeley model 6T-275 submersible pump that is equipped with a 30 horsepower motor. Information from testing conducted shortly after the well was constructed is reported to show the well sustained a yield of 300 gallons per minute with 230 feet of drawdown during a 7 day pumping test. The Berkeley 6T-275 pump is rated to pump between 225 and 250 gallons per minute from the well. The pump curve and specifications for this pump model was furnished to us and is included in Appendix D. The pump was pulled out of the well for the purpose of video-surveying and the depth of the pump was found to be approximately 325 feet.

PHASE 1 – W-LBC STEP-DRAWDOWN TEST

Prior to commencing the 24-hour pumping test, an initial step-drawdown test was conducted at W-LBC, as requested by Mr. Richard Shatz, as a Hydrogeologist consultant for Cal American Water, who expressed concern that excessive pumping rates may adversely effect the well and aquifer if water levels were lowered below the upper screened interval (100 feet below ground surface (bgs)). Therefore, the step drawdown test was conducted about one week prior to the scheduled 24-hour pumping test on June 27, 2005. The step-drawdown began at a pumping rate of 100 gallons per minute (gpm); pumping started at 10:00 AM and ended at 11:20 AM as the water level equilibrated in the LBC well. The first few minutes of the test were actually conducted at a rate much higher than 100 gpm. As a result, the average rate over the 100 gpm rate step was roughly 153 gpm. The second step was 150 gpm, which began at 11:25 AM and ended at 4:25 PM. The pumping level did not stabilize while pumping at 150 gpm; the water level in the pumping well continued to decline throughout this second step. The overall rate of pumping during this step was 156 gpm, which we feel is effectively 150 gpm with regards to the equipment used. Based on the results of the step-drawdown test, we decided to implement a 24-hour pump test at a pumping rate of 100 gpm. The data collected during the step-drawdown test are included in Appendix B.

BACKGROUND WATER LEVELS

The water level of the pumping well, W-LBC, was recorded over the period of two weeks leading up to the pump test. The water level averaged a depth of 44 feet below top of casing (btc) which roughly correlates to an elevation of 116 feet above mean sea level (msl). The top of casing is approximately 14 inches above ground surface. On the day of the initial 24-hour pump test, a Bartley Pump technician proof-tested the pump approximately a half-hour before the start of the test, resulting in a background water level of 45.7 feet btc the morning of the test.

PHASE 2 – INITIAL W-LBC PUMPING TEST

A 24-hour pump test was initiated on the morning of July 5, 2005, at 10:00AM. Prior to the initiation of the pump test, groundwater levels were initially measured at pumping well W-LBC and the off-site monitoring well W-SV. The pumping concluded the following day at 10:00 AM. A flow rate meter and volume discharge meter was attached to the pump. The flow rate was maintained at ±100 gallons/minute. The flow rate was regularly verified by evaluating the measured totalizer data readings. The actual average pumping rate throughout the test, after evaluating the total gallons pumped during the 24 hours, was roughly 106 gpm. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot.

Once the pump test commenced, the depth to groundwater was recorded at W-LBC and W-SV as follows: every minute for the first 10 minutes; every 2 minutes from 10 to 30 minutes; every 5 minutes from 30 to 60 minutes; every 10 minutes from 60 to 120 minutes; every 20 minutes from 120 to 240 minutes; every 30 minutes from 240 to 360 minutes; every 60 minutes from 360 to 720 minutes; and every 120 minutes from 720 to 1,440 minutes. After 24 hours of continuous pumping, a recovery test began immediately following the shut down of the pump. The depth was recorded during recovery in the same intervals as during the pumping test to approximately 95% recovery and then at 24 hours. The field-recorded measurements of the drawdown and recovery, as well as observations and notes, are attached as Appendix B.

The drawdown at the pumping well, W-LBC, after 24 hours of continuous of pumping neared 23 feet and fully recovered following 24 hours of recovery. The observation well, W-SV, showed no significant drawdown from the continuous pumping 1,200 linear feet away.

At the request of Mr. Richard Shatz on behalf of Cal American, ENGEO measured sand content with a Rossum Sand Tester at the beginning and end of the 24-hour pumping test. The results of the sand test yielded few grains of sand, and the total amount of sand recovered fell far below the initial reading line of 1 part per million (ppm). The observations and notes from the sand test are included in Appendix B as part of the test data.

AQUIFER ANALYSIS

Using the pumping and recovery test records, we analyzed the aquifer characteristics, specifically, the transmissivity (**T**) and the storage coefficient (**S**). We have assumed in our analysis, based on previous geotechnical explorations, the aquifer is unconfined and the thickness of the aquifer extends from about 20 to 25 feet bgs to the bottom of the well for a total thickness of roughly 375 feet. The drawdown and recovery data obtained from the aquifer test was used to analyze the aquifer using the Cooper-Jacob and Theis Curve-Matching methods to determine the storage coefficient and transmissivity. A brief explanation of the different methods is included in Appendix B.

Transmissivity (**T**) is the hydraulic conductivity of the full thickness of the aquifer; it is a measure of the aquifer's ability to transmit water (i.e., how permeable it is). The values of transmissivity obtained from different methods of analysis are nearly uniform. The arithmetic mean value of transmissivity is 4,396 gallons per day per foot (gpd/ft), with a range between 3,860 gpd/ft and 4,825 gpd/ft. The geometric mean value of calculated transmissivities is 4,385 gpd/ft. These calculated values are characteristic for the type of materials encountered, such as alluvial materials, and an unconfined aquifer.

The storage coefficient (**S**), or storativity, is the volume of water released from or taken into storage per unit surface area per unit change of the hydraulic head; it is a measure of the aquifer's ability to release groundwater from storage. In typical unconfined aquifers, like the subject site, the value of storativity falls in the typical range of 0.01 and 0.35. Since the observation well felt no effect from the continual pumping in W-LBC, the calculations for storativity were limited. However, by assuming an effective well radius (i.e., the distance from the well where the water level is the same as the water level in the well), we estimate the range of storativity values for the tested aquifer to fall towards the upper bound of the typical range, roughly between 0.15 and 0.35. Further study may be warranted if a tighter range of the value of storativity is desired. (An observation well would have to be installed within 400 feet of W-LBC to successfully obtain the necessary data.)

The following table presents the results of our analysis:

TABLE 2 – Aquifer Characteristics

METHOD OF ANALYSIS	TRANSMISSIVITY **T** gpd/ft	STORAGE COEFFICIENT **S**
Cooper-Jacob Drawdown Method	4,825	0.19
Cooper-Jacob Recovery Method	4,177	N/A
Cooper-Jacob Residual Drawdown Method	4,442	N/A
Cooper-Jacob Calculated Recovery Method	3,860	0.35
Theis Curve Matching Drawdown Method	4,443	0.43
Theis Curve Matching Recovery Method	4,628	0.19

Based on a review of the pumping/recovery test data, the aquifer at the subject site can yield at least 100 gpm or 144,000 gallons per day.

Using the geometric mean value of transmissivity of 4,385 gpd/ft with the Cooper – Jacob modification of the Theis equation, we estimate the theoretical radius of influence may be as great as 600 to 800 feet for W-LBC.

PHASE 3 – SUPPLEMENTAL W-LBC PUMPING TEST

We supplemented our initial W-LBC pumping test with a second pumping test on November 14, 2005, in an effort to determine the adequacy of the well and aquifer. The set-up for this test was identical to the prior test. We pumped the well for over twenty-eight hours at ±80 gpm, roughly equivalent to 150% of the expected demand. No recordings were made at the off-site well W-SV due to the lack of drawdown during the step-drawdown and initial pumping tests at greater pumping rates. The actual average pumping rate throughout the test, after evaluating the total gallons pumped during the length of the test, was roughly 79 gpm. Recovery of the groundwater level was recorded for the following 10 hours. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot. The data for this test are presented in Appendix B.

PHASE 4 – W-SV STEP-DRAWDOWN TEST

As a means to preliminarily assess the capacity of the off-site well W-SV, we conducted a step-drawdown test on November 21, 2005. The set-up for this test was similar to the previous tests. We commenced testing at a rate of 80 gpm and found the groundwater levels to consistently fall. After six hours, we reduced the pumping rate to 60 gpm, and within a few hours of pumping at this lower rate, the groundwater level equilibrated and we halted pumping operations. Recovery of the groundwater level was then recorded over the following 4 hours. The water levels were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot. The data for this test are presented in Appendix B.

GROUNDWATER AVAILABILITY

Review of the pumping/recovery test data and aquifer analysis indicates that the aquifer at Luther Burbank Center has capacity in excess of the predicted water demands for the proposed project. The yield of well W-LBC is at least 80 gallons per minute, or 115,200 gallons per day. The measurements indicate that the groundwater levels outside the LBC property limits and at the periphery of the property did not change. This indicates that pumping from the W-LBC does not impact the groundwater supply of adjacent properties.

WATER QUALITY

Table 3 provides water quality sample results for the two wells, W-LBC and W-SV, for the initial samples collected in July 2005 and the most recent collected in November 2005. W-LBC was only sampled in July 2005 and both wells were sampled in November 2005. For each of the sampling events, samples were collected during a 24-hour pumping test at three times: at the beginning (1 hour), at the middle (12 hours), and at the end (23 hours). The samples were collected from a tap that was installed near the pump. The samples were labeled, preserved in a chilled cooler, and transported to McCampbell Analytical, Inc., of Pacheco, California, with completed chain-of-custody forms the day following the pumping test.

The initial water quality samples collected in November 2005 were analyzed to collect the following water quality parameters: total hardness as $CaCO_3$, total dissolved solids (TDS), total alkalinity as $CaCO_3$, pH; total silica, electrical conductivity, and manganese, iron, and arsenic. The samples collected in November 2005 included additional metal parameters that were not analyzed in the initial samples and included: total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, hardness, pH, electrical conductivity, TDS, antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, and silica.

Analysis of the water quality results indicates that the results from the start, the middle, and the end of each test are similar in value. Additionally, results from the two sampling events conducted in July and November 2005 for well W-LBC are similar in value. The lab results from McCampbell Analytical are included in Appendix C and tabulated in Table 3.

The groundwater sampling results were compared to the California Department of Health Services (DHS) Drinking Water Standard and Secondary Standard Maximum Contaminate Levels (MCLs). For the parameters that were detected in the groundwater samples, the majority were below the DHS MCLs. One exception is manganese. Manganese was detected in all the samples at levels greater than the secondary MCL (SMCL) of 0.05 mg/L. Manganese values for well W-LBC ranged from 1.3 to 1.5 mg/L and for well W-SV ranged from 0.83 to 0.86.

GEOPHYSICAL LOGGING

At the request of Mr. Richard Shatz, Welenco of Bakersfield, Calif., a geophysical logging company, was retained to perform a plumbness and alignment survey, a deviation survey, and a video survey. These activities took place on November 19, 2005. A representative of Cal American, Ms. Julliana Harris of Bookman-Edmonston, was on-site during the operations. The full suite of data and the video are included as Appendix E.

The alignment of the well has come in question by Mr. Richard Shatz. Cal American's acceptable maximum allowable deviation of the well's alignment, according to Mr. Shatz, is two-thirds of the well casing diameter, in our case, approximately 7 inches, per every 100 feet of casing length. The data obtained by Welenco suggests that W-LBC's alignment exceeds this deviation standard. The alignment of the well has little affect on the capacity of the well; its importance regards the diameter of pump that may pass through the casing. Well casings that are extremely out-of-plumb may also affect the rate of wear experienced by a pump, which is an issue of the maintenance of the well.

Mr. Shatz's interpretation of the Welenco data is that the well's alignment results in an effective diameter of 2 inches, meaning that a 2-inch plumb-bob (or smaller) is capable of traversing the entire depth of the well without coming in contact with the casing wall. A low effective diameter suggests that the maintenance and occasional service of the pump within the well may be difficult. The pump, which is situated at approximately 325 feet bgs, was pulled out of the well on November 19, 2005, and resituated a few days later. This exhibits that the alignment of the well allows for the current pump to be lowered through the first 325 feet of well casing with little resistance.

WELL CLEANING

Mr. Richard Shatz has suggested that the well screens are clogged with biological fouling, or biofouling, an accumulation of living and deceased microorganisms, which would require cleaning to provide efficient well production.

The still pictures suggest the biofouling has not caused clogging of the well screen due to encrustation. We reviewed the driller's log to see if the zones of greatest fouling correspond to the lowest water producing intervals. Although our review is limited by the generalities of the depths photographed by Welenco and the vagueness of the driller's lithologic descriptions, we perceive that the zones of greatest biofouling correspond to zones that the driller described as clay.

The Welenco photographs indicate the greatest biofouling existed within the intervals: 158 to 178; 275 to 317, and 358 to 366 feet below ground surface. The driller's log describes these intervals below ground surface as: 160 to 194 being blue and brown clay; 268 to 310 being blue clay with gravel and brown clay; and 328 to 364 being blue clay. These data show a high level of correlation between the zones of greatest biofouling and the clayey layers within the subsurface. This correlation suggests that the biofouling is due to the groundwater's low entrance velocity through the well screen. Entrance velocity should be maintained above 0.1 feet per second to limit clogging as seen in the video.

The biofouling can be reduced by disinfection using bleach or pool chlorine to create a 100 mg/l chlorine solution in the well. This solution would remain in the well for at least four hours, during which light agitation may be applied to the well bore. Following the contact period, the well should be redeveloped. Since the well's alignment is in question, we would recommend the well be carefully developed using airlifting methods. This requires a 2- to 3-inch diameter pipe connected to an air compressor be lowered to the bottom of the well. Application of air creates an aerated water column that results in water being brought to the ground surface. Properly varying the rate of air flow and the pressure will remove the dead biomaterial and clean the screen and filter pack.

Drilling and pump installation companies are well versed at well disinfection and airlift development. We recommend that a video survey to assess the well development results be conducted following the well disinfection and development.

CONCLUSIONS

- The demand of 73,460 gallons per day or 50 gallons per minute is met by the existing production well. The anticipated drawdown of the water table should be less than measured during the test.

- The 24-hour pumping test data indicates that the aquifer at the LBC property has adequate transmissivity and reasonable storage capacity.

- After 24 hours of continuous pumping, the groundwater level measured at the closest adjacent well, W-SV on the Sutter Vineyard property (1,200 feet away), did not change. This indicates that the radius of influence for a 100 gallon per minute pumping rate at W-LBC is much less than

1,200 feet. This clearly indicates that pumping from the well W-LBC does not impact adjacent properties.

- Water quality results from the samples collected from both wells, W-LBC and W-SV, indicate good water quality. There is concern with the manganese concentrations that exceed the California DHS secondary maximum contaminant level. Manganese is not considered to present a risk to human health at the SMCL. EPA does not enforce these "secondary maximum contaminant levels" or "SMCLs." They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color and odor. Excessive manganese in groundwater will cause the water to be black to brown in color; possible black staining and potential bitter metallic taste.

- The similarity of chemical composition indicated by samples collected from the start, middle and end of the two pumping tests support the interpretation that pumping test data do not indicate aquifer boundary conditions affected the calculation of aquifer T and S.

- If water samples are to be collected from the wells in the future, cation and anion parameters should be included in the requested analysis. These parameters will be used to type the water for each well. This data will be used to determine if the wells are screened in the same aquifer.

- Mr. Richard Shatz, consultant to Cal American, has stated that from his review of the draft of this report that we supplied him, that "the aquifers are capable, there seems to be no issues with water quality, and the construction and materials of the well will work." The outstanding issue, in his opinion, is the alignment of the well. It is our experience that the vertical alignment of a well may pose a number of future considerations, which include:

    - If it is necessary to rehabilitate the well, such work may need to be performed using mechanical scrubbing devices if the screens in the well are clogged; and

    - It is possible that the ability to set the pump within the well at greater depths in the future, if necessary, may be restricted if the well deviation is excessive.

It should be noted that to assess these above items, it is possible to check the well for alignment at a later time prior to final acceptance.

We were pleased to be of continued service to you on this project. If you have any questions or comments regarding this letter, please call and we will be glad to discuss them with you.

Very truly yours,

ENGEO INCORPORATED

Jeffrey B. Wisniewski, PE

Reviewed by:

Theodore P. Bayham, GE, CEG

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EXP. 9/30/06
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STATE OF CALIFORNIA

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THEODORE P. BAYHAM
2063
STATE OF CALIFORNIA

for Dennis Nakamoto, CHG, CEG
jbw/dn/tpb/mb: pump

Attachments: Selected References
Appendix A – Figures
Appendix B – Aquifer Test Data, Methods and Calculations
Appendix C – Water Quality Test Results
Appendix D – Miscellaneous Well and Pump Information
Appendix E – Well Logging Data and Video

SELECTED REFERENCES

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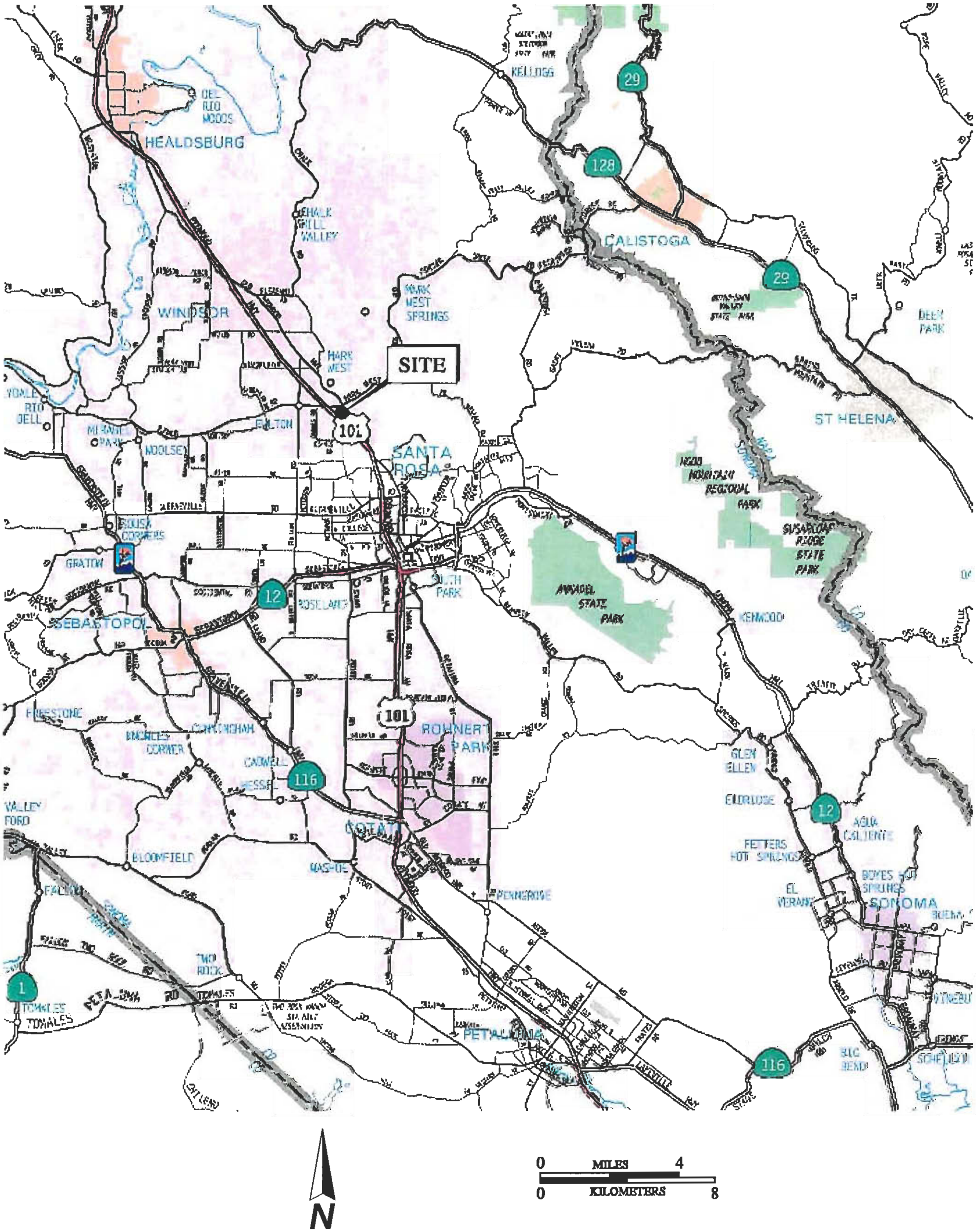
APPENDIX A

Figure 1	Site Vicinity Map
Figure 2	Site and Well Location Plan
Figure 3	Regional Geology
Figure 4	Regional Faulting & Seismicity
Figure 5	Southerly View



BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE VICINITY MAP

SUTTER MEDICAL CENTER OF SANTA ROSA/
LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.005.01	
DATE: FEBRUARY 2006	
DRAWN BY: JBW	CHECKED BY: TPB

FIGURE NO. 1

ORIGINAL FIGURE PRINTED IN COLOR

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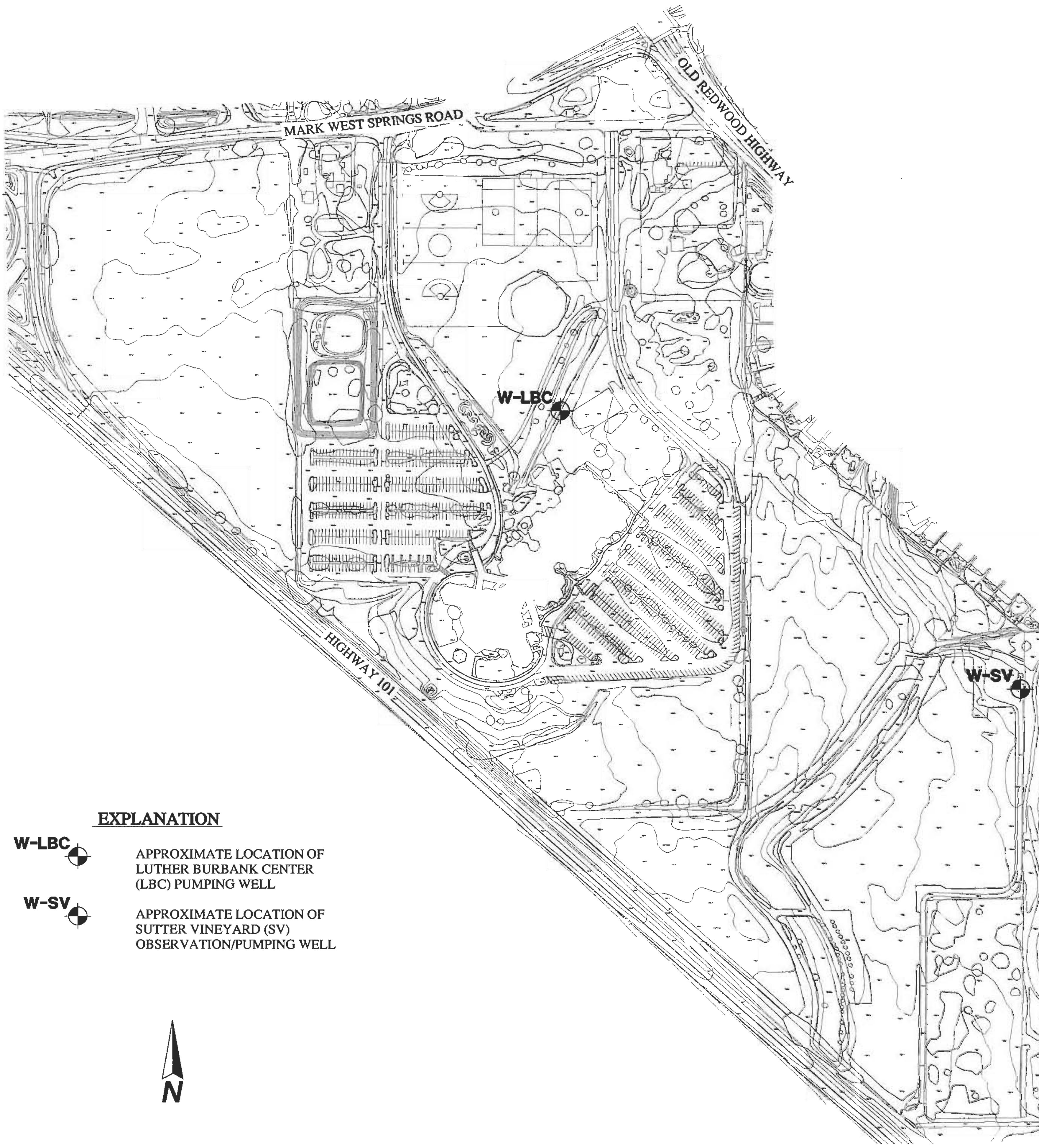

EXPLANATION

W-LBC — APPROXIMATE LOCATION OF LUTHER BURBANK CENTER (LBC) PUMPING WELL

W-SV — APPROXIMATE LOCATION OF SUTTER VINEYARD (SV) OBSERVATION/PUMPING WELL

N

0 FEET 300
0 METERS 150

BASE MAP SOURCE: BREJLE AND RACE CONSULTING CIVIL ENGINEERS

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SITE AND WELL LOCATION PLAN SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.005.01 DATE: FEBRUARY 2006 DRAWN BY: JBW CHECKED BY: TPB	FIGURE NO. 2

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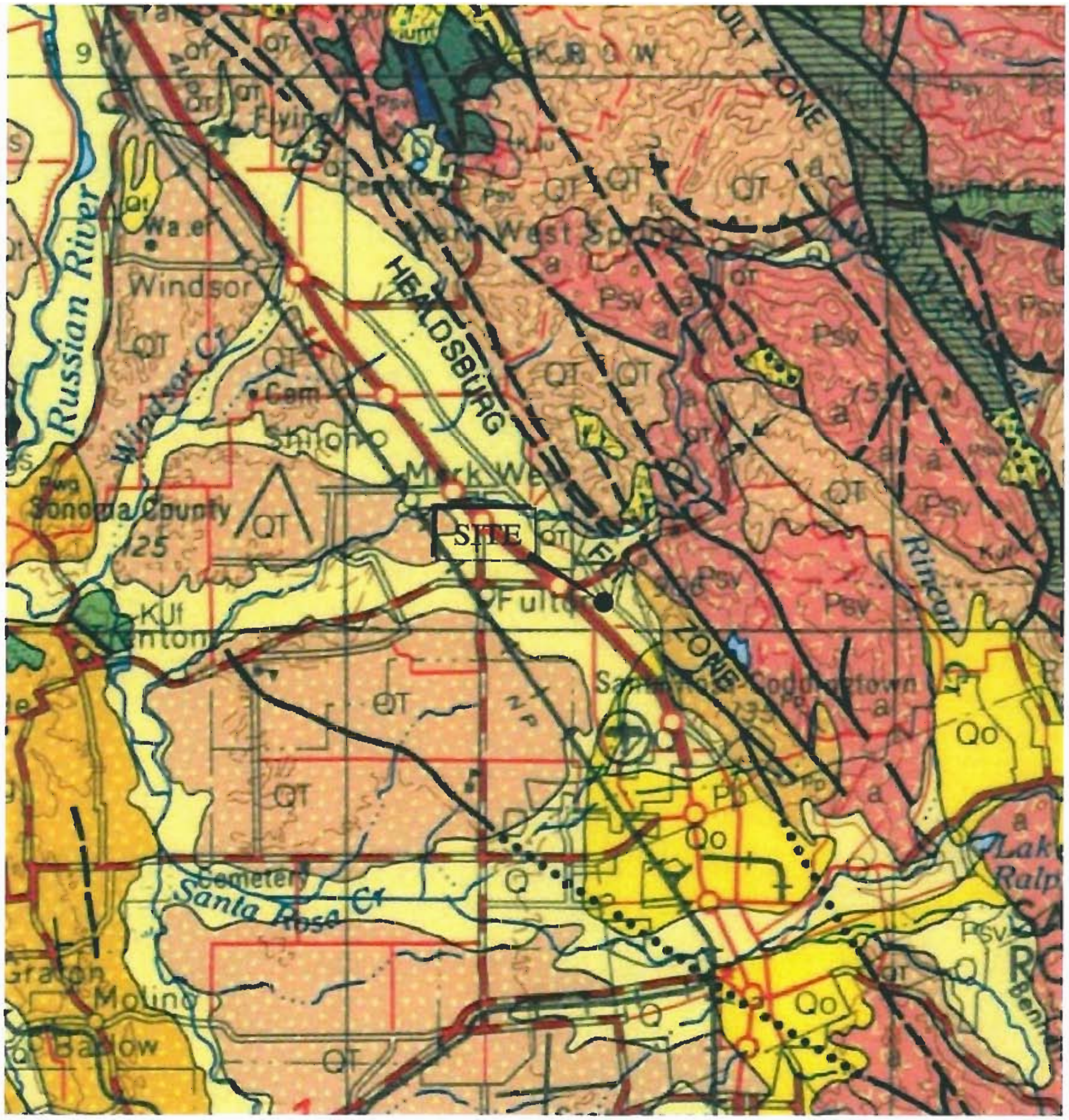

EXPLANATION

ALLUVIUM	SONOMA VOLCANICS
LANDSLIDE DEPOSITS	FRANCISCAN COMPLEX
OLD ALLUVIUM	LOWER CRETACEOUS GREAT VALLEY SEQUENCE
HUICHICA AND GLEN ELLEN FORMATION; INCLUDES UNDIFFERENTIATED CONTINENTAL DEPOSITS	SERPENTINIZED ULTRAMAFIC ROCK

N

0 MILES 2
0 KILOMETERS 4

BASE MAP SOURCE: WAGNER AND BORTUGNO, 1982

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL GEOLOGY
SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.005.01
DATE: FEBRUARY 2006
DRAWN BY: JBW
CHECKED BY: TPB
FIGURE NO. 3

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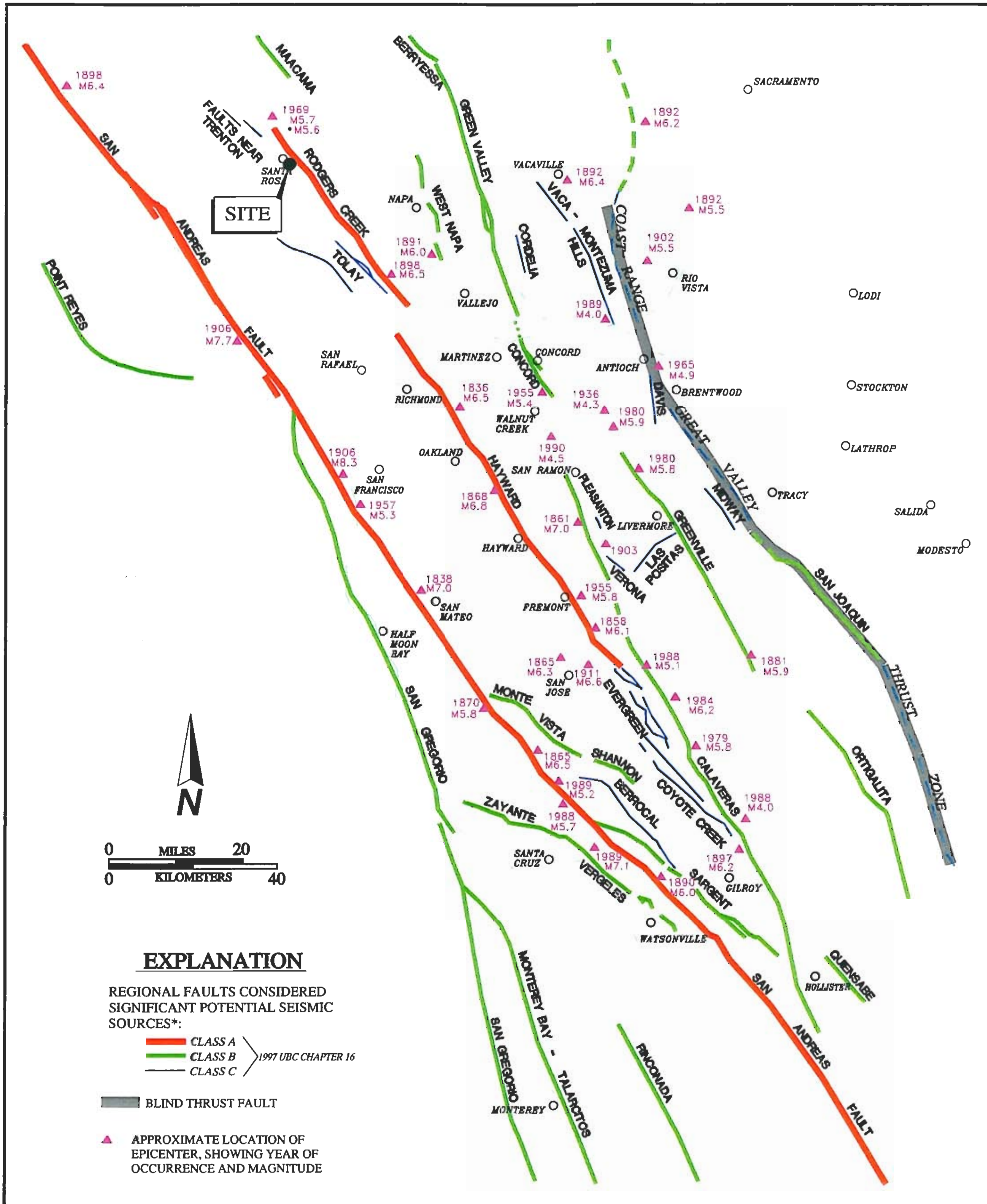

*BASED ON USGS OPEN FILE 96-706

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL FAULTING AND SEISMICITY

SUTTER MEDICAL CENTER OF SANTA ROSA/
LUTHER BURBANK CENTER FOR THE ARTS
SANTA ROSA, CALIFORNIA

PROJECT NO.: 6486.2.005.01
DATE: FEBRUARY 2006
DRAWN BY: JBW
CHECKED BY: TPB
FIGURE NO. 4

ORIGINAL FIGURE PRINTED IN COLOR

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BASE SOURCE: GOOGLE EARTH

NO SCALE

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SOUTHERLY VIEW SUTTER MEDICAL CENTER OF SANTA ROSA/ LUTHER BURBANK CENTER FOR THE ARTS SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.2.005.01 DATE: FEBRUARY 2006 DRAWN BY: JBW CHECKED BY: TPB	FIGURE NO. 5

ORIGINAL FIGURE PRINTED IN COLOR

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APPENDIX B

W-LBC Step-Drawdown Test
Figure B-1: Depth of Groundwater during W-LBC Step-Drawdown Test
Figure B-2: Drawdown during W-LBC Step-Drawdown Test

W-LBC 24-hour Pump Test @ 100gpm
Figure B-3: Depth of Groundwater during W-LBC Pump Test @ 100gpm
Figure B-4: Drawdown during W-LBC Pump Test @ 100gpm

Aquifer Analysis Methodologies
Figure B-5: Cooper-Jacob Drawdown Method
Figure B-6: Cooper-Jacob Recovery Method
Figure B-7: Cooper-Jacob Residual Drawdown Method
Figure B-8: Cooper-Jacob Calculated Recovery Method
Figure B-9: Theis Curve-Matching Drawdown Method
Figure B-10: Theis Curve-Matching Recovery Method

W-LBC 24-hour Pump Test @ 80gpm
Figure B-11: Depth of Groundwater during W-LBC Pump Test @ 80gpm
Figure B-12: Drawdown during W-LBC Pump Test @ 80gpm

W-SV Step-Drawdown Test
Figure B-13: Depth of Groundwater during W-SV Step-Drawdown Test
Figure B-14: Drawdown during W-SV Step-Drawdown Test

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6468.2.005.01
Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27 10:03 AM
End Pumping:	2005-06-27 4:23 PM
Initial Volume (100gpm):	18612 x100 gal
Final Volume (100 gpm):	18734 x100 gal
Initial Volume (150gpm):	18734 x100 gal
Final Volume (150 gpm):	19201 x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	10:04 AM	73.00	36.80	Start 100gpm; actual rate closer to 350gpm for first 10 minutes
2	10:05 AM	75.00	36.80	
3	10:06 AM	-	36.80	
4	10:07 AM	77.00	36.80	
5	10:08 AM	78.00	36.80	
6	10:09 AM	79.00	36.80	
7	10:10 AM	-	36.80	
8	10:11 AM	80.50	36.80	
9	10:12 AM	81.00	36.80	Reduced rate to roughly 125gpm
10	10:13 AM	75.00	36.80	
12	10:15 AM	74.00	36.80	
14	10:17 AM	73.00	36.80	
16	10:19 AM	72.50	36.80	
18	10:21 AM	72.30	36.80	
20	10:23 AM	73.40	36.80	
22	10:25 AM	73.80	36.80	
24	10:27 AM	74.00	36.80	
26	10:29 AM	74.00	36.80	
28	10:31 AM	64.20	36.80	
30	10:33 AM	62.10	36.80	
35	10:38 AM	61.40	36.80	
40	10:43 AM	61.00	36.80	
45	10:48 AM	60.60	36.80	
50	10:53 AM	60.50	36.80	
55	10:58 AM	60.40	36.80	
60	11:03 AM	60.40	36.80	
70	11:13 AM	60.40	36.80	

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27	10:03 AM
End Pumping:	2005-06-27	4:23 PM
Initial Volume (100gpm):	18612	x100 gal
Final Volume (100 gpm):	18734	x100 gal
Initial Volume (150gpm):	18734	x100 gal
Final Volume (150 gpm):	19201	x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
80	11:23 AM	60.40	36.80	End 100 gpm, Start 150 gpm
81	11:24 AM	64.00	36.80	
82	11:25 AM	64.40	36.80	
83	11:26 AM	64.95	36.80	
84	11:27 AM	64.80	36.80	
85	11:28 AM	65.00	36.80	
86	11:29 AM	65.50	36.80	
87	11:30 AM	65.60	36.80	
88	11:31 AM	65.95	36.80	
89	11:32 AM	66.00	36.80	
90	11:33 AM	66.00	36.80	
92	11:35 AM	66.15	36.80	
94	11:37 AM	66.50	36.80	
96	11:39 AM	66.55	36.80	
98	11:41 AM	66.70	36.80	
100	11:43 AM	66.95	36.80	
102	11:45 AM	66.90	36.80	
104	11:47 AM	66.90	36.80	
106	11:49 AM	67.20	36.80	
108	11:51 AM	67.30	36.80	
110	11:53 AM	67.45	36.80	
115	11:58 AM	67.70	36.80	
120	12:03 PM	68.50	36.80	
125	12:08 PM	68.10	36.80	
130	12:13 PM	67.85	36.80	
135	12:18 PM	68.50	36.80	
140	12:23 PM	68.50	36.80	

W-LBC :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-06-27	10:03 AM
End Pumping:	2005-06-27	4:23 PM
Initial Volume (100gpm):	18612	x100 gal
Final Volume (100 gpm):	18734	x100 gal
Initial Volume (150gpm):	18734	x100 gal
Final Volume (150 gpm):	19201	x100 gal

Background Water Level: 44.00 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	Groundwater Depth W-SV (feet, btc)	Observations, odors, clarity, notes.
150	12:33 PM	68.70	36.80	
160	12:43 PM	68.95	36.80	
170	12:53 PM	69.25	36.80	
180	1:03 PM	69.40	37.00	
190	1:13 PM	69.85	37.00	
200	1:23 PM	69.90	37.00	
220	1:43 PM	70.15	37.00	
240	2:03 PM	70.70	37.00	
260	2:23 PM	71.00	37.00	
280	2:43 PM	71.40	37.00	
300	3:03 PM	71.50	37.00	
320	3:23 PM	71.80	37.00	
350	3:53 PM	72.10	37.00	
380	4:23 PM	72.50	37.00	End 150 gpm

Figure B-1: Depth of Groundwater during W-LBC Step-Drawdown Test

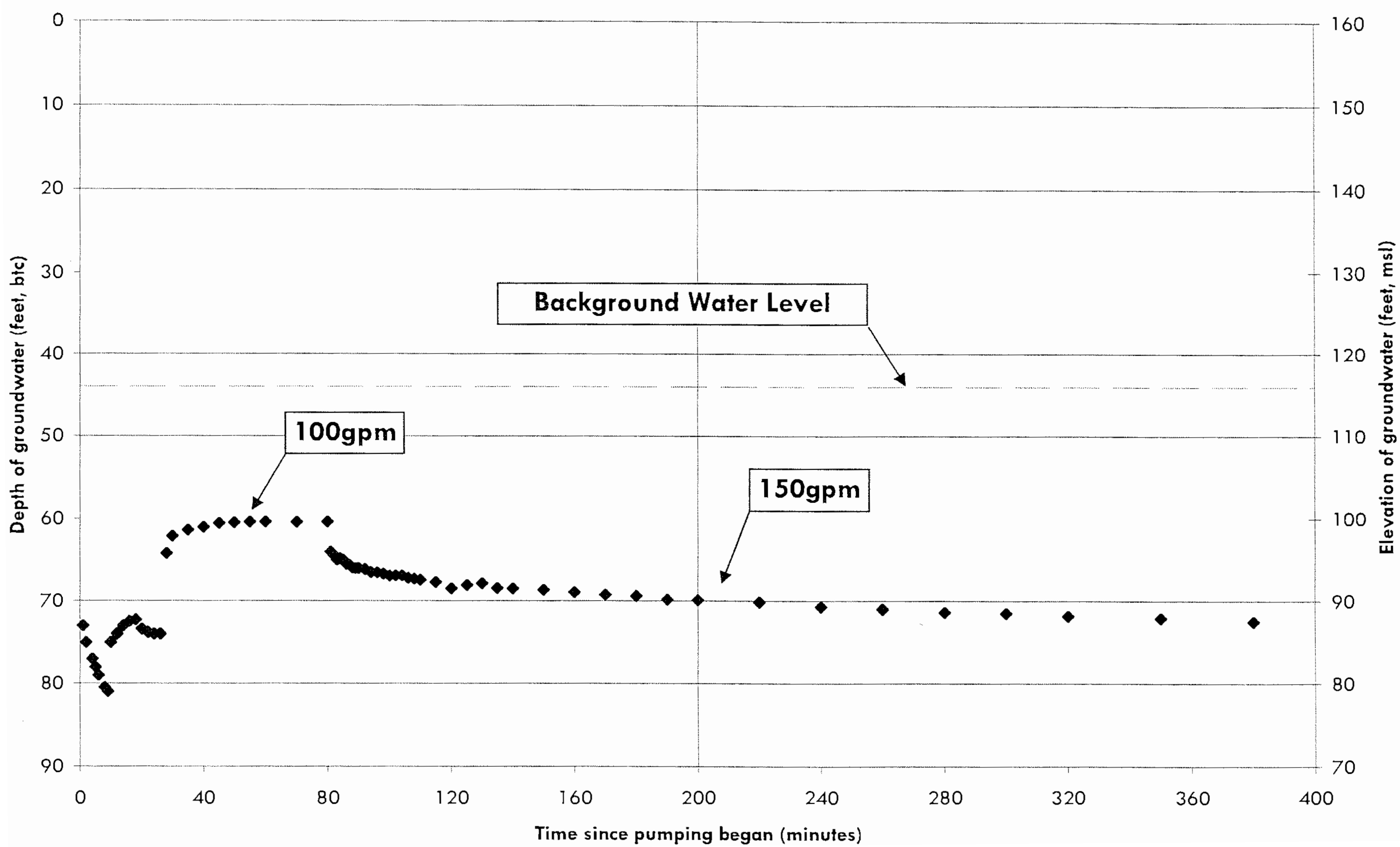
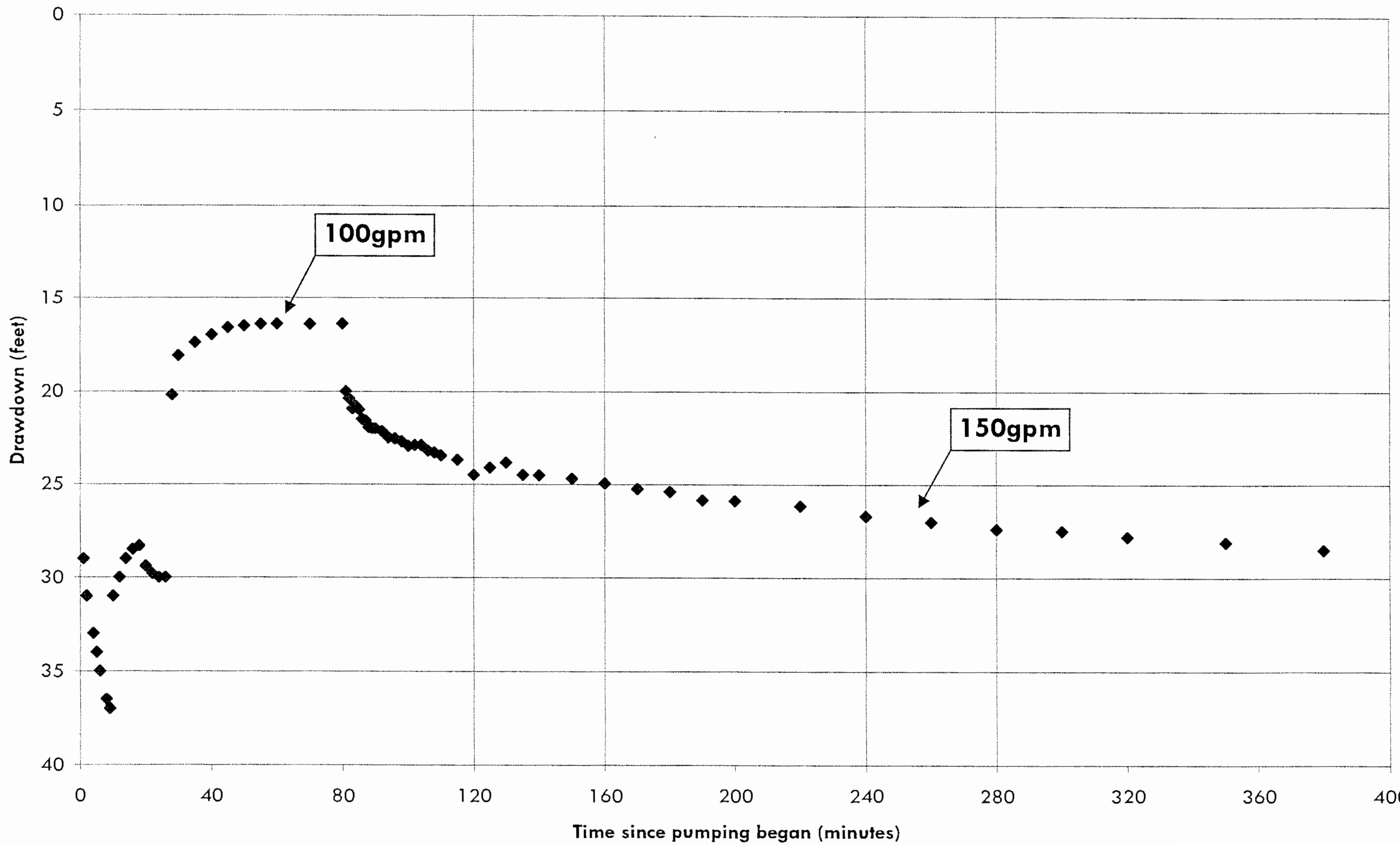


Figure B-2: Drawdown during W-LBC Step-Drawdown Test



W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06 10:00 AM
End Pumping:	2005-07-07 10:00 AM
Initial Volume:	19209 x100 gal
Final Volume:	20736 x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	10:01 AM	55.05	39.00	clear, no odors; Sand Test: 0 ppm
2	10:02 AM	56.05	39.00	
3	10:03 AM	56.60	39.00	
4	10:04 AM	56.85	39.00	
5	10:05 AM	57.10	39.00	first 10 min., 125 gpm @ 135 psi
6	10:06 AM	57.30	39.00	
7	10:07 AM	57.70	39.00	
8	10:08 AM	58.00	39.00	
9	10:09 AM	58.20	39.00	
10	10:10 AM	58.35	39.00	at 10 min., 138 back pressure reducing q to 100 gpm
12	10:12 AM	56.85	39.00	
14	10:14 AM	57.25	39.00	
16	10:16 AM	57.85	39.00	
18	10:18 AM	58.30	39.00	
20	10:20 AM	58.45	39.00	
22	10:22 AM	58.70	39.00	
24	10:24 AM	58.85	39.00	
26	10:26 AM	59.00	39.00	
28	10:28 AM	59.10	39.00	
30	10:30 AM	59.30	39.00	
35	10:35 AM	59.70	39.00	
40	10:40 AM	60.00	39.00	
45	10:45 AM	60.15	39.00	
50	10:50 AM	60.50	39.00	
55	10:55 AM	60.70	39.00	
60	11:00 AM	60.90	39.00	
70	11:10 AM	61.15	39.00	19285
80	11:20 AM	61.50	39.00	19295
90	11:30 AM	61.70	39.00	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06	10:00 AM
End Pumping:	2005-07-07	10:00 AM
Initial Volume:	19209	x100 gal
Final Volume:	20736	x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
100	11:40 AM	62.00	39.00	
110	11:50 AM	62.15	39.20	
120	12:00 PM	62.40	39.40	vineyard pump in use
140	12:20 PM	62.70	39.20	19357.5
160	12:40 PM	63.05	39.10	19378.5
180	1:00 AM	63.30	39.10	
200	1:20 AM	63.60	39.40	19422
220	1:40 AM	63.80	39.90	19442
240	2:00 AM	64.00	39.40	
270	2:30 AM	64.30	39.20	19500
300	3:00 AM	64.60	39.20	
330	3:30 AM	64.85	39.20	
360	4:00 AM	65.05	39.20	19589
420	5:00 AM	65.50	39.20	19652
480	6:00 AM	65.80	39.20	19715
540	7:00 AM	66.20	39.20	19778
600	8:00 AM	66.50	39.20	19842
660	9:00 AM	66.80	39.20	19906
720	10:00 AM	67.00	39.20	19969
840	12:00 PM	67.30	-	20100
960	2:00 AM	67.60	-	20226
1080	4:00 AM	67.90	-	20354
1200	6:00 AM	68.20	-	20483
1320	8:00 AM	68.40	42.10	20617; vineyard pump in use
1440	10:00 AM	68.55	39.90	20736; Sand Test: 0 ppm
1441	10:01 AM	61.40	39.90	
1442	10:02 AM	60.50	39.90	
1443	10:03 AM	59.70	39.90	
1444	10:04 AM	59.20	39.90	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06 10:00 AM
End Pumping:	2005-07-07 10:00 AM
Initial Volume:	19209 x100 gal
Final Volume:	20736 x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1445	10:05 AM	59.00	39.90	
1446	10:06 AM	58.65	39.90	
1447	10:07 AM	58.25	39.90	
1448	10:08 AM	58.05	39.90	
1449	10:09 AM	57.80	39.90	
1450	10:10 AM	57.50	39.90	
1452	10:12 AM	57.20	39.90	
1454	10:14 AM	56.90	39.90	
1456	10:16 AM	56.60	39.90	
1458	10:18 AM	56.35	39.90	
1460	10:20 AM	56.10	39.90	
1462	10:22 AM	55.80	39.90	
1464	10:24 AM	55.65	39.90	
1466	10:26 AM	55.45	39.90	
1468	10:28 AM	55.30	39.90	
1470	10:30 AM	55.10	39.90	
1475	10:35 AM	-	39.90	
1480	10:40 AM	54.25	39.90	
1485	10:45 AM	54.05	39.90	
1490	10:50 AM	53.70	39.90	
1495	10:55 AM	53.50	39.90	
1500	11:00 AM	53.30	39.80	
1510	11:10 AM	52.90	39.80	
1520	11:20 AM	52.60	39.80	
1530	11:30 AM	52.15	39.80	
1540	11:40 AM	51.90	39.80	
1550	11:50 AM	51.55	39.80	
1560	12:00 PM	51.35	39.80	
1580	12:20 PM	50.95	39.80	

W-LBC :: 24-hour Pump Test @ 100gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-07-06	10:00 AM
End Pumping:	2005-07-07	10:00 AM
Initial Volume:	19209	x100 gal
Final Volume:	20736	x100 gal

Background Water Level: 45.70 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings. observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1600	12:40 PM	50.50	40.00	
1620	1:00 PM	50.10	40.60	vineyard pump in use
1640	1:20 PM	49.75	40.00	
1660	1:40 PM	49.50	40.00	
1680	2:00 PM	49.30	40.00	
1710	2:30 PM	48.95	40.00	
1740	3:00 PM	48.60	39.90	
1770	3:30 PM	48.30	39.90	
1800	4:00 PM	48.05	39.90	
1860	5:00 PM	47.50	39.90	
1920	6:00 PM	47.15	39.90	
1980	7:00 PM	46.80	39.90	
2880	10:00 AM	44.40	39.60	

Water Sampling Notes

Sample at 11:00 AM (START); no odor discernable

Sample at 10:00 PM (MIDDLE); mild sulfur-like smell in containers (rotten-egg like)

Sample at 9:00 AM (END); strong sulfur-like smell in container (rotten-egg like)

Figure B-3: Depth of Groundwater during W-LBC Pump Test @ 100gpm

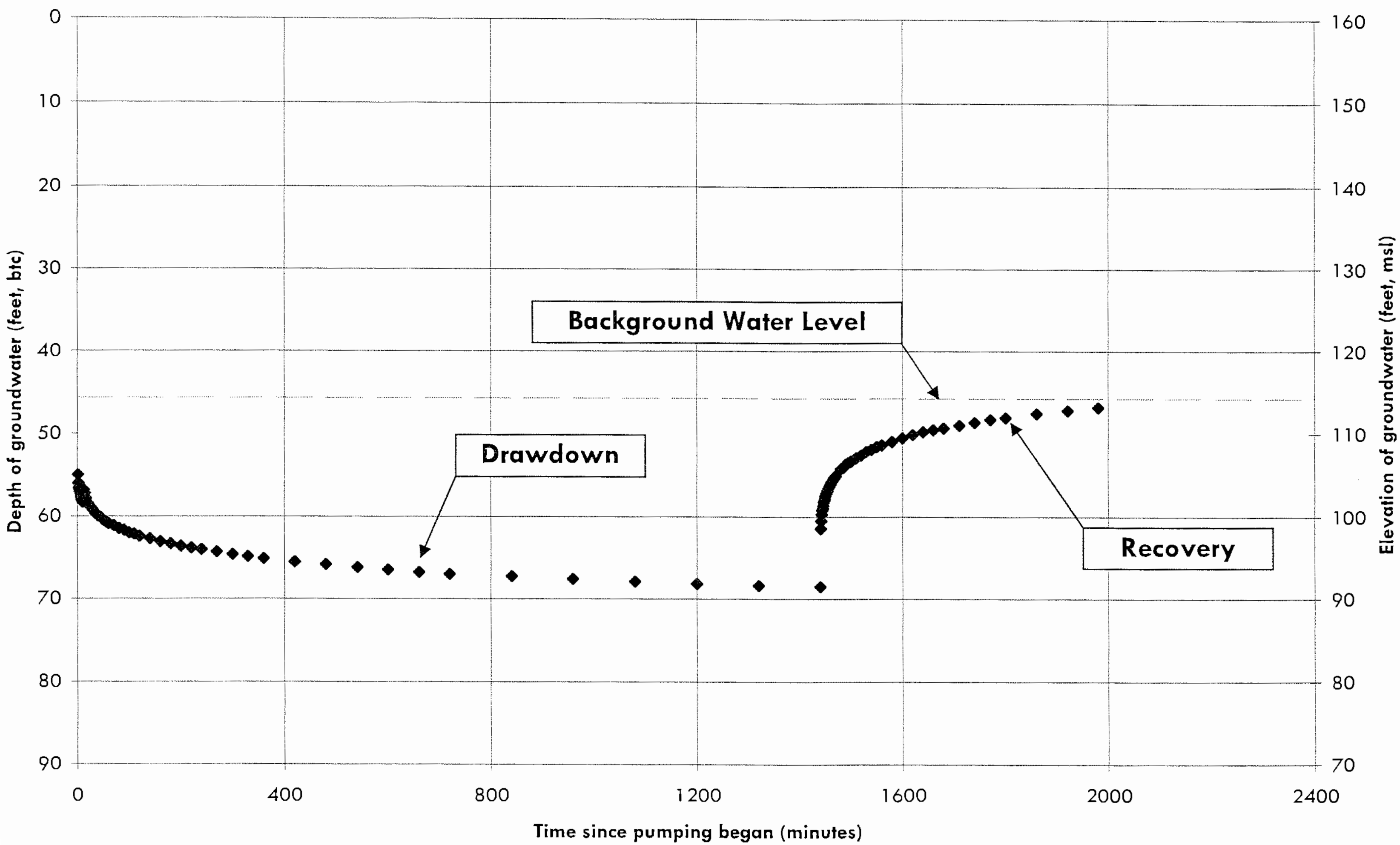
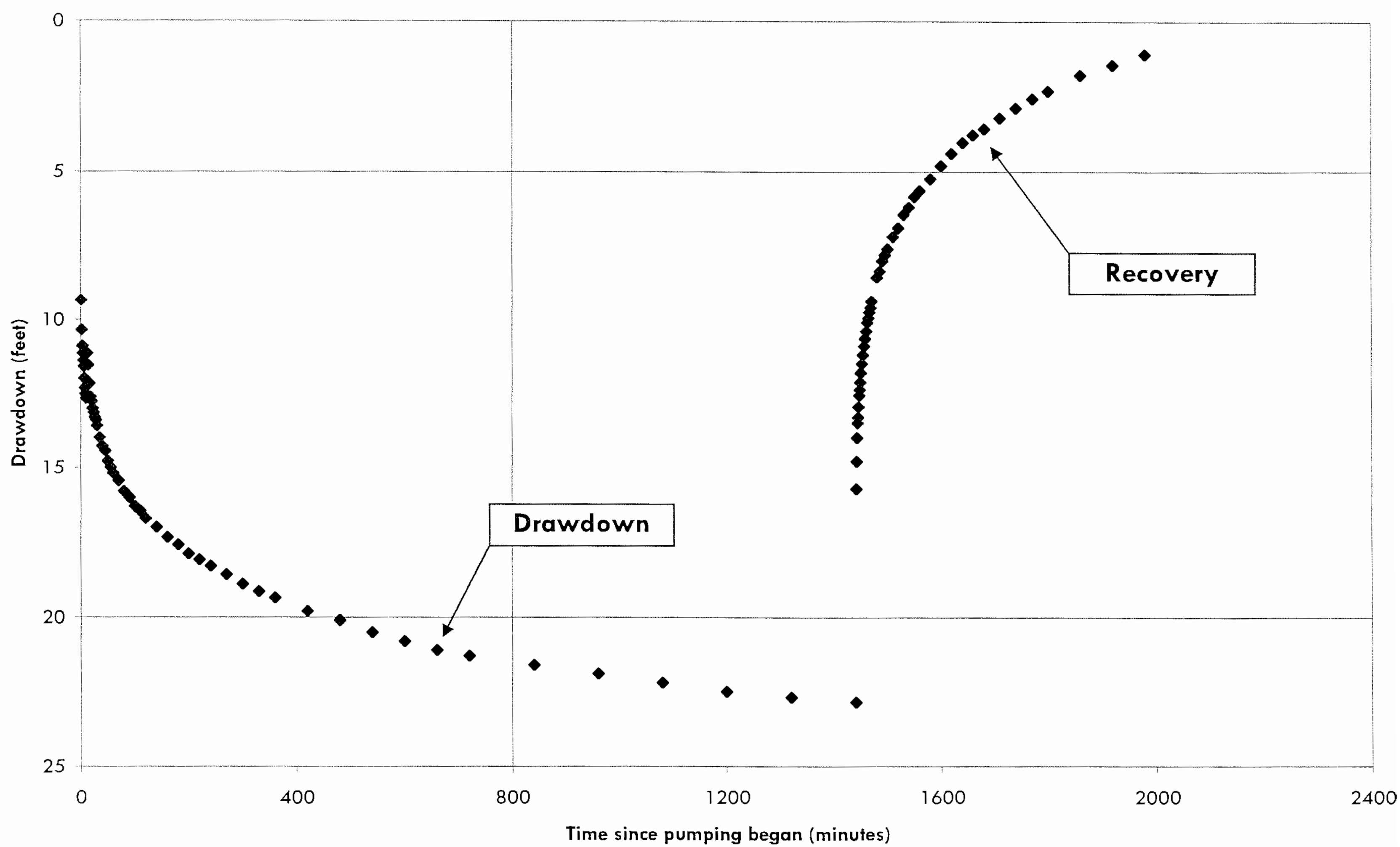


Figure B-4: Drawdown during W-LBC Pump Test @ 100gpm



AQUIFER ANALYSIS METHODOLOGIES

We have calculated the theoretical values of transmissivity and storativity in using the Cooper-Jacob and Theis Curve-Matching methods.

Cooper-Jacob Method

$$T = \frac{264Q}{\Delta s} \qquad S = \frac{0.3T \cdot t_0}{r^2}$$

…where T is the transmissivity in gpd/ft, Q is the flow discharge in gpm, Δs is the drawdown over one time-cycle in feet, S is the storativity, t_0 is the time at which a straight-line extension of the drawdown curve intersects with zero drawdown in days, and r is the distance from the well where the drawdown occurred in feet.

Theis Curve-Matching Method

$$T = \frac{Q \cdot W(u)}{4\pi \cdot s} \qquad S = \frac{4T \cdot t \cdot u}{r^2}$$

…where T is the transmissivity in cubic meters per second per meter, Q is the flow discharge in cubic meters per second, s is the drawdown in meters and t is the time in seconds from one point on the drawdown graph, W(u) is the well function and u is a parameter from the corresponding point on the well function graph, S is the storativity, and r is the distance from the well the drawdown occurred.

Maximum Radius of Influence

We have calculated the theoretical maximum radius of influence from the pumping of W-LBC using Cooper and Jacob modification of the Theis equation as follows:

$$s = \frac{264Q}{T} \log \frac{0.3Tt}{r^2 S}$$

…where s is equal to the maximum available drawdown in feet, Q is equal to the discharge in gpm, T is equal to the transmissivity in gpd/ft, t is equal to the time in days, r is equal to the radius from the well in feet, and S is equal to the storativity which is dimensionless.

Figure B-5: Cooper-Jacob Drawdown Method

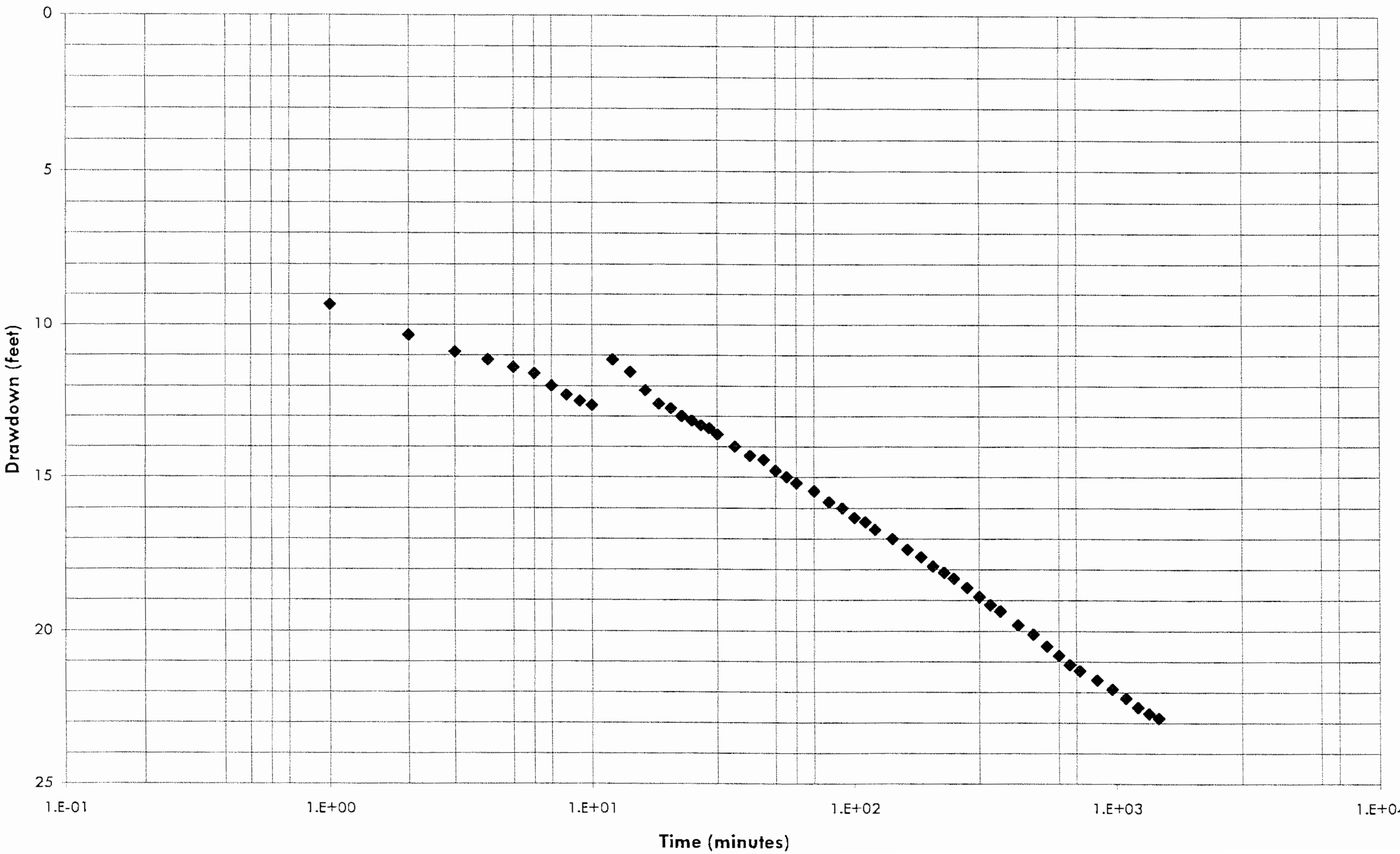


Figure B-6: Cooper-Jacob Recovery Method

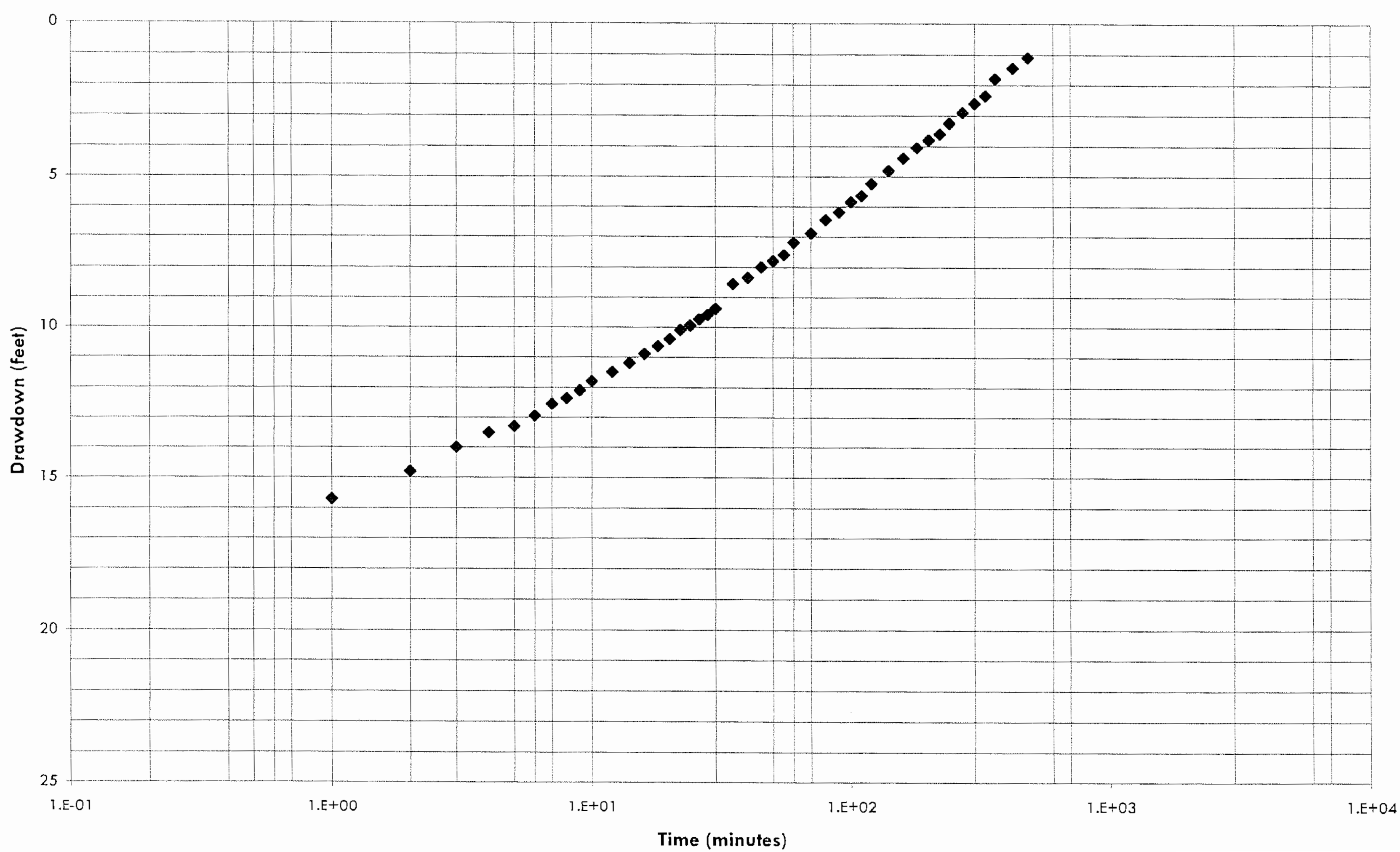


Figure B-7: Cooper-Jacob Residual Drawdown Method

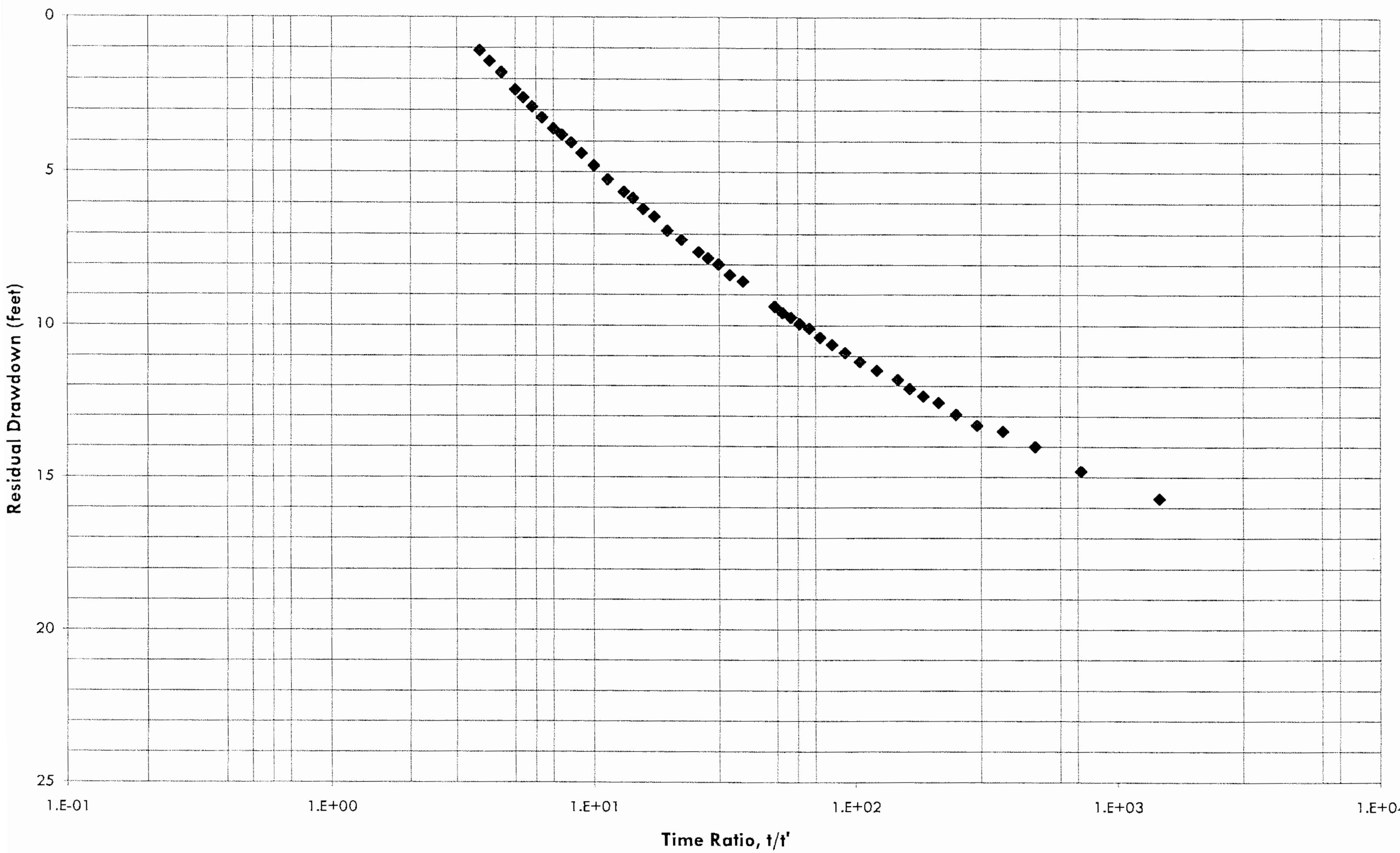


Figure B-8: Cooper-Jacob Calculated Recovery Method

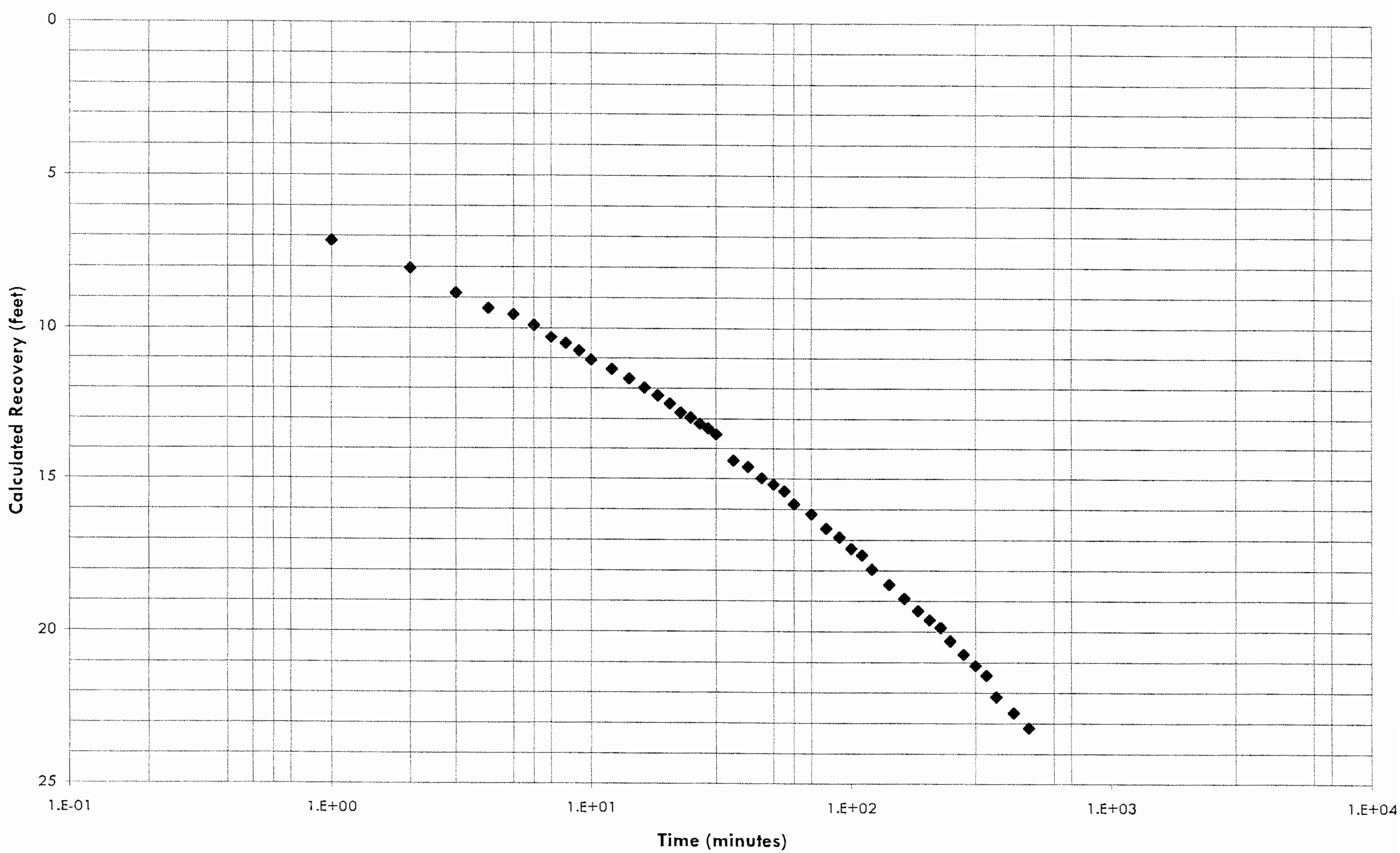


Figure B-9: Theis Curve-Matching Drawdown Method

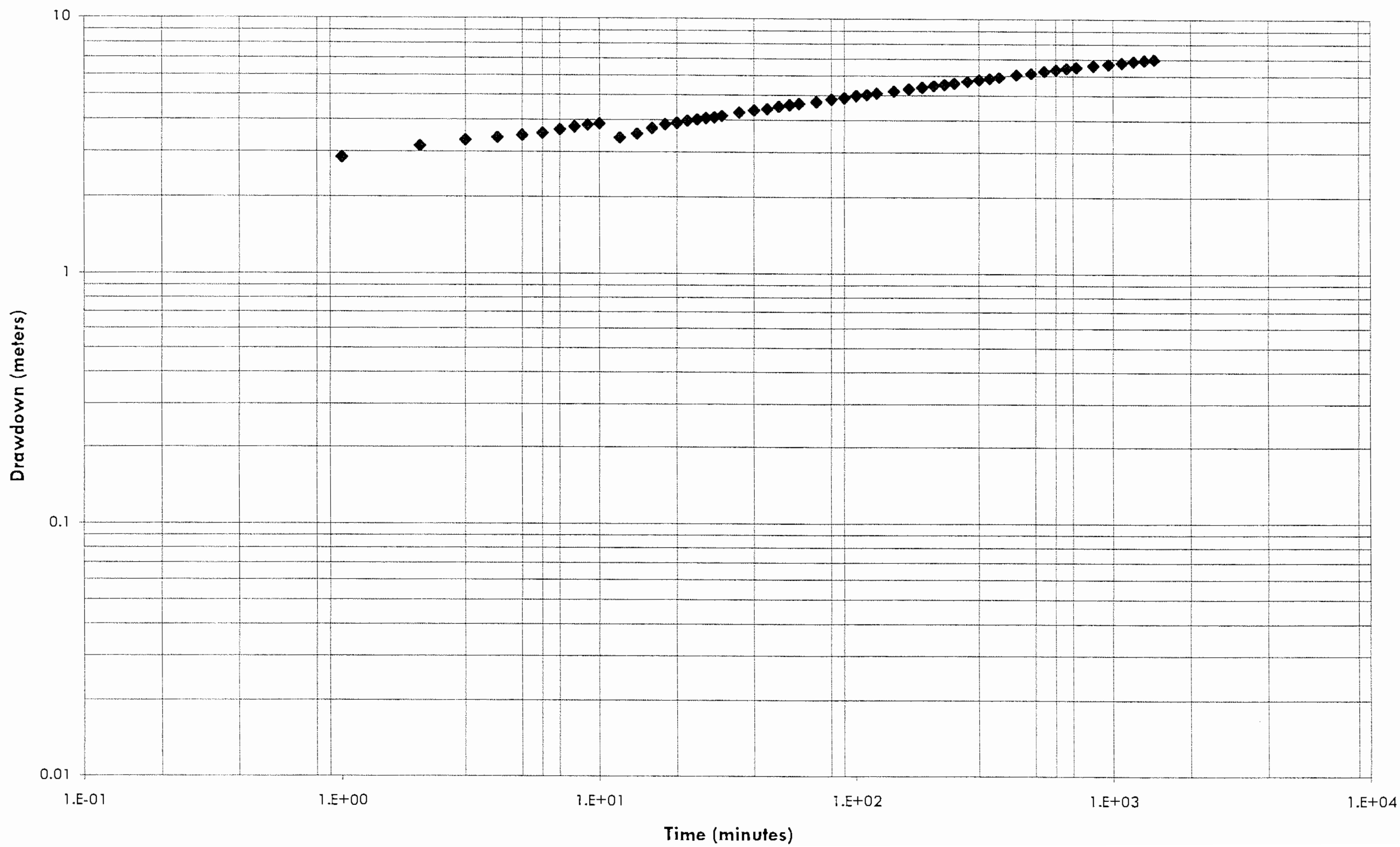
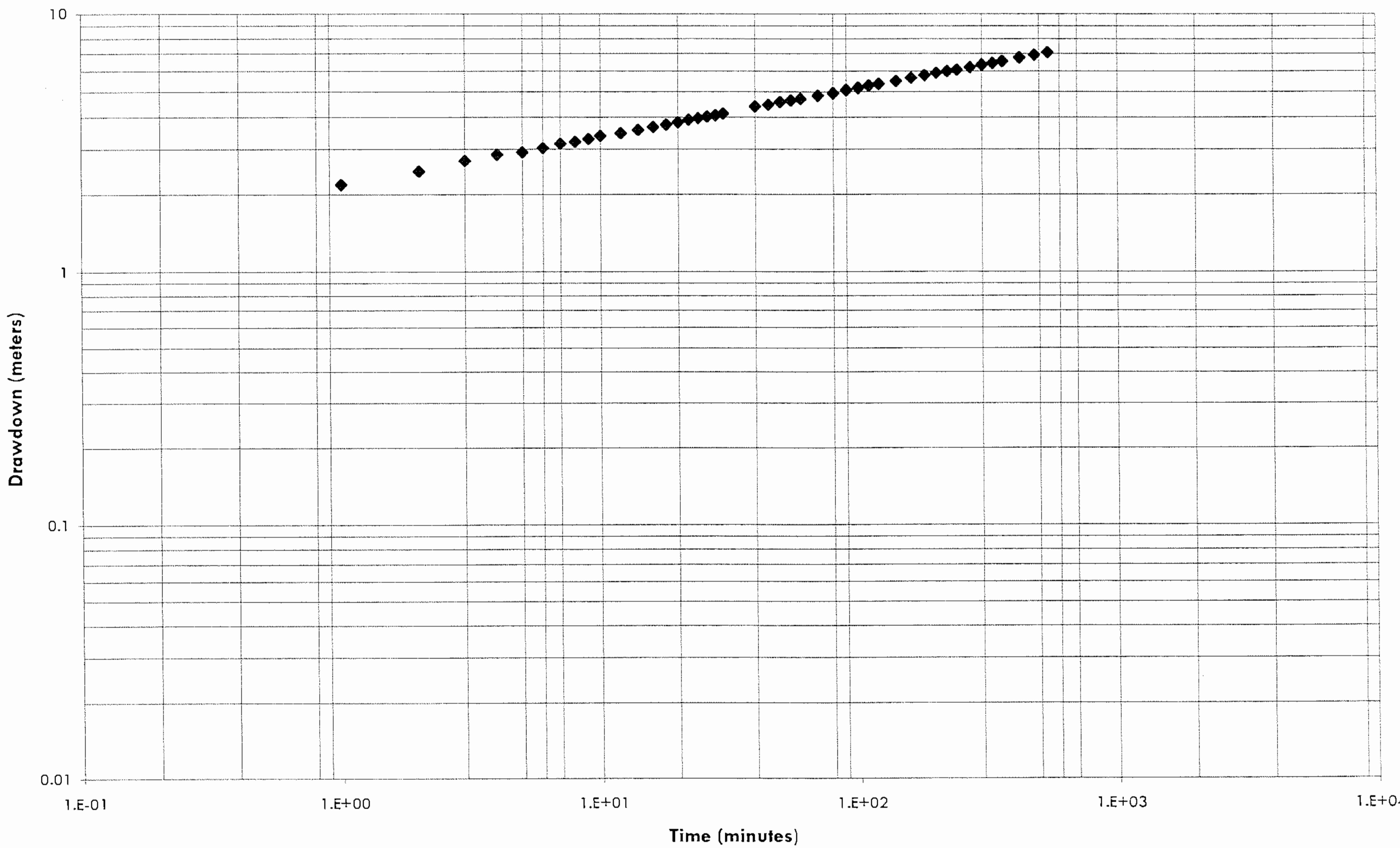


Figure B-10: Theis Curve-Matching Recovery Method



W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	10:51 AM	-	-	
2	10:52 AM	53.40	-	Actually 200gpm
3	10:53 AM	53.70	-	
4	10:54 AM	52.60	-	~82gpm
5	10:55 AM	52.60	-	
6	10:56 AM	52.80	-	Sand Test: neglected due to disruption in well (rust particles, etc.)
7	10:57 AM	53.00	-	
8	10:58 AM	53.21	-	
9	10:59 AM	53.30	-	
10	11:00 AM	53.45	-	
12	11:02 AM	53.71	-	
14	11:04 AM	53.95	-	35977
16	11:06 AM	54.13	-	35979
18	11:08 AM	54.30	-	
20	11:10 AM	54.50	-	35981
22	11:12 AM	54.68	-	35983
24	11:14 AM	54.71	-	35985
26	11:16 AM	54.98	-	35987
28	11:18 AM	55.12	-	35989
30	11:20 AM	55.25	-	35990
35	11:25 AM	55.51	-	35994
40	11:30 AM	55.76	-	35998
45	11:35 AM	56.00	-	36002
50	11:40 AM	56.21	-	36006
55	11:45 AM	56.37	-	36009
60	11:50 AM	56.61	-	36014
70	12:00 AM	56.97	-	36022
80	12:10 PM	57.25	-	36032
90	12:20 AM	57.50	-	36040

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	W-SV (feet, btc)	Totalizer readings, observations, odors, clarity, notes.
100	12:30 PM	57.72	-	36048
110	12:40 AM	57.89	-	36055
120	12:50 PM	58.12	-	36062
140	1:10 PM	58.42	-	36078
160	1:30 PM	58.73	-	36094
180	1:50 PM	59.01	-	36111
200	2:10 PM	59.28	-	36127
220	2:30 PM	59.52	-	36144
240	2:50 PM	59.71	-	36158
270	3:20 PM	60.00	-	36182; Sand Test: 0 ppm
300	3:50 PM	60.24	-	36206
330	4:20 PM	60.49	-	36229
360	4:50 PM	60.71	-	36255
420	5:50 PM	61.10	-	36298
480	6:50 PM	61.50	-	36351
540	7:50 PM	61.85	-	36405
600	8:50 PM	62.10	-	36447
660	9:50 PM	62.36	-	36492
720	10:50 PM	62.60	-	36538
840	12:50 AM	62.96	-	36630
960	2:50 AM	63.30	-	36725
1080	4:50 AM	63.61	-	36819
1200	6:50 AM	63.88	-	36915
1320	8:50 AM	64.12	-	37021
1440	10:50 AM	64.32	-	37102
1590	1:20 PM	64.49	-	37233
1690	3:00 PM	64.65	-	37304; Sand Test: 0 ppm
1691	3:01 PM	59.61	-	
1692	3:02 PM	58.70	-	

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	W-SV (feet, btc)	Totalizer readings, observations, odors, clarity, notes.
1693	3:03 PM	58.15	-	
1694	3:04 PM	57.71	-	
1695	3:05 PM	57.39	-	
1696	3:06 PM	57.15	-	
1697	3:07 PM	57.00	-	
1698	3:08 PM	56.76	-	
1699	3:09 PM	56.58	-	
1700	3:10 PM	56.40	-	
1702	3:12 PM	56.15	-	
1704	3:14 PM	55.82	-	
1706	3:16 PM	55.56	-	
1708	3:18 PM	55.41	-	
1710	3:20 PM	55.24	-	
1712	3:22 PM	55.05	-	
1714	3:24 PM	54.85	-	
1716	3:26 PM	54.72	-	
1718	3:28 PM	54.58	-	
1720	3:30 PM	54.48	-	
1725	3:35 PM	54.18	-	
1730	3:40 PM	53.94	-	
1735	3:45 PM	53.70	-	
1740	3:50 PM	53.48	-	
1745	3:55 PM	53.32	-	
1750	4:00 PM	53.15	-	
1760	4:10 PM	52.81	-	
1770	4:20 PM	52.55	-	
1780	4:30 PM	52.28	-	
1790	4:40 PM	52.05	-	
1800	4:50 PM	51.84	-	

W-LBC :: 24-hour Pump Test @ 80gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-14 10:50 AM
End Pumping:	2005-11-15 3:00 PM
Initial Volume:	35964 x100 gal
Final Volume:	37304 x100 gal

Background Water Level: 44.35 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth W-LBC (feet, btc)	Groundwater Depth W-SV (feet, btc)	Totalizer readings, observations, odors, clarity, notes.
1810	5:00 PM	51.66	-	
1830	5:20 PM	51.30	-	
1850	5:40 PM	51.00	-	
1870	6:00 PM	50.75	-	
1890	6:20 PM	50.50	-	
1910	6:40 PM	50.27	-	
1930	7:00 PM	50.07	-	
1960	7:30 PM	49.79	-	
1990	8:00 PM	49.52	-	
2020	8:30 PM	49.30	-	
2050	9:00 PM	49.10	-	
2110	10:00 PM	48.76	-	
2170	11:00 PM	48.47	-	
2230	12:00 AM	48.20	-	
2290	1:00 AM	47.92	-	

Water Sampling Notes

Sample at 12:00 PM (START)

Sample at 10:50 PM (MIDDLE)

Sample at 8:50 AM (END)

Figure B-11: Depth of Groundwater during W-LBC Pump Test @ 80gpm

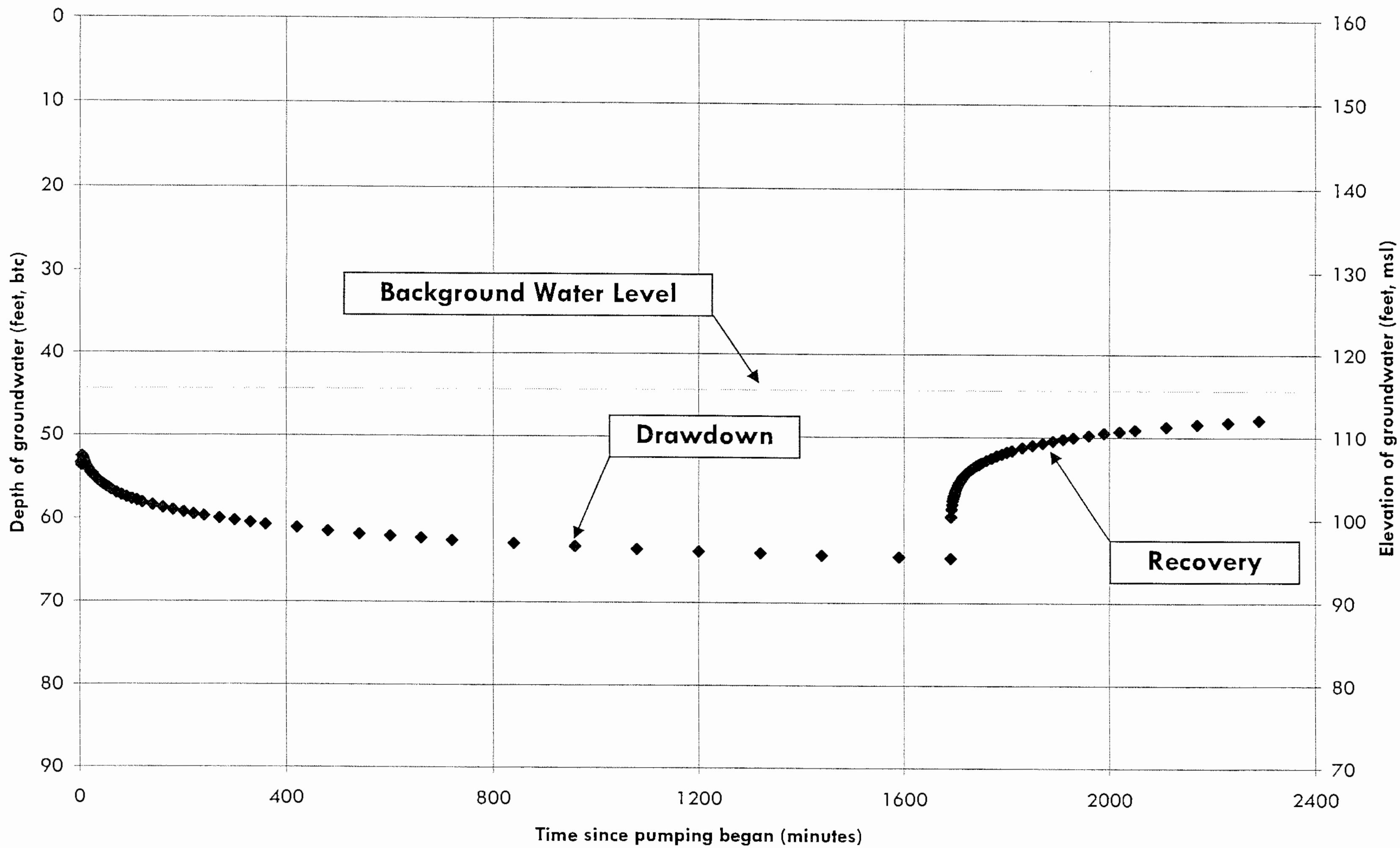
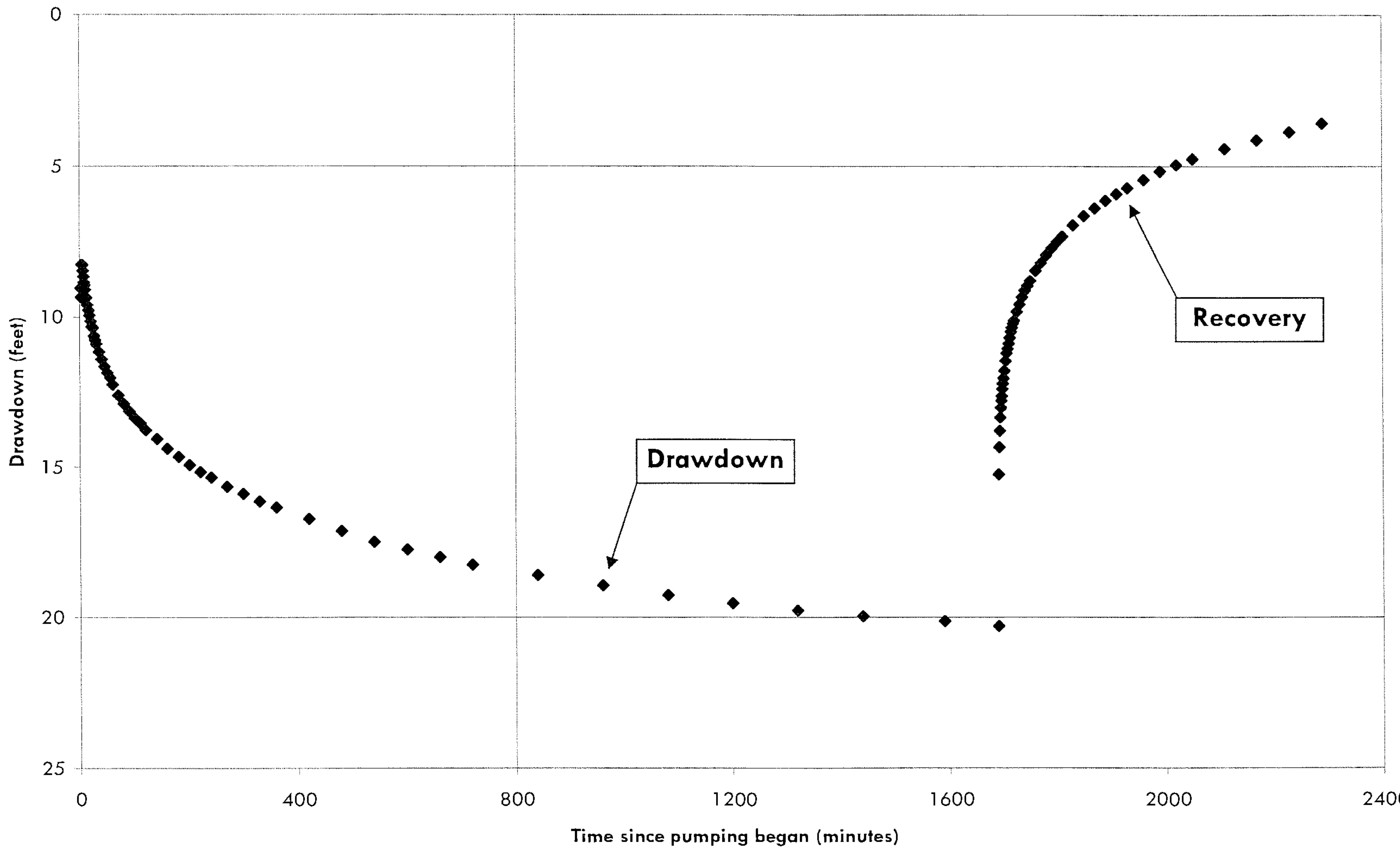


Figure B-12: Drawdown during W-LBC Pump Test @ 80gpm



W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
1	9:51 AM	-	47.88	Start 80gpm; 60psi back pressure
2	9:52 AM	-	49.89	
3	9:53 AM	-	51.45	
4	9:54 AM	-	52.07	
5	9:55 AM	-	52.85	
6	9:56 AM	-	54.12	
7	9:57 AM	-	54.54	
8	9:58 AM	-	55.00	
9	9:59 AM	-	55.49	
10	10:00 AM	-	55.87	
12	10:02 AM	-	56.57	
14	10:04 AM	-	57.11	40174
16	10:06 AM	-	57.73	40189
18	10:08 AM	-	58.63	40217
20	10:10 AM	-	59.08	40231; Sand Test: 0 ppm
22	10:12 AM	-	59.38	40242
24	10:14 AM	-	59.80	40258
26	10:16 AM	-	60.19	40275
28	10:18 AM	-	60.43	40290
30	10:20 AM	-	60.78	40306
35	10:25 AM	-	61.80	40358
40	10:30 AM	-	62.27	40380
45	10:35 AM	-	62.81	40424
50	10:40 AM	-	63.32	40468
55	10:45 AM	-	63.79	40507
60	10:50 AM	-	64.21	40546
70	11:00 AM	-	64.92	40628
80	11:10 AM	-	65.60	40718

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
90	11:20 AM	-	66.14	40803
100	11:30 AM	-	-	
110	11:40 AM	-	67.05	40967
120	11:50 AM	-	67.47	41052
140	12:10 PM	-	68.15	41218
160	12:30 PM	-	68.55	41385
180	12:50 PM	-	69.31	41851
200	1:10 PM	-	69.73	41728
220	1:30 PM	-	70.14	41879
240	1:50 PM	-	70.52	42042
270	2:20 PM	-	71.00	42288
300	2:50 PM	-	71.47	42537
336	3:26 PM	-	71.92	42842
360	3:50 PM	-	72.20	43037; End 80gpm, Start 60gpm; 82psi back pressure
361	3:51 PM	-	70.62	43042
362	3:52 PM	-	70.50	
363	3:53 PM	-	69.87	
364	3:54 PM	-	69.73	43057
365	3:55 PM	-	69.58	43064
366	3:56 PM	-	69.39	43070
367	3:57 PM	-	69.18	43076
368	3:58 PM	-	69.10	43082
369	3:59 PM	-	68.93	43088
370	4:00 PM	-	68.85	43094
372	4:02 PM	-	68.68	43106
374	4:04 PM	-	68.47	43121
376	4:06 PM	-	68.35	43133
378	4:08 PM	-	68.24	43145

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21	9:50 AM
End Pumping:	2005-11-21	6:50 PM
Initial Volume (80gpm):	40059	x100 gal
Final Volume (80 gpm):	43037	x100 gal
Initial Volume (60gpm):	43038	x100 gal
Final Volume (60 gpm):	44138	x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
380	4:10 PM	-	68.16	43158
382	4:12 PM	-	68.08	43169
384	4:14 PM	-	68.01	43179
386	4:16 PM	-	67.93	43192
388	4:18 PM	-	67.87	43203
390	4:20 PM	-	67.82	43215
395	4:25 PM	-	67.70	43248
400	4:30 PM	-	67.60	43279
405	4:35 PM	-	67.55	43308
410	4:40 PM	-	67.46	43338
415	4:45 PM	-	67.40	43368
420	4:50 PM	-	67.34	43402
430	5:00 PM	-	67.26	43461
440	5:10 PM	-	67.21	43526
450	5:20 PM	-	67.19	43584
460	5:30 PM	-	67.17	43672
470	5:40 PM	-	67.15	43710
480	5:50 PM	-	67.17	43764
500	6:10 PM	-	67.17	43892
520	6:30 PM	-	67.19	44010; Sand Test: 0 ppm
540	6:50 PM	-	67.23	44138; End 60gpm
541	6:51 PM	-	62.62	
542	6:52 PM	-	61.35	
543	6:53 PM	-	60.16	
544	6:54 PM	-	59.16	
545	6:55 PM	-	58.31	
546	6:56 PM	-	57.87	
547	6:57 PM	-	57.32	

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21	9:50 AM
End Pumping:	2005-11-21	6:50 PM
Initial Volume (80gpm):	40059	x100 gal
Final Volume (80 gpm):	43037	x100 gal
Initial Volume (60gpm):	43038	x100 gal
Final Volume (60 gpm):	44138	x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
548	6:58 PM	-	56.82	
549	6:59 PM	-	56.30	
550	7:00 PM	-	55.88	
552	7:02 PM	-	55.27	
554	7:04 PM	-	54.67	
556	7:06 PM	-	54.20	
558	7:08 PM	-	53.74	
560	7:10 PM	-	53.36	
562	7:12 PM	-	52.80	
564	7:14 PM	-	52.57	
566	7:16 PM	-	52.31	
568	7:18 PM	-	52.05	
570	7:20 PM	-	51.80	
575	7:25 PM	-	51.27	
580	7:30 PM	-	50.80	
585	7:35 PM	-	50.27	
590	7:40 PM	-	49.92	
595	7:45 PM	-	49.60	
600	7:50 PM	-	49.25	
610	8:00 PM	-	48.70	
620	8:10 PM	-	48.15	
630	8:20 PM	-	47.75	
640	8:30 PM	-	47.37	
650	8:40 PM	-	47.01	
660	8:50 PM	-	46.71	
680	9:10 PM	-	46.16	
700	9:30 PM	-	45.71	
720	9:50 PM	-	45.34	

W-SV :: Step-Drawdown Test

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6468.2.005.01

Engineer: Jeffrey Wisniewski

Start Pumping:	2005-11-21 9:50 AM
End Pumping:	2005-11-21 6:50 PM
Initial Volume (80gpm):	40059 x100 gal
Final Volume (80 gpm):	43037 x100 gal
Initial Volume (60gpm):	43038 x100 gal
Final Volume (60 gpm):	44138 x100 gal

Background Water Level: 42.40 feet, below top of casing [btc] (approx. 20 inches above ground)

Elapsed Time (minutes)	Time	Groundwater Depth		Totalizer readings, observations, odors, clarity, notes.
		W-LBC (feet, btc)	W-SV (feet, btc)	
740	10:10 PM	-	44.98	
760	10:30 PM	-	44.67	
780	10:50 PM	-	44.38	

Water Sampling Notes

Sample at 10:50 AM (START)

Sample at 4:20 PM (MIDDLE)

Sample at 6:30 PM (END)

Figure B-13: Depth of Groundwater during W-SV Step-Drawdown Test

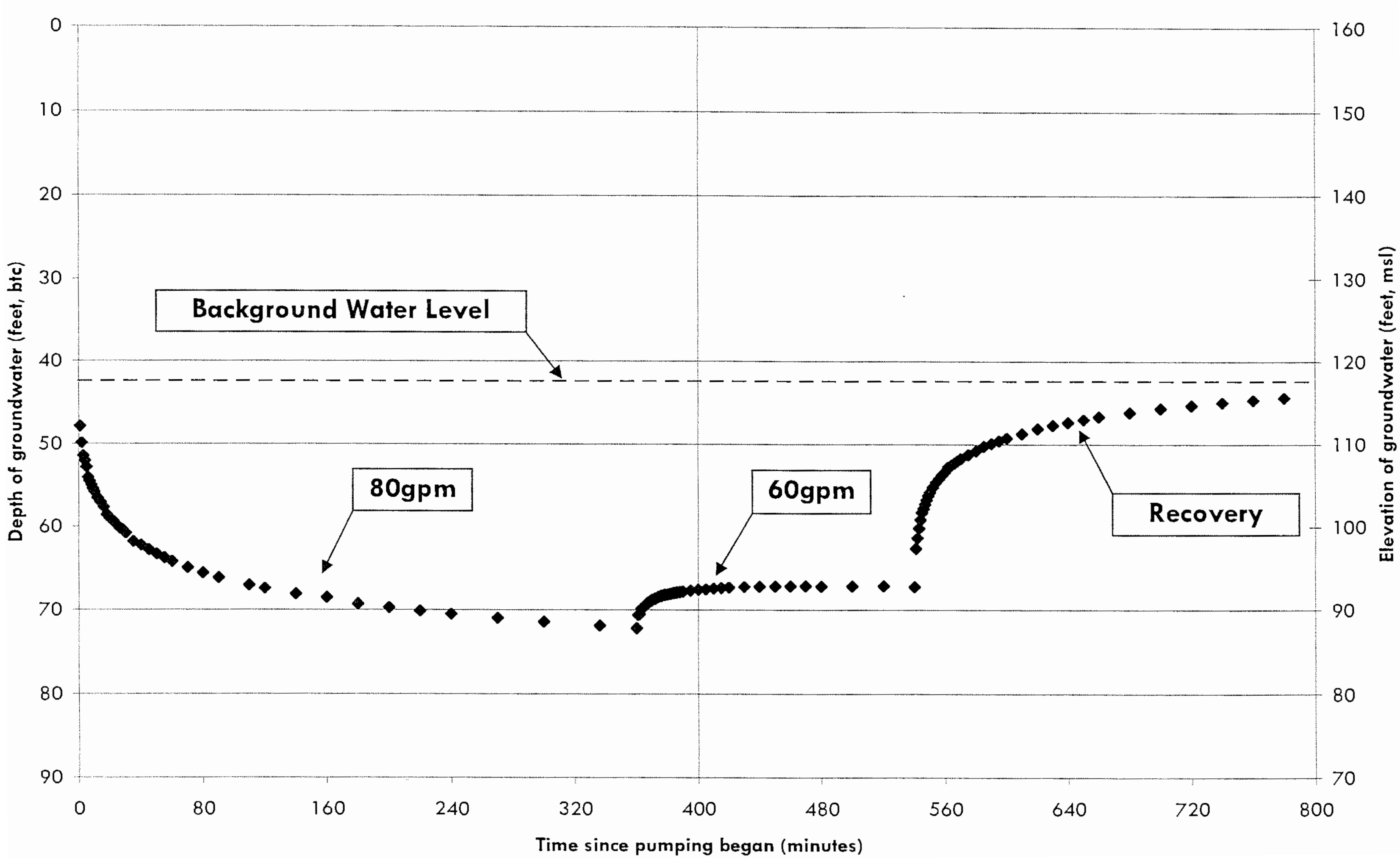
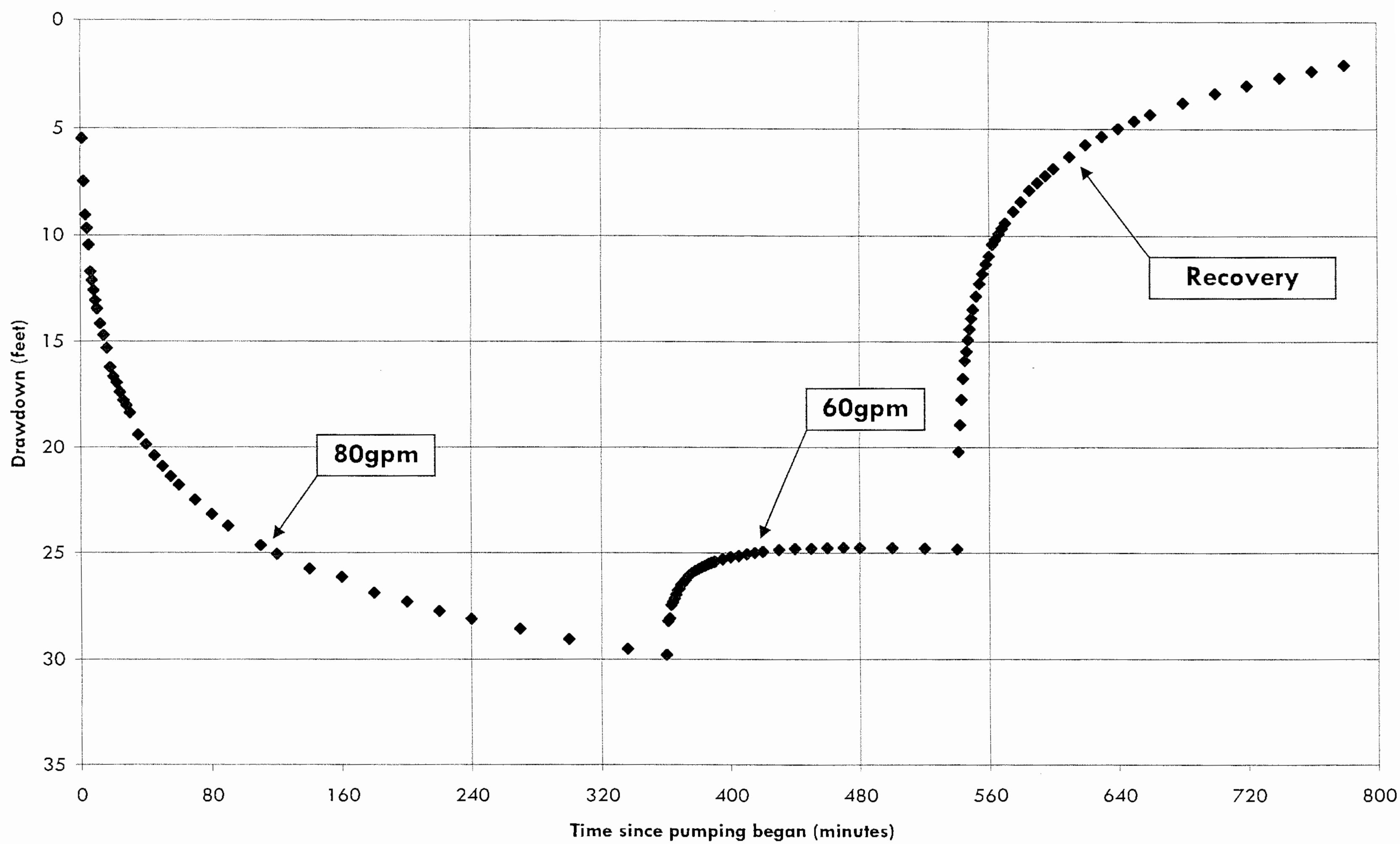


Figure B-14: Drawdown during W-SV Step-Drawdown Test



McCampbell Analytical, Inc.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

INVOICE for ANALYTICAL SERVICES

COPY

Invoice N°: 0507082

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 07/05/05
Date Received: 07/07/05

INV DATE: *July 15, 2005*
Print DATE: *July 15, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
Hardness	5 days	Water	3	1	$28.00	$84.00
ICP-MS Metals (TTLC)	5 days	Water	3	1	$53.00	$159.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			3	1	$7.00	$21.00
					SubTotal:	$486.00

Invoice Total: $486.00

If paid by**08/13/05** Prompt Pay Invoice Total = $437.40

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 1.5% interest per month will be charged. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled:	07/05/05
		Date Received:	07/07/05
	Client Contact: Jeff Wisniewski	Date Reported:	07/15/05
	Client P.O.:	Date Completed:	07/15/05

WorkOrder: 0507082

July 15, 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
690 Walnut Avenue, Suite 220		Date Received: 07/07/05
Mare Island, CA 94592	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/09/05-07/14/05

Metals*

Extraction method: E200.8 Analytical methods: E200.8 Work Order: 0507082

Lab ID	Client ID	Matrix	Extraction	Arsenic	Iron	Manganese	Silicon	DF	% SS
001B	Start	W	TTLC	9.9	320	1500	34,000	1	109
002B	Middle	W	TTLC	9.5	270	1500	33,000	1	104
003B	End	W	TTLC	9.4	270	1500	33,000	1	112

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	Matrix	Extraction	Arsenic	Iron	Manganese	Silicon	Units
	W	TTLC	0.5	20	20	20	μg/L
	S	TTLC	NA	NA	NA	NA	NA

*water samples are reported in μg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
690 Walnut Avenue, Suite 220		Date Received: 07/07/05
Mare Island, CA 94592	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/08/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0507082

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0507082-001A	Start	W	DISS.	110	18.5	N/A
0507082-002A	Middle	W	DISS.	110	18.5	N/A
0507082-003A	End	W	DISS.	110	18.5	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

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ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
690 Walnut Avenue, Suite 220		Date Received: 07/07/05
Mare Island, CA 94592	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/07/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B — Analytical methods: SM2320B — Work Order: 0507082

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001A	Start	W	155	ND	155	ND	1
002A	Middle	W	151	ND	151	ND	1
003A	End	W	153	ND	153	ND	1
Reporting Limit for DF =1; ND means not detected at or above the reporting limit		W	1	1	1	1	mg CaCO3/L
		S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05	
		Date Received: 07/07/05	
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05	
	Client P.O.:	Date Analyzed: 07/07/05	

pH*

Analytical Method: SM4500H+B

Work Order: 0507082

Lab ID	Client ID	Matrix	pH
0507082-001A	Start	W	7.22 @ 19.9°C
0507082-002A	Middle	W	7.23 @ 18.9°C
0507082-003A	End	W	7.25 @ 19.5°C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
		Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/07/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0507082

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0507082-001A	Start	W	334 @ 25.0°C	1
0507082-002A	Middle	W	327 @ 25.0°C	1
0507082-003A	End	W	332 @ 25.0°C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 μmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(μmhos/cm @ 25°C) per SSSA volume 5 part 3.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
		Date Received: 07/07/05
	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/08/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0507082

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0507082-001A	Start	W	240	1
0507082-002A	Middle	W	230	1
0507082-003A	End	W	228	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L	
	S	NA	

* water samples reported in mg/L.

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0507082

EPA Method: E200.8			Extraction: E200.8			BatchID: 16945		Spiked Sample ID: 0507048-001B		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Arsenic	3.7	10	94.3	98.3	3.01	102	104	1.95	75 - 125	85 - 115
Iron	5600	100	NR	NR	NR	106	103	2.88	75 - 125	85 - 115
Manganese	1600	100	NR	NR	NR	103	104	0.968	75 - 125	85 - 115
%SS:	106	750	102	106	4.44	99	102	2.24	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001B	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-001B	7/05/05 11:00 AM	7/07/05	7/14/05 6:57 PM
0507082-002B	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM	0507082-002B	7/05/05 10:00 AM	7/07/05	7/14/05 7:03 PM
0507082-003B	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM	0507082-003B	7/05/05 9:00 AM	7/07/05	7/14/05 7:10 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water | QC Matrix: Water | WorkOrder: 0507082

EPA Method: E200.8			Extraction: E200.8			BatchID: 16945		Spiked Sample ID: N/A		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	N/A	10	N/A	N/A	N/A	103	109	5.95	N/A	85 - 115
%SS:	N/A	750	N/A	N/A	N/A	92	87.2	5.50	N/A	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001B	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-001B	7/05/05 11:00 AM	7/07/05	7/14/05 6:57 PM
0507082-002B	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM	0507082-002B	7/05/05 10:00 AM	7/07/05	7/14/05 7:03 PM
0507082-003B	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM	0507082-003B	7/05/05 9:00 AM	7/07/05	7/14/05 7:10 PM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

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QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0507082

EPA Method: SM2340B **Extraction: E200.8** **BatchID: 16945** **Spiked Sample ID: 0507048-001B**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	170	3.3	NR	NR	NR	90.9	93.9	3.28	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/08/05 1:36 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/08/05 1:51 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/08/05 2:07 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2320B Units: mg CaCO3/L BatchID: 17039

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	155	1	154	1	0.647	<20
0507082-002A	151	1	151	1	0	<20
0507082-003A	153	1	154	1	0.651	<20

BATCH 17039 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 7:34 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 7:44 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 7:55 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0507082

Method Name: SM4500H+B			Units: ±, pH units @ °C		BatchID: 17006	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0507082-001A	7.22 @ 19.9°C	1	7.21 @ 19.9°C	1	0.01	±0.02
0507082-002A	7.23 @ 18.9°C	1	7.22 @ 18.8°C	1	0.01	±0.02
0507082-003A	7.25 @ 19.5°C	1	7.25 @ 19.4°C	1	0	±0.02

BATCH 17006 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 8:04 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 8:14 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 8:24 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2510B			Units: µmhos/cm @ 25°C		BatchID: 17037	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	334 @ 25.0°C	1	333 @ 25.0°C	1	0.3	<2
0507082-002A	327 @ 25.0°C	1	327 @ 25.0°C	1	0	<2
0507082-003A	332 @ 25.0°C	1	333 @ 25.0°C	1	0.301	<2

BATCH 17037 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/07/05 8:58 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/07/05 9:08 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/07/05 9:18 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0507082

Method Name: SM2540C			Units: mg/L		BatchID: 17038	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0507082-001A	240	1	260	10	8	<10
0507082-002A	230	1	240	10	4.26	<10
0507082-003A	228	1	240	10	5.13	<10

BATCH 17038 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/08/05 2:38 PM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/08/05 2:48 PM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/08/05 2:58 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

Engm 0507082

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CHAIN OF CUSTODY RECORD

TURN AROUND TIME: ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Jeff Wisniewski Bill To:
Company: ENGEO Inc.
690 Walnut Ave. Suite220
Vallejo, CA 94592 E-Mail: jwisniewski@engeo.com
Tele: (707) 562-0030 Fax: (707) 562-0032
Project #: 6486.2.005.01 Project Name: SUTTER
Project Location: Santa Rosa, CA
Sampler Signature: [signature]

SAMPLE ID (Field Point Name)	LOCATION	Sampling Date	Sampling Time	# Containers	Type Containers	Water	Soil	Air	Sludge	Other	ICE	HCL	HNO_3	Other
START	LBC	7/5/05	11 AM	3		X							(1)	
MIDDLE	LBC	7/5/05	10 PM	3		X							(1)	
END	LBC	7/6/05	9 AM	3		X							(1)	

Analysis Request (5)

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~BTEX only (EPA 602/8020)~~ pH	~~(8015)~~ Total silica	Total Petroleum Oil & Grease (5520/1664 (EF/BF)	~~Total Petroleum Hydrocarbons (418.1)~~ electrical conductivity	EPA 601/8010/8021 (Halocarbons)	~~EPA 608 / 8081 (Cl Pesticides)~~ manganese	~~EPA 608 / 8082 PCB's ONLY~~ iron	~~EPA 8140 / 8141 (NP Pesticides)~~ arsenic	EPA 8150 / 8151 (Acidic Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525 / 625 / 8270 (SVOCs)	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020)	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Other: Total hardness as $CaCO_3$	Other: TDS (total dissolved solids)	Other: Total alkalinity as $CaCO_3$	Comments: Filter Samples for Metals analysis: Yes / No
START		X	X		X		X	X	X								X	X	X	
MIDDLE		X	X		X		X	X	X								X	X	X	
END		X	X		X		X	X	X								X	X	X	

Relinquished By:	Date:	Time:	Received By:
[signature]	7/7/05	4:10P	[signature]

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB ____

PRESERVATION: VOAS | O&G | METALS ✓ pH<2 | OTHER

COMMENTS:

McCampbell Analytical, Inc.
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Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0507082 ClientID: ENGM

Report to:		Bill to:	Requested TAT: 5 days
Jeff Wisniewski	TEL: (707) 562-0030	Matthew Harrell	
ENGEO Incorporated	FAX: (707) 562-0032	ENGEO Incorporated	
690 Walnut Avenue, Suite 220	ProjectNo: #6486.2.005.01; Sutter	690 Walnut Avenue, Suite 220	*Date Received:* 07/07/2005
Mare Island, CA 94592	PO:	Mare Island, CA 95492	*Date Printed:* 07/07/2005

Requested Tests (See legend below)

Sample ID	ClientSampID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
0507082-001	Start	Water	7/5/05 11:00:00 AM	☐	A	A	B	A	A	A	A								
0507082-002	Middle	Water	7/5/05 10:00:00 AM	☐	A	A	B	A	A	A	A								
0507082-003	End	Water	7/5/05 9:00:00 AM	☐	A	A	B	A	A	A	A								

Test Legend:

1	Alka(spe)_W	2	HARDMS_DISS	3	METALSMS_W	4	PH_W	5	PRDISSOLVED
6	SC_W	7	TDS_W	8		9		10	
11		12		13		14		15	

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

INVOICE for ANALYTICAL SERVICES

COPY

Invoice N°: 0507082 A

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 7/5/05
Date Received: 08/31/05

INV DATE: *September 07, 2005*
Print DATE: *August 31, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
CAM 17 Metals (TTLC)	5 days	Water	3	1	$123.00	$369.00
					SubTotal:	$369.00

Invoice Total: $369.00

If paid by **10/07/05** Prompt Pay Invoice Total = $332.10

RECEIVED
SEP 06 2005

PROJECT # ____________
APPROVED BY: ____________
REASON # ____________
ACCOUNT # ____________
VOUCHER # ____________

* ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 1.5% interest per month will be charged. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
690 Walnut Avenue, Suite 220		Date Received: 07/07/05
Mare Island, CA 94592	Client Contact: Jeff Wisniewski	Date Reported: 07/15/05
	Client P.O.:	Date Completed: 08/31/05

WorkOrder: 0507082

August 31, 2005

Dear Jeff:

Enclosed are:

1). the results of **3** analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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ENGEO Incorporated	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 07/05/05
690 Walnut Avenue, Suite 220		Date Received: 07/07/05
Mare Island, CA 94592	Client Contact: Jeff Wisniewski	Date Extracted: 07/07/05
	Client P.O.:	Date Analyzed: 07/09/05

CAM / CCR 17 Metals*

Lab ID	0507082-001A	0507082-002A	0507082-003A		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	Start	Middle	End			
Matrix	W	W	W		S	W
Extraction Type	TTLC	TTLC	TTLC		mg/kg	µg/L

ICP-MS Metals, Concentration*

Analytical Method: E200.8 Extraction Method: E200.8 Work Order: 0507082

Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	9.9	9.5	9.4		NA	0.5
Barium	130	130	130		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	1.3	1.2	0.67		NA	0.5
Lead	6.4	4.8	3.3		NA	0.5
Mercury	ND	ND	ND		NA	0.05
Molybdenum	1.1	1.0	1.0		NA	0.5
Nickel	ND	ND	0.53		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.5
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.1	1.2	1.2		NA	0.5
Zinc	41	32	30		NA	5.0
%SS:	109	104	112			
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0507082

EPA Method: E200.8			Extraction: E200.8			BatchID: 16945		Spiked Sample ID: 0507048-001B		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	1.4	10	83	84.6	1.63	105	106	1.14	75 - 125	85 - 115
Arsenic	3.7	10	94.3	98.3	3.01	102	104	1.95	75 - 125	85 - 115
Barium	93	100	98.4	106	3.63	102	104	1.65	75 - 125	85 - 115
Beryllium	ND	10	82.2	81	1.47	108	109	0.277	75 - 125	85 - 115
Cadmium	1.3	10	95.2	97.3	1.92	100	102	1.59	75 - 125	85 - 115
Chromium	3300	10	NR	NR	NR	99.3	101	1.40	75 - 125	85 - 115
Cobalt	10	10	90	99.6	4.85	98.7	99.6	0.908	75 - 125	85 - 115
Copper	13	10	90.8	99.7	4.03	99.5	100	0.900	75 - 125	85 - 115
Lead	16	10	96.8	107	3.99	101	103	1.47	75 - 125	85 - 115
Mercury	0.11	0.50	102	104	1.60	104	106	1.90	75 - 125	85 - 115
Molybdenum	5.1	10	87.6	91.5	2.78	96.5	98.6	2.15	75 - 125	85 - 115
Nickel	54	10	NR	NR	NR	102	103	0.973	75 - 125	85 - 115
Selenium	1.2	10	99.1	100	0.983	101	100	1.29	75 - 125	85 - 115
Silver	0.72	10	91.1	91.8	0.710	105	105	0	75 - 125	85 - 115
Thallium	ND	10	93	95.4	2.55	102	103	0.881	75 - 125	85 - 115
Vanadium	11	10	97.5	111	6.32	99.1	100	1.00	75 - 125	85 - 115
Zinc	49	100	95.2	94.2	0.693	101	103	1.96	75 - 125	85 - 115
%SS:	106	750	102	106	4.44	99	102	2.24	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 16945 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0507082-001A	7/05/05 11:00 AM	7/07/05	7/09/05 6:50 AM	0507082-002A	7/05/05 10:00 AM	7/07/05	7/09/05 7:11 AM
0507082-003A	7/05/05 9:00 AM	7/07/05	7/09/05 7:32 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.
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INVOICE for ANALYTICAL SERVICES

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 11/14/05
Date Received: 11/16/05

RECEIVED
DEC 12 2005

Invoice N°: 0511324

INV DATE: *November 23, 2005*
Print DATE: *November 23, 2005*

Report To: Jeff Wisniewski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
CAM 17 Metals + Misc. Elements (TTLC)	5 days	Water	3	1	$147.00	$441.00
Hardness	5 days	Water	3	1	$28.00	$84.00
Metals (Dissolved)	5 days	Water	1	1	$17.00	$17.00
Metals (Dissolved)	5 days	Water	2	1	$12.00	$24.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			3	1	$7.00	$21.00
					SubTotal:	$809.00

Invoice Total: $809.00

If paid by**12/23/05** Prompt Pay Invoice Total = $728.10

* ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 10% interest will be charged annually. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05
		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Reported: 11/23/05
	Client P.O.:	Date Completed: 11/23/05

WorkOrder: 0511324

November 23, 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B Analytical methods: SM2320B Work Order: 0511324

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001B	@ Start	W	160	ND	160	ND	1
002B	@ Middle	W	158	ND	158	ND	1
003B	@ End	W	156	ND	156	ND	1

Reporting Limit for DF =1; ND means not detected at or above the reporting limit						
	W	1.0	1.0	1.0	1.0	mg CaCO3/L
	S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

pH*

Analytical Method: SM4500H+B

Work Order: 0511324

Lab ID	Client ID	Matrix	pH
0511324-001A	@ Start	W	7.36 @ 21.6 °C
0511324-002A	@ Middle	W	7.37 @ 20.9 °C
0511324-003A	@ End	W	7.38 @ 21.5 °C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/16/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0511324

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0511324-001A	@ Start	W	381 @ 25.0 °C	1
0511324-002A	@ Middle	W	372 @ 25.0 °C	1
0511324-003A	@ End	W	376 @ 25.0 °C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 µmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(µmhos/cm @ 25°C) per SSSA volume 5 part 3.

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05 Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/18/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0511324

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0511324-001A	@ Start	W	224	1
0511324-002A	@ Middle	W	232	1
0511324-003A	@ End	W	218	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L
	S	NA

* water samples reported in mg/L.

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05
		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/17/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0511324

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0511324-001C	@ Start	W	DISS.	130	23	N/A
0511324-002C	@ Middle	W	DISS.	120	23	N/A
0511324-003C	@ End	W	DISS.	120	23	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05
		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/18/05

Silica as SiO2*

Extraction method: E200.7/E200.8 Analytical methods: E200.7 Work Order: 0511324

Lab ID	Client ID	Matrix	Extraction	Silica as SiO2	DF	% SS
0511324-001C	@ Start	W	DISS.	70,000	1	N/A
0511324-002C	@ Middle	W	DISS.	74,000	1	N/A
0511324-003C	@ End	W	DISS.	72,000	1	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	50	μg/L
	S	TTLC	NA	mg/kg

*water samples are reported in μg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

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DHS Certification No. 1644

AR Angela Rydelius, Lab Manager

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/14/05-11/15/05
		Date Received: 11/16/05
	Client Contact: Jeff Wisniewski	Date Extracted: 11/16/05
	Client P.O.:	Date Analyzed: 11/17/05-11/22/05

CAM / CCR 17 Metals + Misc. Elements*

ICP-MS Metals, Concentration*

Analytical Method: E200.8 | Extraction Method: E200.8 | Work Order: 0511324

Lab ID	0511324-001C	0511324-002C	0511324-003C		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	@ Start	@ Middle	@ End			
Matrix	W	W	W		S	W
Extraction Type	DISS.	DISS.	DISS.		mg/kg	µg/L
Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	7.1	8.3	8.8		NA	0.5
Barium	100	110	110		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	0.83	0.57	0.72		NA	0.5
Iron	72	170	200		NA	20
Lead	ND	0.59	0.69		NA	0.5
Manganese	1300	1300	1300		NA	20
Mercury	0.073	0.064	0.051		NA	0.012
Molybdenum	1.0	0.99	1.0		NA	0.5
Nickel	1.0	0.62	1.7		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.19
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.0	1.2	1.3		NA	0.5
Zinc	42	46	39		NA	5.0
%SS:	N/A	N/A	N/A			
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

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DHS Certification No. 1644

Angela Rydelius, Lab Manager

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Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.7

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511324

EPA Method: E200.7	Extraction: E200.7/E200.8				BatchID: 19055			Spiked Sample ID: 0511324-001C		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	33,000	100	NR	NR	NR	87.1	95.7	9.41	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 19055 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/18/05 11:35 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/18/05 11:36 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/18/05 11:38 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content

DHS Certification No. 1644

SH QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511324

EPA Method: E200.8		Extraction: E200.8			BatchID: 19046		Spiked Sample ID: 0511319-003A			
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	ND	10	108	108	0	102	101	0.889	75 - 125	85 - 115
Arsenic	0.73	10	105	102	2.62	98.5	103	4.81	75 - 125	85 - 115
Barium	ND	100	111	111	0	98.8	99.2	0.434	75 - 125	85 - 115
Beryllium	ND	10	92.8	92.5	0.313	91.8	92.7	0.997	75 - 125	85 - 115
Cadmium	ND	10	103	103	0	99.1	99.7	0.654	75 - 125	85 - 115
Chromium	ND	10	111	107	3.40	96.8	101	4.30	75 - 125	85 - 115
Cobalt	ND	10	102	103	0.195	97.6	98.9	1.34	75 - 125	85 - 115
Copper	8.9	10	104	96.9	3.28	107	113	5.64	75 - 125	85 - 115
Iron	260	100	NR	NR	NR	113	112	0.981	75 - 125	85 - 115
Lead	0.5	10	102	102	0	98.7	98.5	0.213	75 - 125	85 - 115
Manganese	21	100	116	115	0.657	103	104	1.07	75 - 125	85 - 115
Mercury	0.018	0.50	106	107	0.619	105	106	0.398	75 - 125	85 - 115
Molybdenum	ND	10	103	103	0	96.5	97.2	0.723	75 - 125	85 - 115
Nickel	ND	10	106	106	0	98.7	102	2.87	75 - 125	85 - 115
Selenium	ND	10	102	101	1.38	97.9	98.2	0.337	75 - 125	85 - 115
Silver	ND	10	103	103	0	93.4	94.8	1.38	75 - 125	85 - 115
Thallium	ND	10	96.7	97.4	0.659	97.4	97	0.412	75 - 125	85 - 115
Vanadium	ND	10	112	109	2.71	99	103	3.73	75 - 125	85 - 115
Zinc	ND	100	103	104	0.963	99.3	99.7	0.432	75 - 125	85 - 115
%SS:	111	750	111	111	0	96	96	0	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons. a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

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Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR E200.8

BATCH 19046 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/17/05 1:26 AM	0511324-001C	11/14/05 11:00 AM	11/16/05	11/22/05 11:41 AM
0511324-002C	11/14/05 10:00 PM	11/16/05	11/17/05 2:05 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/22/05 11:49 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/17/05 2:18 AM	0511324-003C	11/15/05 9:00 AM	11/16/05	11/22/05 11:58 AM

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2)

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SW QA/QC Officer

McCampbell Analytical, Inc.

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Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511324

EPA Method: SM2340B		Extraction: E200.8			BatchID: 19046		Spiked Sample ID: 0511319-003A		
Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	11	2.91	NR	NR	NR	99.7	103	3.39	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19046 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001C	11/14/05 11:00 AM	11/16/05	11/17/05 1:58 AM	0511324-002C	11/14/05 10:00 PM	11/16/05	11/17/05 2:12 AM
0511324-003C	11/15/05 9:00 AM	11/16/05	11/17/05 2:25 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

Sfd QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity Matrix: W WorkOrder: 0511324

Method Name: SM2320B Units: mg CaCO3/L BatchID: 18979

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001B	160	1	160	1	0	<20
0511324-002B	158	1	155	1	1.92	<20
0511324-003B	156	1	155	1	0.643	<20

BATCH 18979 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001B	11/14/05 11:00 AM	11/16/05	11/16/05 5:56 PM	0511324-002B	11/14/05 10:00 PM	11/16/05	11/16/05 6:05 PM
0511324-003B	11/15/05 9:00 AM	11/16/05	11/16/05 6:12 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

McCampbell Analytical, Inc.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0511324

Method Name: SM4500H+B			Units: ±, pH units @ °C		BatchID: 18989	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0511324-001A	7.36 @ 21.6 °C	1	7.35 @ 21.6 °C	1	0.01	±0.02
0511324-002A	7.37 @ 20.9 °C	1	7.36 @ 20.9 °C	1	0.01	±0.02
0511324-003A	7.38 @ 21.5 °C	1	7.39 @ 21.5 °C	1	0.01	±0.02

BATCH 18989 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/16/05 7:40 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/16/05 7:50 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/16/05 8:00 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0511324

Method Name: SM2510B			Units: µmhos/cm @ 25°C		BatchID: 19008	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001A	381 @ 25.0 °C	1	381 @ 25.0 °C	1	0	<2
0511324-002A	372 @ 25.0 °C	1	372 @ 25.0 °C	1	0	<2
0511324-003A	376 @ 25.0 °C	1	376 @ 25.0 °C	1	0	<2

BATCH 19008 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/16/05 7:10 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/16/05 7:20 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/16/05 7:30 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0511324

Method Name: SM2540C			Units: mg/L		BatchID: 19034	
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511324-001A	224	1	240	10	6.9	<10
0511324-002A	232	1	240	10	3.39	<10
0511324-003A	218	1	220	10	0.913	<10

BATCH 19034 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511324-001A	11/14/05 11:00 AM	11/16/05	11/18/05 2:58 PM	0511324-002A	11/14/05 10:00 PM	11/16/05	11/18/05 3:08 PM
0511324-003A	11/15/05 9:00 AM	11/16/05	11/18/05 3:18 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

engm 051132A

McCAMPBELL ANALYTICAL INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: JEFF WISNIEWSKI Bill To: JEFF WISNIEWSKI
Company: ENGEO INC
690 WALNUT AVE # 220
VALLEJO, CA 94592 E-Mail:
Tele: () 707-562-0030 Fax: () 707-562-0032
Project #: 6486.2.005.01 Project Name: SUTTER
Project Location: SANTA ROSA, CALIF.
Sampler Signature: [signature]

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~TPH as Diesel~~ (8015) DH	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	~~EPA 601 / 8010~~ TOTAL SILICA	~~BTEX ONLY (EPA 602 / 8020)~~ EC	~~EPA 608 / 8080~~ MANGANESE	~~EPA 608 / 8080 PCB's ONLY~~ IRON	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: TOTAL HARDNESS	Other: TDS	Other: TOTAL ALKALINITY	Comments
@ START	W-LBC	11/14	11 AM	4		X										X			X	X	X	X				X				X	X	X	filtered per J.W.
@ MIDDLE	↓	11/14	10 PM	4		X										X			X	X	X	X				↓				↓	↓	↓	
@ END	↓	11/15	9 AM	4		X										X			X	X	X	X				↓				↓	↓	↓	

Relinquished By:	Date:	Time:	Received By:
[signature]	11/16	3PM	[signature]
[signature]			

ICE/t° ____ GOOD CONDITION ✓ HEAD SPACE ABSENT ____ DECHLORINATED IN LAB ____

PRESERVATION ____ APPROPRIATE CONTAINERS ✓ PERSERVED IN LAB ____

VOAS	O&G	METALS	OTHER

McCampbell Analytical, Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0511324 ClientID: ENGM EDF: NO

Report to:		Bill to:	
Jeff Wisniewski	TEL: (707) 562-0030	Matthew Harrell	Requested TAT: 5 days
ENGEO Incorporated	FAX: (707) 562-0032	ENGEO Incorporated	
690 Walnut Avenue, Suite 220	ProjectNo: #6486.2.005.01; Sutter	690 Walnut Avenue, Suite 220	*Date Received:* 11/16/2005
Mare Island, CA 94592	PO:	Mare Island, CA 95492	*Date Printed:* 11/16/2005

					Requested Tests (See legend below)											
Sample ID	ClientSampID	Matrix	Collection Date	Hold	1	2	3	4	5	6	7	8	9	10	11	12
0511324-001	@ Start	Water	11/14/05 11:00:00	☐	B	C	C	C	A	C	A	A				
0511324-002	@ Middle	Water	11/14/05 10:00:00	☐	B	C	C	C	A	C	A	A				
0511324-003	@ End	Water	11/15/05 9:00:00	☐	B	C	C	C	A	C	A	A				

Test Legend:

1	Alka(spe)_W	2	CAMMET(D)MS_W	3	HARDMS_DISS	4	METALS_DISS	5	PH_W
6	PRDISSOLVED	7	SC_W	8	TDS_W	9		10	
11		12							

Prepared by: Melissa Valles

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.

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INVOICE for ANALYTICAL SERVICES

Project Name: #6486.2.005.01; Sutter
PO Number: N/A
Date Sampled: 11/21/05
Date Received: 11/22/05

RECEIVED
DEC 0 2 2005

Invoice N°: 0511426

INV DATE: *November 30, 2005*
Print DATE: *November 30, 2005*

Report To: Jeff Wisnienski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

Invoice To: Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Description	TAT	Matrix	Qty	Mult	Unit Price	Test Total
Tests:						
Alkalinity	5 days	Water	3	1	$20.00	$60.00
CAM 17 Metals + Misc. Elements (TTLC)	5 days	Water	3	1	$123.00	$369.00
Hardness	5 days	Water	3	1	$28.00	$84.00
Metals (Dissolved)	5 days	Water	3	1	$41.00	$123.00
pH	5 days	Water	3	1	$11.00	$33.00
Specific Conductivity	5 days	Water	3	1	$20.00	$60.00
Total Dissolved Solids	5 days	Water	3	1	$23.00	$69.00
Miscellaneous:						
Sample Filtering			6	1	$7.00	$42.00
					SubTotal:	$840.00

Invoice Total: $840.00

If paid by **12/29/05** Prompt Pay Invoice Total = $756.00

PROJECT #
APPROVED BY: ____________
REASON # ____________
ACCOUNT # ____________
VOUCHER # ____________

*** ALL FAXED INVOICES ARE FOR YOUR INFORMATION ONLY - PLEASE PAY OFF ORIGINAL**

Please include the invoice number with your check and remit to Accounts Receivable at the letter head address. MAI also accepts credit card (Visa/Master Card/Discover/American Express) payment. Please call Account Receivable for details on this service.

MAI's EDF charge does not include the EDF charge for subcontracted analyses. The minimum EDF charge per workorder is $25.00. For invoice total greater than $5000.00, EDF will be 2% of the total invoice. The EDF charge for subcontracted analyses will be identical to Subcontractor's fee.

Terms are net 30 days from the invoice date. After this period 10% interest will be charged annually. Overdue accounts are responsible for all legal and collection fees. If you have any questions about billing, please contact Accounts Receivable at McCampbell Analytical.

McCampbell Analytical, Inc.	110 2nd Avenue South, #D7, Pacheco, CA 94553-5560 Telephone : 925-798-1620 Fax : 925-798-1622 Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled:	11/21/05
		Date Received:	11/22/05
	Client Contact: Jeff Wisnienski	Date Reported:	11/30/05
	Client P.O.:	Date Completed:	11/30/05

WorkOrder: 0511426

November 30, 2005

RECEIVED
DEC 0 2 2005

Dear Jeff:

Enclosed are:

1). the results of 3 analyzed samples from your **#6486.2.005.01; Sutter project,**

2). a QC report for the above samples

3). a copy of the chain of custody, and

4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.
110 2nd Avenue South, #D7, Pacheco, CA 94553-5560
Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Marc Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/30/05

Silica, Si02*

Extraction method: E200.7/E200.8 Analytical methods: E200.7 Work Order: 0511426

Lab ID	Client ID	Matrix	Extraction	Silica	DF	% SS
0511426-001D	W-SV @ START	W	DISS.	73,000	1	N/A
0511426-002D	W-SV @ MIDDLE	W	DISS.	69,000	1	N/A
0511426-003D	W-SV @ END	W	DISS.	72,000	1	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	50	μg/L
	S	TTLC	NA	mg/kg

*water samples are reported in μg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in μg/wipe, filter samples in μg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

McCampbell Analytical, Inc.

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Telephone : 925-798-1620 Fax : 925-798-1622
Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/28/05

CAM / CCR 17 Metals + Misc. Elements*

Lab ID	0511426-001D	0511426-002D	0511426-003D		Reporting Limit for DF =1; ND means not detected above the reporting limit	
Client ID	W-SV @ START	W-SV @ MIDDLE	W-SV @ END			
Matrix	W	W	W		S	W
Extraction Type	DISS.	DISS.	DISS.		mg/kg	µg/L

ICP-MS Metals, Concentration*

Analytical Method: E200.8 Extraction Method: E200.8 Work Order: 0511426

Dilution Factor	1	1	1		1	1
Antimony	ND	ND	ND		NA	0.5
Arsenic	14	14	14		NA	0.5
Barium	82	83	84		NA	5.0
Beryllium	ND	ND	ND		NA	0.5
Cadmium	ND	ND	ND		NA	0.25
Chromium	ND	ND	ND		NA	0.5
Cobalt	ND	ND	ND		NA	0.5
Copper	ND	ND	ND		NA	0.5
Iron	140	120	120		NA	20
Lead	0.72	ND	ND		NA	0.5
Manganese	860	830	850		NA	20
Mercury	0.022	0.026	0.015		NA	0.012
Molybdenum	2.1	2.0	2.0		NA	0.5
Nickel	0.65	0.54	0.54		NA	0.5
Selenium	ND	ND	ND		NA	0.5
Silver	ND	ND	ND		NA	0.19
Thallium	ND	ND	ND		NA	0.5
Vanadium	1.9	1.8	1.9		NA	0.5
Zinc	51	32	27		NA	5.0
%SS:	N/A	N/A	N/A			
Comments						

*water samples are reported in µg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

Angela Rydelius, Lab Manager

APPENDIX C

McCampbell Analytical, Inc.
Water Quality Test Results

W-LBC Pumping Test @ 100gpm
W-LBC Pumping Test @ 100gpm Supplemental
W-LBC Pumping Test @ 80gpm
W-SV Step-Drawdown Test
Table 3 – Water Quality Results

McCampbell Analytical, Inc.

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Website: www.mccampbell.com E-mail: main@mccampbell.com

ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/24/05

Hardness*

Extraction method: E200.8 Analytical methods: SM2340B Work Order: 0511426

Lab ID	Client ID	Matrix	Extraction	Hardness	DF	% SS
0511426-001C	W-SV @ START	W	DISS.	98.0	19	N/A
0511426-002C	W-SV @ MIDDLE	W	DISS.	100	19	N/A
0511426-003C	W-SV @ END	W	DISS.	95.0	17	N/A

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	DISS.	1.0	mg/L
	S	TTLC	NA	mg/kg

*water samples are reported in mg/L, product/oil/non-aqueous liquid samples and all TCLP / STLC / DISTLC / SPLP extracts are reported in mg/L, soil/sludge/solid samples in mg/kg, wipe samples in µg/wipe, filter samples in µg/filter.

means surrogate diluted out of range; ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

i) aqueous sample containing greater than ~1 vol. % sediment; for DISSOLVED metals, this sample has been preserved prior to filtration; for TTLC metals, a representative sediment-water mixture was digested; j) reporting limit raised due to insufficient sample amount; k) reporting limit raised due to matrix interference; m) estimated value due to low/high surrogate recovery, caused by matrix interference; n) results are reported on a dry weight basis; p) see attached narrative.

DHS Certification No. 1644

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

Total & Speciated Alkalinity as Calcium Carbonate*

Extraction method: SM2320B Analytical methods: SM2320B Work Order: 0511426

Lab ID	Client ID	Matrix	Total*	Carbonate*	Bicarbonate*	Hydroxide*	DF
001B	W-SV @ START	W	148	ND	148	ND	1
002B	W-SV @ MIDDLE	W	148	ND	148	ND	1
003B	W-SV @ END	W	148	ND	148	ND	1

Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W	1.0	1.0	1.0	1.0	mg CaCO3/L
	S	NA	NA	NA	NA	mg/Kg

*water samples are reported in mg calcium carbonate/L. Hydroxide, Carbonate & Bicarbonate alkalinity measure @ end-point of pH = 8.3 & 4.5 per SM2320B.

h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~1 vol. % sediment

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Marc Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05 Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

pH*

Analytical Method: SM4500H+B

Work Order: 0511426

Lab ID	Client ID	Matrix	pH
0511426-001A	W-SV @ START	W	7.68 @ 16.0 °C
0511426-002A	W-SV @ MIDDLE	W	7.71 @ 13.8 °C
0511426-003A	W-SV @ END	W	7.66 @ 13.9 °C

Method Accuracy and Reporting Units	W	±0.05, pH units @ °C
	S	NA

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05
		Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/22/05

Specific Conductivity*

Analytical Method: SM2510B

Work Order: 0511426

Lab ID	Client ID	Matrix	Specific Conductivity	DF
0511426-001A	W-SV @ START	W	310 @ 25.0°C	1
0511426-002A	W-SV @ MIDDLE	W	308 @ 25.0°C	1
0511426-003A	W-SV @ END	W	311 @ 25.0°C	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 μmhos/cm @ 25°C	
	S	NA	

* Salinity (mg/L) = 0.64 * S.C.(μmhos/cm @ 25°C) per SSSA volume 5 part 3.

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ENGEO Incorporated 690 Walnut Avenue, Suite 220 Mare Island, CA 94592	Client Project ID: #6486.2.005.01; Sutter	Date Sampled: 11/21/05
		Date Received: 11/22/05
	Client Contact: Jeff Wisnienski	Date Extracted: 11/22/05
	Client P.O.:	Date Analyzed: 11/23/05

Total Dissolved Solids*

Analytical Method: SM2540C

Work Order: 0511426

Lab ID	Client ID	Matrix	Total Dissolved Solids	DF
0511426-001A	W-SV @ START	W	226	1
0511426-002A	W-SV @ MIDDLE	W	244	1
0511426-003A	W-SV @ END	W	210	1

Reporting Limit for DF = 1; ND means not detected at or above the reporting limit	W	10 mg/L	
	S	NA	

* water samples reported in mg/L.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR E200.7

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511426

EPA Method: E200.7 **Extraction: E200.7/E200.8** **BatchID: 19055** **Spiked Sample ID: 0511324-001C**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Silicon	33,000	100	NR	NR	NR	87.1	95.7	9.41	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

BATCH 19055 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001D	11/21/05 11:00 AM	11/22/05	11/30/05 2:56 PM	0511426-002D	11/21/05 4:00 PM	11/22/05	11/30/05 2:58 PM
0511426-003D	11/21/05 6:00 PM	11/22/05	11/30/05 3:00 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

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QC SUMMARY REPORT FOR E200.8

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511426

EPA Method: E200.8 Extraction: E200.8 BatchID: 19150 Spiked Sample ID: 0511424-002D

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	µg/L	µg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Antimony	0.59	10	87.7	88.5	0.872	94.6	91.7	3.11	75 - 125	85 - 115
Arsenic	ND	10	95.8	98	2.22	91.2	91	0.143	75 - 125	85 - 115
Barium	7.8	100	89.1	91	1.89	94.4	92.5	2.12	75 - 125	85 - 115
Beryllium	ND	10	100	103	1.97	99.9	96.9	3.02	75 - 125	85 - 115
Cadmium	ND	10	90.8	92.1	1.49	95.2	92.6	2.85	75 - 125	85 - 115
Chromium	0.66	10	86.2	89.5	3.50	89.8	88.5	1.45	75 - 125	85 - 115
Cobalt	ND	10	92.2	93.5	1.34	94.5	92.9	1.73	75 - 125	85 - 115
Copper	7.2	10	95.1	93	1.83	92.4	89.4	3.36	75 - 125	85 - 115
Iron	55	100	80.1	95.7	10.9	97.7	96.2	1.56	75 - 125	85 - 115
Lead	2.8	10	76.6	85.8	8.43	92.9	90.6	2.50	75 - 125	85 - 115
Manganese	ND	100	95.2	98.1	2.97	97.5	97.1	0.483	75 - 125	85 - 115
Mercury	ND	0.50	107	107	0	104	104	0	75 - 125	85 - 115
Molybdenum	ND	10	90.8	93.3	2.75	89.9	86.6	3.74	75 - 125	85 - 115
Nickel	0.55	10	92.4	92	0.409	93.1	90.8	2.48	75 - 125	85 - 115
Selenium	ND	10	95.8	98.3	2.48	89.1	89.4	0.336	75 - 125	85 - 115
Silver	ND	10	92.8	94.8	2.16	87.1	85.1	2.32	75 - 125	85 - 115
Thallium	ND	10	90.2	93	3.11	93	91.5	1.64	75 - 125	85 - 115
Vanadium	0.59	10	90.9	94.3	3.48	94.2	92.5	1.83	75 - 125	85 - 115
Zinc	23	100	83.9	83.6	0.282	96.4	93.4	3.13	75 - 125	85 - 115
%SS:	92	750	94	95	1.67	98	97	0.819	70 - 130	70 - 130

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:

NONE

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

SH QA/QC Officer

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QC SUMMARY REPORT FOR E200.8

BATCH 19150 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001D	11/21/05 11:00 AM	11/22/05	11/28/05 7:21 PM	0511426-002D	11/21/05 4:00 PM	11/22/05	11/28/05 8:05 PM
0511426-003D	11/21/05 6:00 PM	11/22/05	11/28/05 8:22 PM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644

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QC SUMMARY REPORT FOR SM2340B

W.O. Sample Matrix: Water QC Matrix: Water WorkOrder: 0511426

EPA Method: SM2340B **Extraction: E200.8** **BatchID: 19150** **Spiked Sample ID: 0511424-002D**

Analyte	Sample	Spiked	MS	MSD	MS-MSD	LCS	LCSD	LCS-LCSD	Acceptance Criteria (%)	
	mg/L	mg/L	% Rec.	% Rec.	% RPD	% Rec.	% Rec.	% RPD	MS / MSD	LCS / LCSD
Hardness	21	2.91	NR	NR	NR	92.8	92.8	0	75 - 125	85 - 115

All target compounds in the Method Blank of this extraction batch were ND less than the method RL with the following exceptions:
NONE

BATCH 19150 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001C	11/21/05 11:00 AM	11/22/05	11/24/05 9:11 AM	0511426-002C	11/21/05 4:00 PM	11/22/05	11/24/05 9:24 AM
0511426-003C	11/21/05 6:00 PM	11/22/05	11/24/05 10:20 AM				

MS = Matrix Spike; MSD = Matrix Spike Duplicate; LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample Duplicate; RPD = Relative Percent Deviation.

% Recovery = 100 * (MS-Sample) / (Amount Spiked); RPD = 100 * (MS - MSD) / ((MS + MSD) / 2).

MS / MSD spike recoveries and / or %RPD may fall outside of laboratory acceptance criteria due to one or more of the following reasons: a) the sample is inhomogenous AND contains significant concentrations of analyte relative to the amount spiked, or b) the spiked sample's matrix interferes with the spike recovery.

N/A = not applicable to this method.

NR = analyte concentration in sample exceeds spike amount for soil matrix or exceeds 2x spike amount for water matrix or sample diluted due to high matrix or analyte content.

DHS Certification No. 1644 ______ QA/QC Officer

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: Alkalinity **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2320B			Units: mg CaCO3/L			BatchID: 19136
SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001B	148	1	148	1	0	<20
0511426-002B	148	1	147	1	0.678	<20
0511426-003B	148	1	148	1	0	<20

BATCH 19136 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001B	11/21/05 11:00 AM	11/22/05	11/22/05 9:50 PM	0511426-002B	11/21/05 4:00 PM	11/22/05	11/22/05 10:02 PM
0511426-003B	11/21/05 6:00 PM	11/22/05	11/22/05 10:14 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

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QC SUMMARY REPORT FOR WET CHEMISTRY TESTS

Test Method: pH **Matrix:** W **WorkOrder:** 0511426

Method Name: SM4500H+B Units: ±, pH units @ °C BatchID: 19149

SampleID	Sample	DF	Dup / Ser. Dil.	DF	RD	Acceptance Criteria
0511426-001A	7.68 @ 16.0 °C	1	7.67 @ 15.9 °C	1	0.01	±0.02
0511426-002A	7.71 @ 13.8 °C	1	7.72 @ 13.8 °C	1	0.01	±0.02
0511426-003A	7.66 @ 13.9 °C	1	7.65 @ 13.9 °C	1	0.01	±0.02

BATCH 19149 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/22/05 8:50 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/22/05 9:00 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/22/05 9:10 PM				

Test Method: Specific Conductivity **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2510B Units: µmhos/cm @ 25°C BatchID: 19124

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001A	310 @ 25.0°C	1	310 @ 25.0°C	1	0	<2
0511426-002A	308 @ 25.0°C	1	308 @ 25.0°C	1	0	<2
0511426-003A	311 @ 25.0°C	1	311 @ 25.0°C	1	0	<2

BATCH 19124 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/22/05 8:20 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/22/05 8:30 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/22/05 8:40 PM				

Test Method: Total Dissolved Solids **Matrix:** W **WorkOrder:** 0511426

Method Name: SM2540C Units: mg/L BatchID: 19034

SampleID	Sample	DF	Dup / Ser. Dil.	DF	% RPD	Acceptance Criteria (%)
0511426-001A	226	1	240	10	6.01	<10
0511426-002A	244	1	260	10	6.35	<10
0511426-003A	210	1	220	10	4.65	<10

BATCH 19034 SUMMARY

Sample ID	Date Sampled	Date Extracted	Date Analyzed	Sample ID	Date Sampled	Date Extracted	Date Analyzed
0511426-001A	11/21/05 11:00 AM	11/22/05	11/23/05 2:40 PM	0511426-002A	11/21/05 4:00 PM	11/22/05	11/23/05 2:50 PM
0511426-003A	11/21/05 6:00 PM	11/22/05	11/23/05 3:00 PM				

Dup = Duplicate; Ser. Dil. = Serial Dilution; MS = Matrix Spike; RD = Relative Difference; RPD = Relative Percent Deviation.

RD = Absolute Value (Sample - Duplicate); RPD = 100 * (Sample - Duplicate) / (Sample + Duplicate) * 2.

DHS Certification No. 1644

QA/QC Officer

enge 0511426

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PACHECO, CA 94553-5560
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CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☐ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: JEFF WISNIEWSKI Bill To: (SAME)

Company: ENGEO

690 WALNUT AVE SUITE 220

VALLEJO, CA 94592 E-Mail:

Tele: () 707-562-0030 Fax: () 707-562-0032

Project #: 6486-2.005.01 Project Name: SUTTER

Project Location: SANTA ROSA, CA

Sampler Signature: [signature]

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED Ice	METHOD PRESERVED HCl	METHOD PRESERVED HNO_3	METHOD PRESERVED Other
@ START	W-SU	11/21	11:00A	4		X								
@ MIDDLE	W-SU	11/21	4:00P	4		X								
@ END	W-SU	11/21	6:00P	4		X								

Analysis Request / Other / Comments

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~TPH as Diesel (8015)~~ PH	Total Petroleum Oil & Grease (5520 E&F/B&F)	Total Petroleum Hydrocarbons (418.1)	~~EPA 601 / 8010~~ TOTAL SILICA	~~BTEX ONLY (EPA 602 / 8020)~~ EC	~~EPA 608 / 8080~~ MANGANESE	~~EPA 608 / 8080 PCB's ONLY~~ IRON	EPA 624 / 8240 / 8260	EPA 625 / 8270	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals	LUFT 5 Metals	Lead (7240/7421/239.2/6010)	RCI	Other: TOTAL HARDNESS	Other: TDS	Other: TOTAL ALKALINITY	Other	Comments
@ START		X			X	X	X	X				X				X	X	X		
@ MIDDLE		X			X	X	X	X				X				X	X	X		
@ END		X			X	X	X	X				X				X	X	X		

Relinquished By:	Date:	Time:	Received By:
[signature]	11/22/05	1:00PM	[signature]
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ✓

GOOD CONDITION ✓

HEAD SPACE ABSENT ____

DECHLORINATED IN LAB ____

PRESERVATION ____ VOAS | O&G | METALS | OTHER

APPROPRIATE CONTAINERS ✓

PERSERVED IN LAB ____

McCampbell Analytical, Inc.
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CHAIN-OF-CUSTODY RECORD

WorkOrder: 0511426 ClientID: ENGM EDF: NO

Report to:
Jeff Wisnienski
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 94592

TEL: (707) 562-0030
FAX: (707) 562-0032
ProjectNo: #6486.2.005.01; Sutter
PO:

Bill to:
Matthew Harrell
ENGEO Incorporated
690 Walnut Avenue, Suite 220
Mare Island, CA 95492

Requested TAT: 5 days
Date Received: 11/22/2005
Date Printed: 11/22/2005

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests (See legend below) 1	2	3	4	5	6	7	8	9	10	11	12
0511426-001	W-SV @ START	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				
0511426-002	W-SV @ MIDDLE	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				
0511426-003	W-SV @ END	Water	11/21/2005	☐	B	D	C	D	A	C	A	A				

Test Legend:

1	Alka(spe)_W	2	CAMMET(D)MS_W	3	HARDMS_DISS	4	METALS_DISS	5	PH_W
6	PRDISSOLVED	7	SC_W	8	TDS_W	9		10	
11		12							

Prepared by: Rosa Venegas

Comments:

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

TABLE 3
Water Quality Results
Wells W-LBC and W-SV, Sutter Medical Center of Santa Rosa, California

Well I.D.	Sample Date	Phase	Total Alkalinity	Bicarbonate as CaCO3	Carbonate as CaCO3	Hydroxide as CaCO3	Hardness	pH	Electrical Conductivity	Total Dissolved Solids	Antimony (EPA 200)	Arsenic (EPA 200)	Barium (EPA 200)	Beryllium (EPA 200)	Cadmium (EPA 200)	Chromium (EPA 200)	Cobalt (EPA 200)	Copper (EPA 200)	Iron (EPA 200)	Lead (EPA 200)	Manganese (EPA 200)	Mercury (EPA 200)	Molybdenum (EPA 200)	Nickel (EPA 200)	Selenium (EPA 200)	Silver (EPA 200)	Thallium (EPA 200)	Vanadium (EPA 200)	Zinc (EPA 200)	Silica (EPA E200.7)
			mg/L	mg/L	mg/L	mg/L	mg/L	Units	mhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
W-LBC	7/5/2005	Start Time	155	155	<1.0	<1.0	110	7.22	334	240	NA	0.0099	NA	NA	NA	NA	NA	NA	0.320	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	34
		Middle Time	151	151	<1.0	<1.0	110	7.23	327	230	NA	0.0095	NA	NA	NA	NA	NA	NA	0.270	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	33
		End Time	153	153	<1.0	<1.0	110	7.25	332	228	NA	0.0094	NA	NA	NA	NA	NA	NA	0.270	NA	*1.5*	NA	NA	NA	NA	NA	NA	NA	NA	33
W-LBC	11/14/2005	Start Time	160	160	<1.0	<1.0	130	7.36	381	224	<0.0005	0.0071	0.100	<0.0005	<0.00025	<0.0005	<0.0005	0.00083	0.072	<0.0005	*1.3*	0.000073	0.0010	0.00100	<0.0005	<0.00019	<0.0005	0.0010	0.0420	70
		Middle Time	158	158	<1.0	<1.0	120	7.37	372	232	<0.0005	0.0083	0.110	<0.0005	<0.00025	<0.0005	<0.0005	0.00057	0.170	0.00059	*1.3*	0.000064	0.0010	0.00006	<0.0005	<0.00019	<0.0005	0.0012	0.0460	74
		End Time	156	156	<1.0	<1.0	120	7.38	376	218	<0.0005	0.0088	0.110	<0.0005	<0.00025	<0.0005	<0.0005	0.00072	0.200	0.00069	*1.3*	0.000051	0.0010	0.00170	<0.0005	<0.00019	<0.0005	0.0013	0.0390	72
W-SV	11/21/2005	Start Time	148	148	<1.0	<1.0	98	7.68	310	226	<0.0005	0.0140	0.082	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.140	0.00072	*0.860*	0.000022	0.0021	0.00065	<0.0005	<0.00019	<0.0005	0.0019	0.0510	73
		Middle Time	148	148	<1.0	<1.0	100	7.71	308	244	<0.0005	0.0140	0.083	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.120	<0.0005	*0.830*	0.000026	0.0020	0.00054	<0.0005	<0.00019	<0.0005	0.0018	0.0320	69
		End Time	148	148	<1.0	<1.0	95	7.66	311	210	<0.0005	0.0140	0.084	<0.0005	<0.00025	<0.0005	<0.0005	<0.0005	0.120	<0.0005	*0.850*	0.000015	0.0020	0.00054	<0.0005	<0.00019	<0.0005	0.0019	0.0270	72
California Department of Health Services Drinking Water Standard and Secondary Standard MCLs			n/a	n/a	n/a	n/a	n/a	6.5-8.5	n/a	500	0.006	0.05	2	0.004	0.005	0.1	n/a	1.3	0.3	0.015	0.05	0.002	n/a	0.1	0.05	0.1	0.0017	0.0500	5	n/a
Type								Secondary		Secondary	Primary	Primary	Primary	Primary	Primary	Primary		Primary	Secondary	Primary	Secondary	Primary		Primary	Primary	Secondary		Action Level	Secondary	

Notes:

mg/L = milligrams per liter

µmhos/cm = mircosiemens per centimeter

Less than value "<" indicates that parameter was not detected at the laboratory reporting limit

Italicized Numbers indicate a MCL exceedence

n/a = not available

NA = Not analyzed

APPENDIX D

State of California Well Completion Report
Pump Curve and Specifications

WELL COMPLETION REPORT - STATE OF CALIFORNIA

1 of 1 No# 761332

Well No. 1

Permit Date: 06/29/00 Permit # WEL00--0343

Date Work Began 8/3/00 Ended 8/11/00

Permit Agency Dept of Permits & Resource Management

State Well No./Station No.

APN/TRS/Other

GEOLOGIC LOG

ORIENTATION: Vertical
DRILLING METHOD: Rotary
FLUID: Mud

Ft	to Ft	DESCRIPTION
0	4	Top soil
4	40	Brown clay
40	64	Gravel and rock
64	84	Brown clay
84	100	Sandy blue clay
100	104	Gravel with clay
104	120	Gravel with rock
120	123	Hard black rock
123	129	Gravel
129	132	Blue clay
132	142	Gravel
142	154	Blue clay
154	160	Gravel
160	164	Blue clay
164	174	Brown clay
174	184	Blue clay
184	208	Gravel
208	212	Clay with gravel
212	218	Gravel
218	224	Blue clay
224	230	Blue clay
230	244	Gravel with brown clay
244	254	Gravel
254	284	Blue clay
284	288	Gravel
288	294	Blue clay with gravel
294	310	Brown clay
310	314	Gravel
214	320	Brown clay
320	328	Gravel
328	384	Blue clay
384	388	Gravel and rock
388	388	Brown clay
388	394	Gravel
394	404	Blue clay

TOTAL DEPTH OF BORING (FT): 404

TOTAL DEPTH OF COMPLETED WELL (FT): 400

WELL OWNER

Name: Luther Burbank Center
Mailing Address: 50 Mark West Springs Rd
Santa Rosa, CA 95403

WELL LOCATION

Address: 50 Mark West Springs Rd
City: Santa Rosa
County: Sonoma
APN Book 057 - 040 - 045
Latitude Longitude

LOCATION SKETCH

attn: Jason
584-9198 (Fax)

ACTIVITY

XXX New Well
Modification/Repair
Deepen
Other (Specify)
DESTROY (Describe) Procedures and Materials Under "Geologic Log")

PLANNED USES

Water Supply
XX Domestic XX Public
Irrigation Industrial

PLANNED USES:

Monitoring
Test well
Cathodic Protection
Heat Exchange
Direct Push
Injection
Vapor Extraction
Sparging
Remediation
Other (specify)

WATER LEVEL & YIELD OF COMPLETED WELL

Depth to First Water (ft.) BELOW SURFACE

Depth of Static Water Level (Ft) 25
Estimate Yield (GPM)* 100+
Date Measured: 08/11/00
Test Length/Test type: 2 hr / Air lift
Total drawdown (ft) 400

*May not be representative of a well's long-term yield

Depth from surface Ft	to Ft	Bore-hole diameter Inches	Type Blank	Type Screen	Material Grade	Diameter	Gauge	Slot Size
0	100	14	XX		PVC	10	200	
100	160	14		XX	PVC	10	200	0.032
160	180	14	XX		PVC	10	200	
180	320	14		XX	PVC	10	200	0.032
320	360	14	XX		PVC	10	200	
360	400	14		XX	PVC	10	200	0.032

Depth From Surface Ft	to Ft	Annular Material Seal Material
0	50	Bentonite
50	404	12 x 20 / 8 x 16

ATTACHMENTS

No Geologic Log
No Well Construct Diagram
No Geophysical Log(s)
No Soil/Water Chemical Analyses
No Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

NAME: LES PETERSEN DRILLING AND PUMP, INC
ADDRESS 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403
SIGNED: Ray Petersen/ 08/11/00 26108

Well Driller/Authorized Representative Date C-57 License

DWR Driller Owner Local

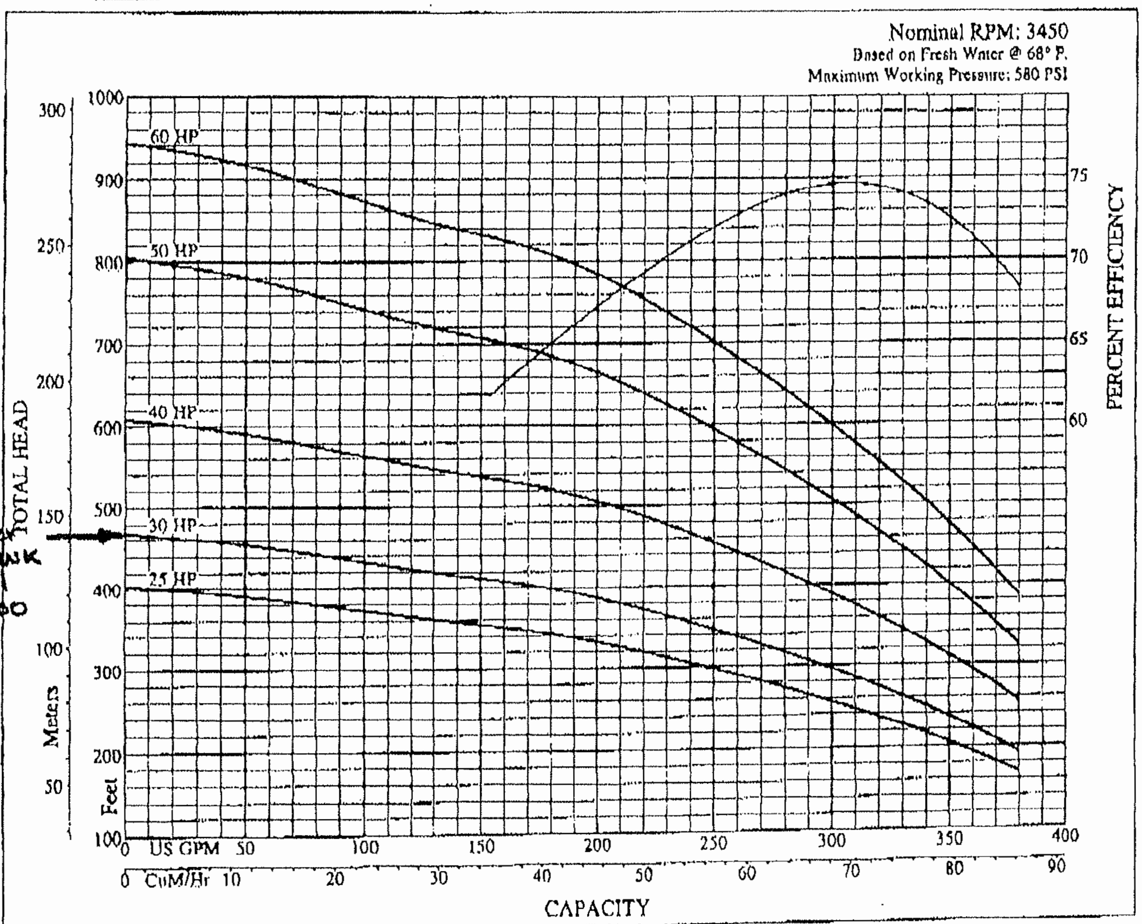
9/26/00 2 day 16 ± hour pump test by Berkley
200-220 gpm
Pump: Berkeley 6TB75 w/ 30 HP motor

Post-it® Fax Note 7671	Date 6/3/05 # of pages ▶ 1
To NADINE	From DON KAMINSKI
Co./Dept.	Co. BARTLEY PUMP
Phone # 542-2668	Phone # 584-9191
Fax # 527-0901	Fax # 584-9198

BERKELEY®

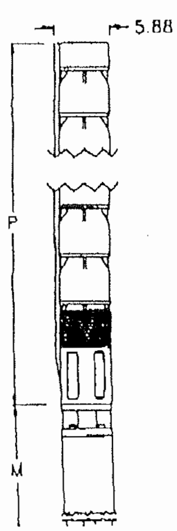
TURBINE

6T-275



Luther Burbank well 12/2000

OUTLINE DIMENSIONS / WEIGHTS



HP	stages	Motor size	P length	M* length	MD* dia.	Mtr. wt.	Pump wt.
25	6	6"	43.98	33.13	5.38	148	153
30	7	6"	48.98	35.69	5.38	162	172
40	9	6"	58.98	40.81	5.38	195	211
50	12	6"	73.98	57.83	5.38	310	269
60	14	6"	83.98	63.83	5.38	340	308

Note: dimensions = inches; weight = U.S. lbs.

M* Maximum length (Franklin Electric Motor)
MD* Motor diameter (Franklin Electric Motor)

SPECIFICATIONS

Minimum Well I.D.	6.0 Inches
Minimum Submergence @ BEP (above inlet)	10.0 Feet
Capacity Range	125 – 380 GPM
Discharge	4" F NPT

See manufacturer's data for motor cooling requirements

SUPERSEDES

All Previous

Date 04/15/96

— ergm 0507082

McCAMPBELL ANALYTICAL, INC.

110 2nd AVENUE SOUTH, #D7
PACHECO, CA 94553-5560
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (925) 798-1620 Fax: (925) 798-1622

CHAIN OF CUSTODY RECORD

TURN AROUND TIME ☐ RUSH ☐ 24 HR ☐ 48 HR ☐ 72 HR ☑ 5 DAY

EDF Required? Coelt (Normal) No Write On (DW) No

Report To: Jeff Wisniewski Bill To:
Company: ENGEO Inc.
690 Walnut Ave. Suite220
Vallejo, CA 94592 E-Mail: jwisniewski@engeo.com
Tele: (707) 562-0030 Fax: (707) 562-0032
Project #: 6486.2.005.01 Project Name: SUTTER
Project Location: Santa Rosa, CA
Sampler Signature: Jeff B. W

SAMPLE ID (Field Point Name)	LOCATION	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	Soil	Air	Sludge	Other	METHOD PRESERVED ICE	HCL	HNO_3	Other
✓ @ START	LBC	7/5/05	11 AM	3		X							(1)	
✓ @ MIDDLE	LBC	7/5/05	10 PM	3		X							(1)	
✓ @ END	LBC	7/6/05	9 AM	3		X							(1)	

Analysis Request (5)

SAMPLE ID	BTEX & TPH as Gas (602/8020 + 8015)/MTBE	~~BTEX only (EPA 602/8020)~~ pH	~~(8015)~~ total silica	Total Petroleum Oil & Grease (5520/1664 (EF/BF)	~~Total Petroleum Hydrocarbons (418.1)~~ electrical conductivity	EPA 601/8010/8021 (Halocarbons)	~~EPA 608 / 8081 (Cl Pesticides)~~ manganese	~~EPA 608 / 8082 PCB's ONLY~~ iron	~~EPA 8140 / 8141 (NP Pesticides)~~ arsenic	EPA 8150 / 8151 (Acidic Herbicides)	EPA 524.2 / 624 / 8260 (VOCs)	EPA 525 / 625 / 8270 (SVOCs)	PAH's / PNA's by EPA 625 / 8270 / 8310	CAM-17 Metals (6010 / 6020) added 8/30/05 JLB	LUFT 5 Metals (6010 / 6020)	Lead (200.8 / 200.9 / 6010)	Other: Total hardness as $CaCO_3$	Other: TDS (total dissolved solids)	Other: Total alkalinity as $CaCO_3$	Comments: Filter Samples for Metals analysis: Yes / No
START		X	X		X		X	X	X					X			X	X	X	
MIDDLE		X	X		X		X	X	X					X			X	X	X	
END		X	X		X		X	X	X					X			X	X	X	

Relinquished By:	Date:	Time:	Received By:
Jeff B. W	7/7/05	4:10P	[signature]
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

ICE/t° ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT
DECHLORINATED IN LAB
APPROPRIATE CONTAINERS ✓
PRESERVED IN LAB

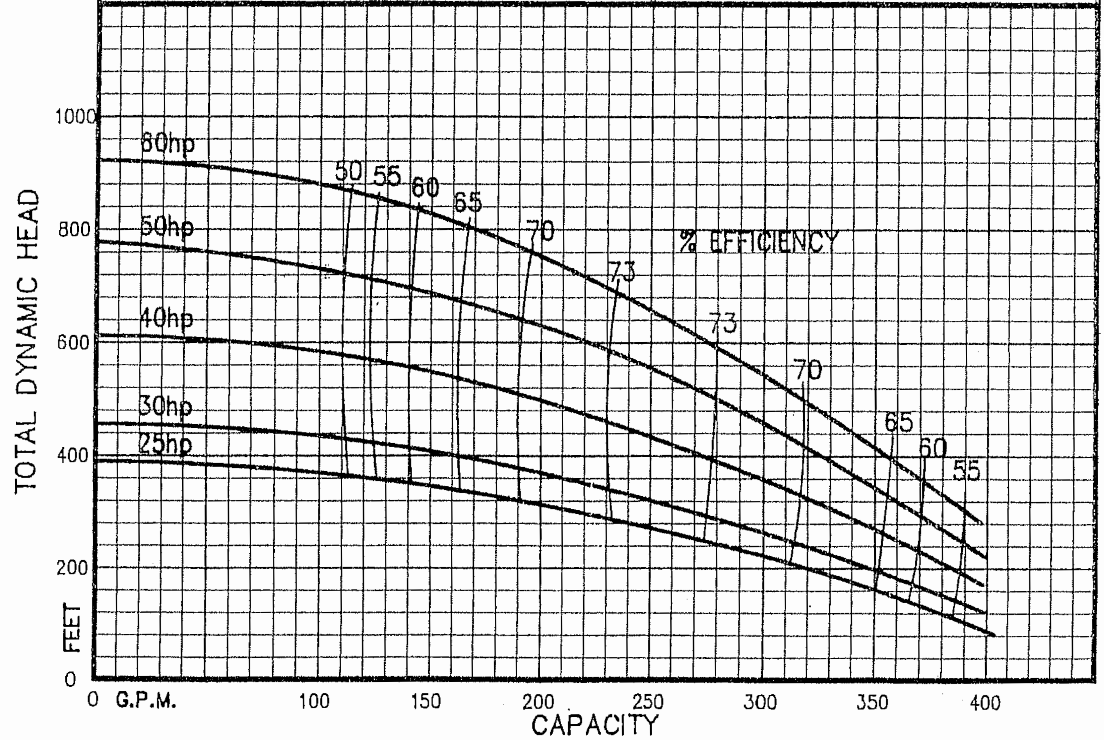
PRESERVATION VOAS | O&G | METALS ✓ pH<2 | OTHER

COMMENTS:

Submersible Turbine Model 6T-275

FAMILY CURVE — SIZE: 6"
DESIGN SERIES: 6T-275
SPEED: 3450 — HZ: 60
CURVE NO.: ST2375B — DATE: 5 DEC 89

BERKELEY PUMPS



Specifications

CURVE No. ST2375B

LIQUID END WEIGHTS

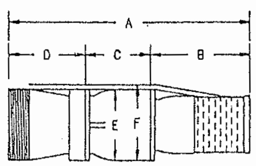
DESCRIPTION	WEIGHT LBS.	HP RATING	MOTOR FLANGE
ONE STAGE L.E.	55.8	25-60	6"
ONE STAGE L.E.			
ONE STAGE L.E.			
EACH ADDED STAGE	19.4	ALL	ALL

IMPELLER DATA

TYPE: ENCLOSED EYE AREA 5.76 Sq. In.
THRUST CONSTANT K 1.83 Lbs./Ft of HEAD.

HP	IMPELLER No.	STAGES	IMPELLER Dia.
60	S39553	14	4.47" @ 32° (3.81")
50	S39552	12	4.44" @ 32° (3.78")
40	S39551	10	4.41" @ 30° (3.75")
30	S39553	7	4.47" @ 32° (3.81")
25	S39552	6	4.44" @ 32° (3.78")

OUTLINE DIMENSIONS



A– ONE STAGE LIQUID END LENGTH
B– SUCTION CONNECTION LENGTH
C– STAGE LENGTH
D– DISCHARGE CONNECTION LENGTH
E– BOWL DIAMETER
F– DIAMETER ACROSS LEAD GUARD

BOWL DATA

BOWL No. M04461 PUMP SHAFT Dia. 1"
TYPE: THREADED DISCHARGE SIZE 3" NPT (Female) 4" NPT (Male)

NOTE: For each additional stage add 'C'

A	B	C	D	E	F	HP RATING	MOTOR FLANGE
19.63	11.00	5.00	3.63	5.38	5.81	25-60	6"

REVISED 15 May 90

APPENDIX E

Welenco

Wellbore Video Report
Plumbness and Alignment Interpretation Package
Wellbore Drift Interpretation Package
VHS Video

Vid-Pac

Wellbore Video Report

welenco

Company	ENGEO	**Job Ticket**	5211
		Run No.	1
Address	690 Walnut Ave, Ste. 200	**Well No**	W-LBC
City	Mare Island, Vallejo **State** CA **Zip** 94592	**Survey Date**	November 19, 2005
Requested by	Jeff Wisniewski **P.O.**	**Well Owner**	Sutter Medical
Copy To	Carla Nelson (Geomatrix)	**Camera**	CCV SideScan Color Camera
Reason For Survey	General Inspection	**Zero Datum**	Ground Level
Operator	Dan Ihde **Well Depth**	**Video Vai**	L-22

Location 50 West Mark Springs Rd, Santa Rosa, CA

Casing I.D. at Surface 9.25" **I.D. Reference** Well Records **Build-Up** Moderate increases with depth

SELECTED WELLBORE SNAPSHOTS

0043'

0098' (See Other Side)

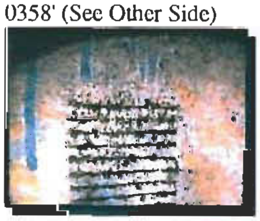
0158'

0178' (See Other Side)

0275'

0317'

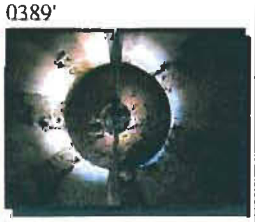
0358' (See Other Side)



0366'

0378' (See Other Side)

0389'



TRUE DEPTHS	WELLBORE/CASING INFORMATION
	Downview Depths are 2' deeper than displayed
0'	Recording Starts - Zeroed on Sideview Lens at Ground Level
43'	Static Water Level - Poor visibility
94'	Visibility improves rapidly
98'	Sideview - Top of Horizontal slots
158'	Sideview - Bottom of 1st section of slots
178'	Sideview - Top of 2nd section of slots
275'	Sideview - Slots with increased build-up
317'	Sideview - Bottom of 2nd slot section
358'	Sideview - Top of 3rd slot section - increased build-up
366'	Sideview - Roots
378'	Sideview - Growths on slots
389'	Downview - Fill - Bottom of survey at 391'
389'	Begin Sideview inspection to top of slots

welenco, inc.
5201 Woodmere Dr.
Bakersfield, CA 93313

www.welenco.com
e-mail: welenco@welenco.com
Phone: 1-(800) 445-9914
Fax: 1-(661) 834-2550

Notes:

0098'

0178'

0358'

0378'

welenco, inc.
5201 Woodmere Dr.
Bakersfield, CA 93313

www.welenco.com
e-mail: welenco@welenco.com
Phone: 1-(800) 445-9914
Fax: 1-(661) 834-2550

Notes:

Drift-Pac™

Plumbness and Alignment Interpretation Package

Prepared Especially For

ENGEO

W-LBC

November 19, 2005

welenco

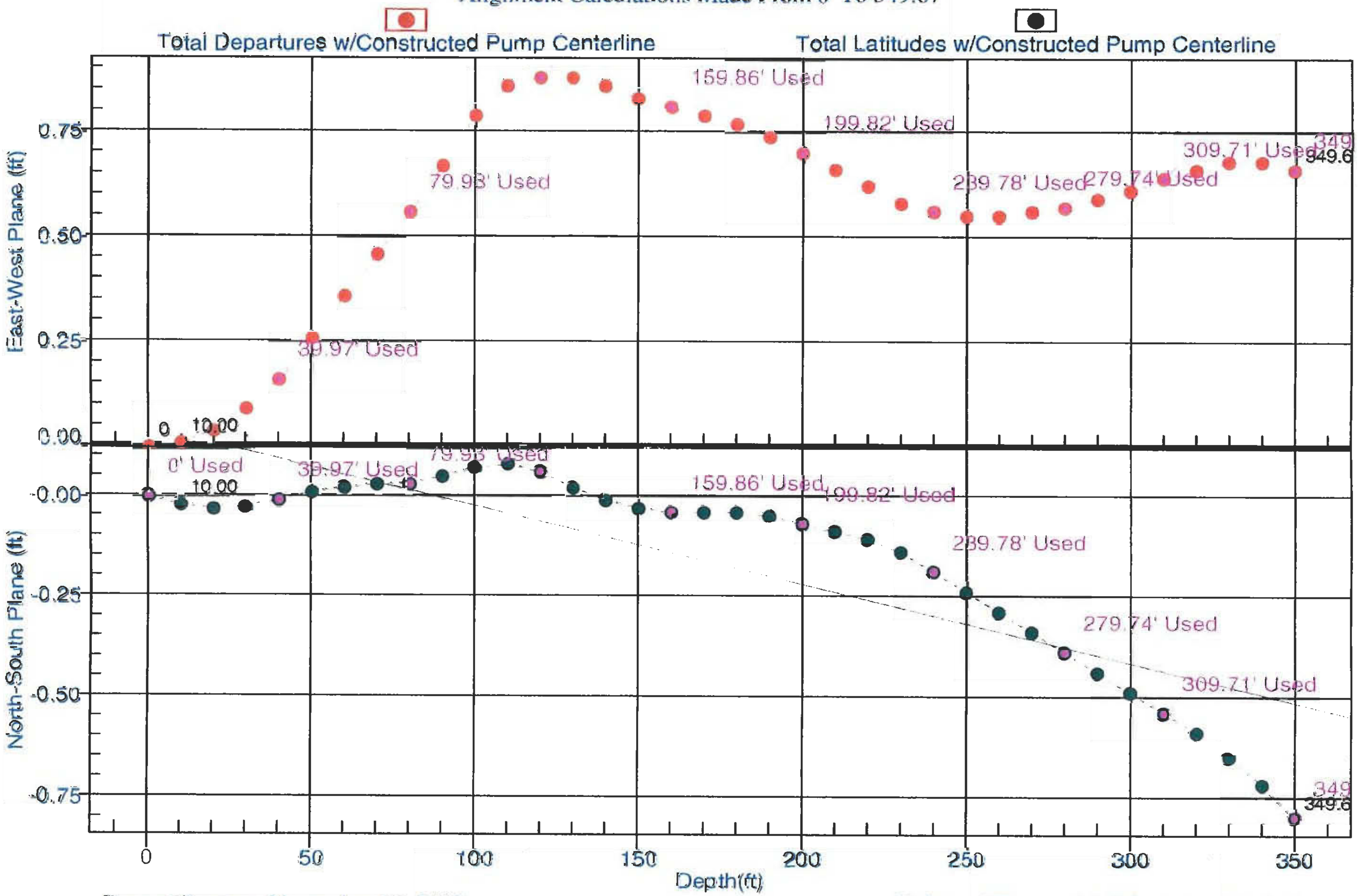
ENGEO

W-LBC

DRIFT-PAC Straightness/Alignment Calculations

Constructed Pump Centerline (Well Centerline/Straightness) View Used To Calculate Actual Drift and Effective Diameter

Alignment Calculations Made From 0' To 349.67'



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

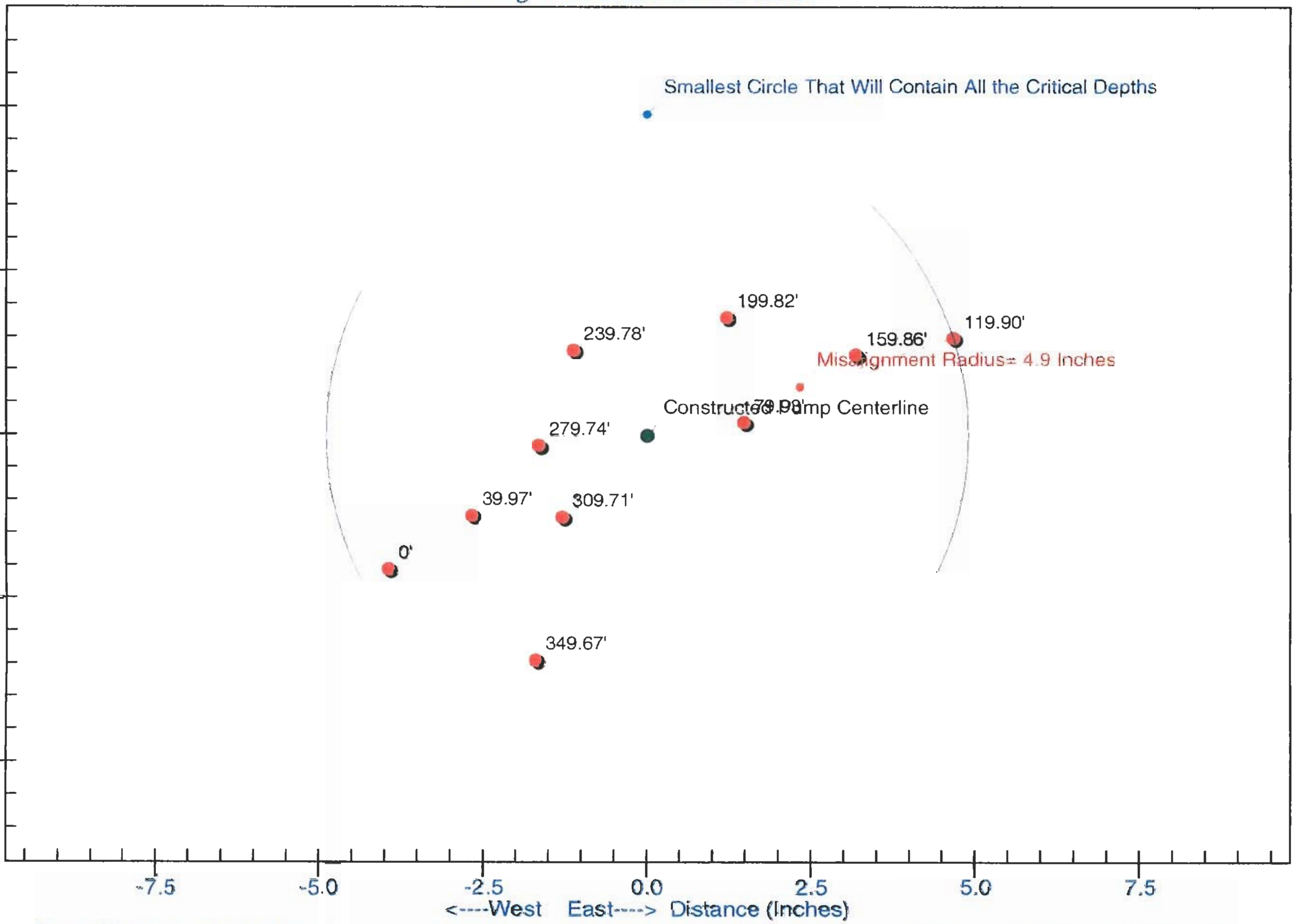
Welenco, Inc. (800) 445-9914

ENGEO

W-LBC

Drift-Pac Straightness/Alignment View

Misalignment Diameter = 9.8 Inches



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

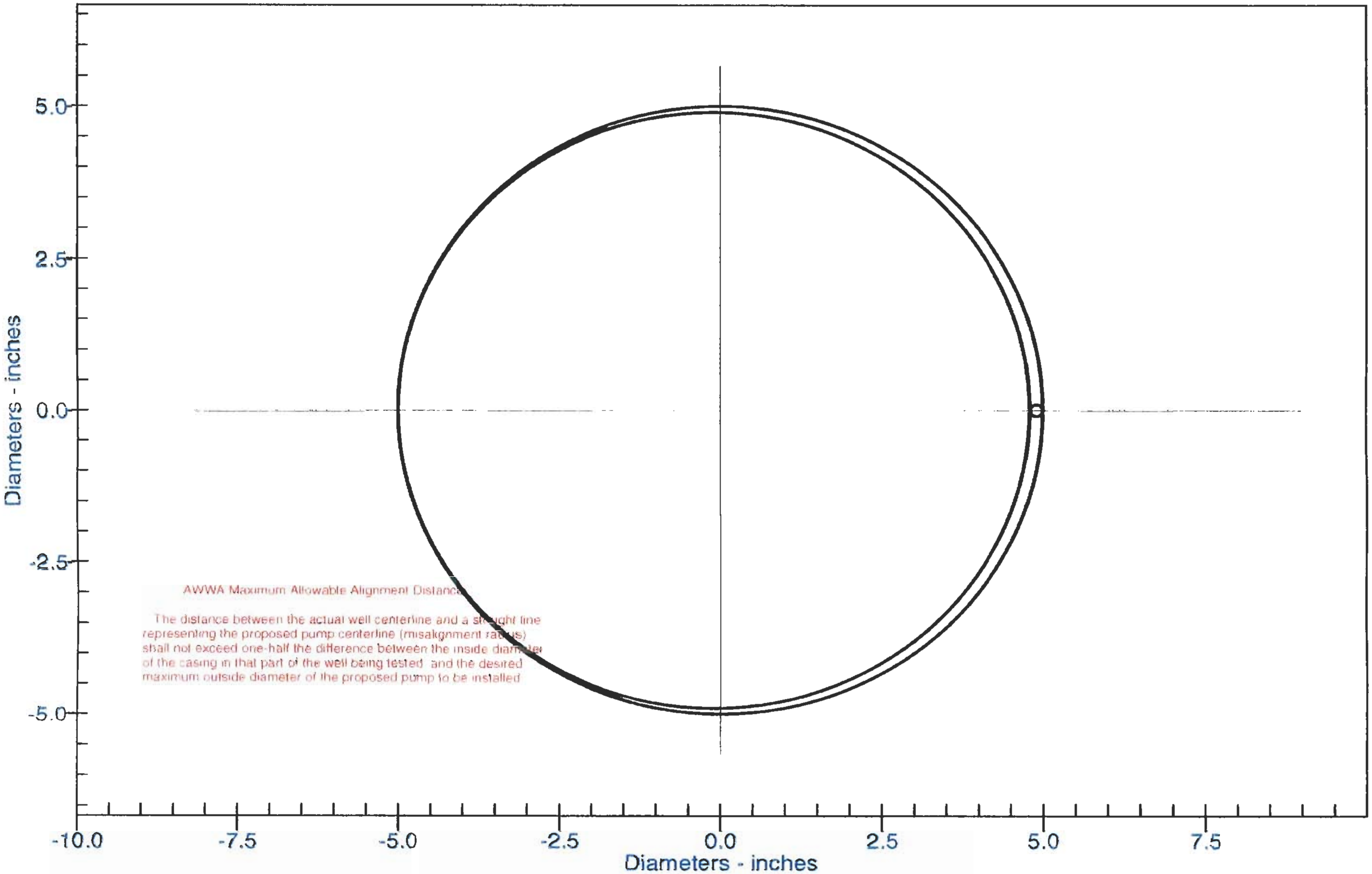
Welenco, Inc. (800) 445-9914

ENGEO

W-LBC

Drift-Pac Misalignment/Effective Diameter Relationship

Green circle = Desired Casing Size of 10 Inches
Blue circle = Misalignment diameter of 9.8 Inches (See Note Below)
Red circle = Effective Diameter of 0.2 Inches From 0' To 349.67'



Date of Survey: November 19, 2005

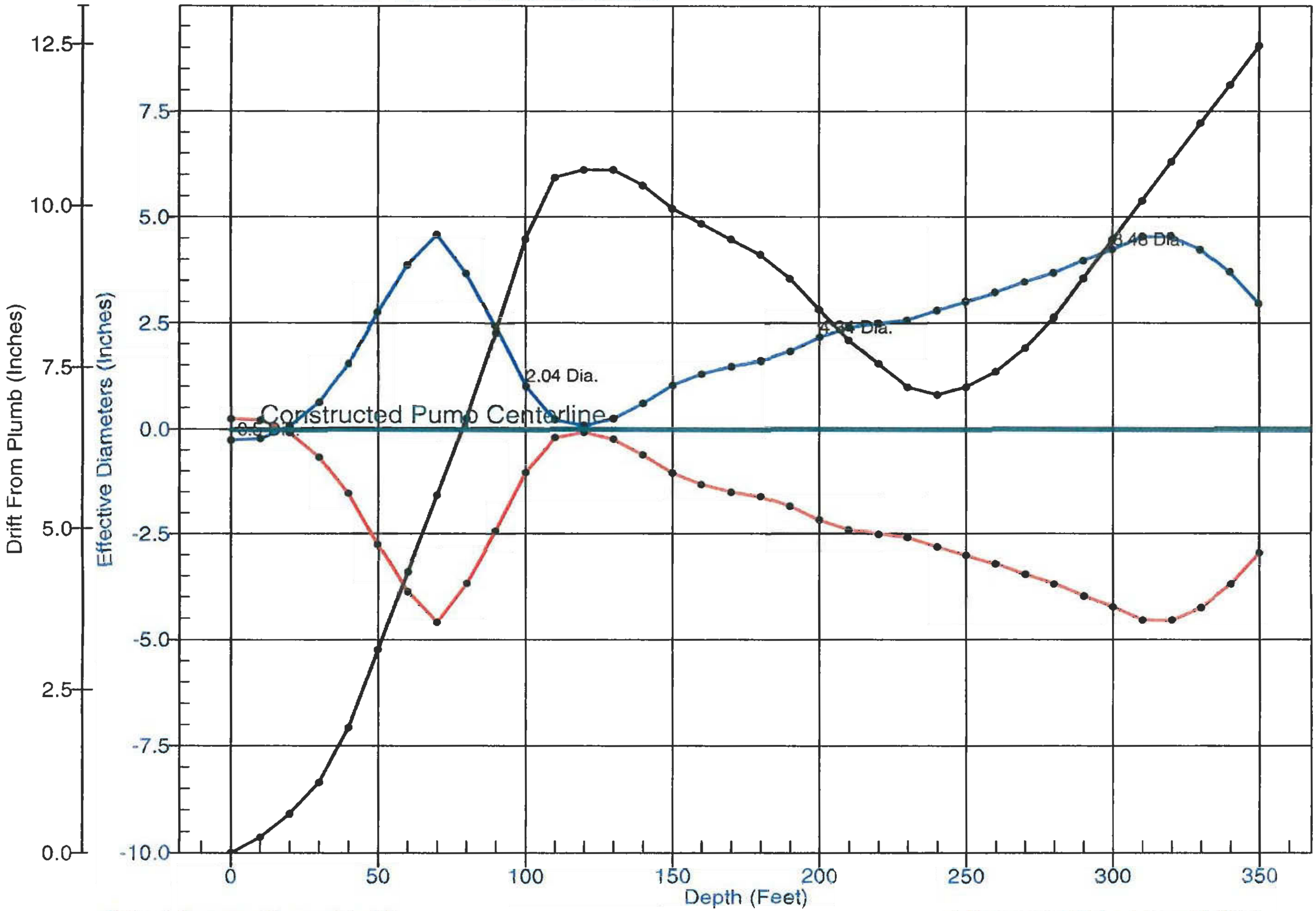
Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

ENGEO

W-LBC

Drift-Pac Vertical Plane of Effective Diameters vs. Drift From Plumb



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

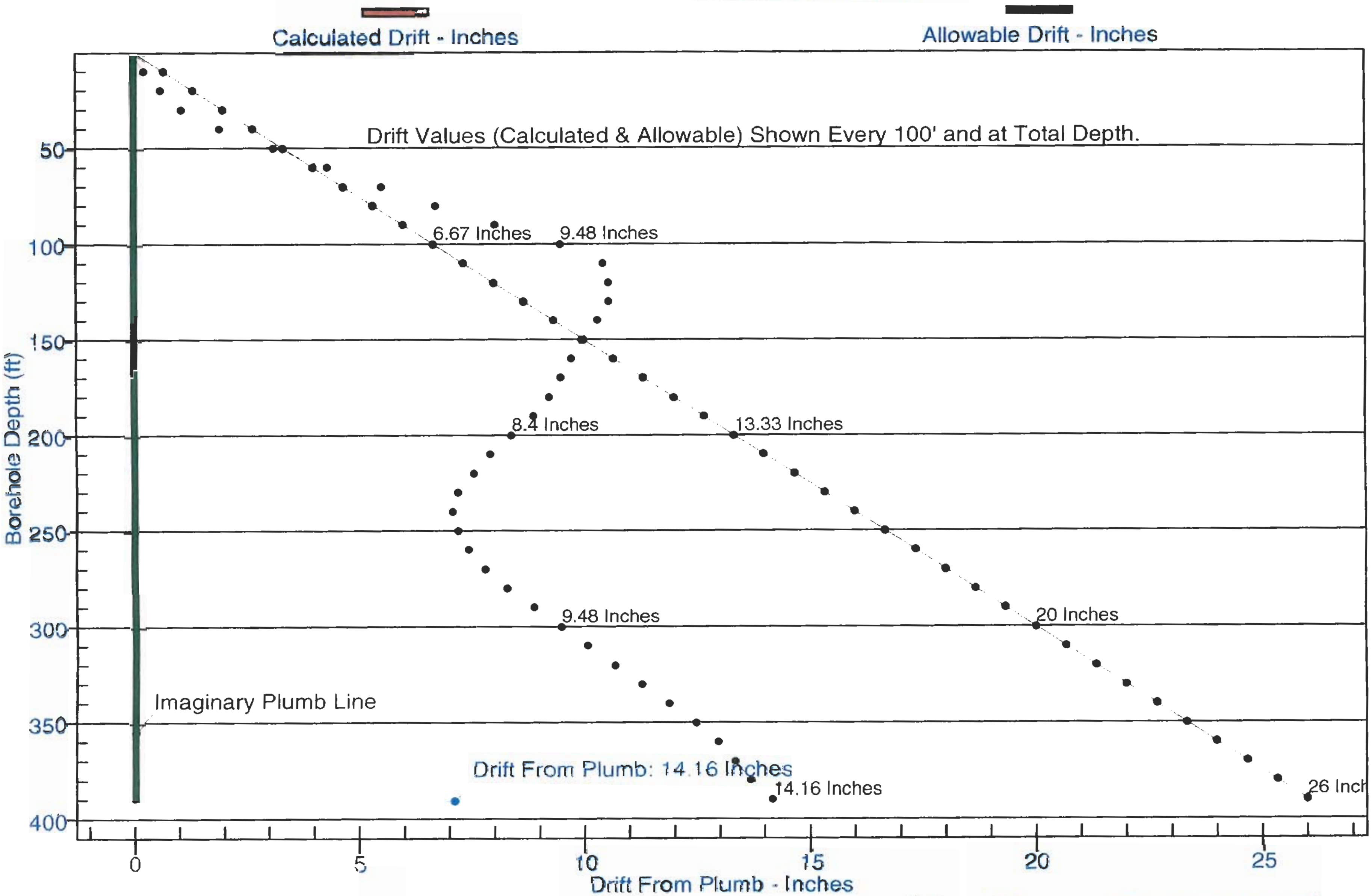
ENGEO

W-LBC

Drift-Pac Plumbness and AWWA Standard A-100 Plot

Maximum AWWA Allowable Drift = 26 Inches for 10 Inch Casing

Maximum Calculated Drift = 14.16 Inches



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

Drift-Pac™

Wellbore DRIFT Interpretation Package

Prepared Especially For

ENGEO

W-LBC

November 19, 2005

welenco

Drift-Pac — Wellbore Deviation and Directional Interpretation — welenco

Company	ENGEO	**County**	Sonoma
Well Number	W-LBC	**Date of Survey**	November 19, 2005
Field	Santa Rosa	**Recorded By**	Dan Ihde
Equipment No.	L-22 **Job Number** 5211	**welenco Office**	Bakersfield
Location	50 Mark West Springs Rd.	**Tool Type**	Compass
Remarks		**Tool Number**	3533
Directional Calculation Method	Balanced Tangential Method	**Dogleg Calculation Method**	Lubinski Method
State	CA	**Magnetic Declination Used**	
Witness	Carla Nelson		

Measured Information			Closure Calculations				Rectangular Coordinates				Dogleg Severity	
Measured Depth, Feet	Inclination, Degrees From Vertical	Azimuth, Degrees, True	Course Deviation, Feet	True Vertical Depth, Feet	Closure Distance, Feet	Closure Bearing Degrees, True	Latitude, Feet	Departure, Feet	Total Latitude, Feet	Total Departure, Feet	Dogleg Severity, Degs/20 Feet	Dogleg Severity, Degs/100 Feet
0.00	0.13	131	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
10.00	0.10	153	0.02	10.00	0.02	140.50	-0.02	0.01	-0.02	0.01		
20.00	0.25	108	0.03	19.99	0.05	128.10	-0.02	0.03	-0.03	0.04		
30.00	0.31	75	0.05	29.98	0.09	109.30	0.00	0.05	-0.03	0.09		
40.00	0.55	76	0.08	39.97	0.16	94.10	0.02	0.07	-0.01	0.16		
50.00	0.62	79	0.10	49.96	0.26	87.60	0.02	0.10	0.01	0.26		
60.00	0.55	89	0.10	59.95	0.36	86.50	0.01	0.10	0.02	0.36		
70.00	0.55	88	0.10	69.94	0.46	86.90	0.00	0.10	0.03	0.46		
80.00	0.62	83	0.10	79.93	0.56	86.60	0.01	0.10	0.03	0.56		
90.00	0.70	80	0.12	89.92	0.67	85.70	0.02	0.11	0.05	0.67		
100.00	0.70	78	0.12	99.92	0.79	84.70	0.02	0.12	0.07	0.79		
110.00	0.16	104	0.07	109.91	0.87	84.60	0.01	0.07	0.08	0.86		
120.00	0.22	175	0.03	119.90	0.88	86.10	-0.02	0.02	0.06	0.88		
130.00	0.22	193	0.04	129.89	0.88	88.60	-0.04	0.00	0.02	0.88		
140.00	0.24	219	0.04	139.88	0.86	90.90	-0.04	-0.02	-0.01	0.86		
150.00	0.15	252	0.03	149.87	0.83	92.40	-0.02	-0.03	-0.03	0.83		
160.00	0.12	265	0.02	159.86	0.81	92.80	-0.01	-0.02	-0.04	0.81		
170.00	0.10	266	0.02	169.85	0.79	92.90	0.00	-0.02	-0.04	0.79		
180.00	0.12	270	0.02	179.84	0.77	93.10	0.00	-0.02	-0.04	0.77		
190.00	0.25	245	0.03	189.83	0.74	94.00	-0.01	-0.03	-0.05	0.74		
200.00	0.26	246	0.04	199.82	0.70	95.70	-0.02	-0.04	-0.07	0.70		
210.00	0.28	243	0.05	209.81	0.66	97.70	-0.02	-0.04	-0.09	0.66		
220.00	0.28	243	0.05	219.80	0.63	100.20	-0.02	-0.04	-0.11	0.62		
230.00	0.29	215	0.05	229.79	0.60	103.90	-0.03	-0.04	-0.14	0.58		
240.00	0.29	200	0.05	239.78	0.59	108.60	-0.05	-0.02	-0.19	0.56		
250.00	0.29	180	0.05	249.77	0.60	113.40	-0.05	-0.01	-0.24	0.55		
260.00	0.30	171	0.05	259.76	0.62	117.60	-0.05	0.00	-0.29	0.55		
270.00	0.30	172	0.05	269.75	0.65	121.30	-0.05	0.01	-0.34	0.56		

TVD in Feet 389.63 **Final Closure Distance in Feet** 1.18 **Final Closure Bearing in Degrees** 155.40

Measured Information			Closure Calculations				Rectangular Coordinates				Dogleg Severity	
Measured Depth, Feet	Inclination, Degrees From Vertical	Azimuth, Degrees, True	Course Deviation, Feet	True Vertical Depth, Feet	Closure Distance, Feet	Closure Bearing Degrees, True	Latitude, Feet	Departure, Feet	Total Latitude, Feet	Total Departure, Feet	Dogleg Severity, Degs/20 Feet	Dogleg Severity, Degs/100 Feet
280.00	0.31	167	0.05	279.74	0.69	124.60	-0.05	0.01	-0.39	0.57		
290.00	0.32	150	0.05	289.73	0.74	126.90	-0.05	0.02	-0.44	0.59		
300.00	0.31	158	0.05	299.72	0.79	128.80	-0.05	0.02	-0.49	0.61		
310.00	0.32	155	0.05	309.71	0.84	130.50	-0.05	0.02	-0.54	0.64		
320.00	0.33	160	0.06	319.70	0.89	132.20	-0.05	0.02	-0.59	0.66		
330.00	0.34	165	0.06	329.69	0.94	133.90	-0.06	0.02	-0.65	0.68		
340.00	0.44	186	0.07	339.68	0.99	136.60	-0.07	0.00	-0.72	0.68		
350.00	0.48	197	0.08	349.67	1.04	140.20	-0.08	-0.02	-0.80	0.66		
360.00	0.54	208	0.09	359.66	1.08	144.40	-0.08	-0.03	-0.88	0.63		
370.00	0.40	217	0.08	369.65	1.11	148.20	-0.07	-0.04	-0.95	0.59		
380.00	0.41	217	0.07	379.64	1.14	151.50	-0.06	-0.04	-1.00	0.54		
390.00	0.58	219	0.09	389.63	1.18	155.40	-0.07	-0.05	-1.07	0.49		

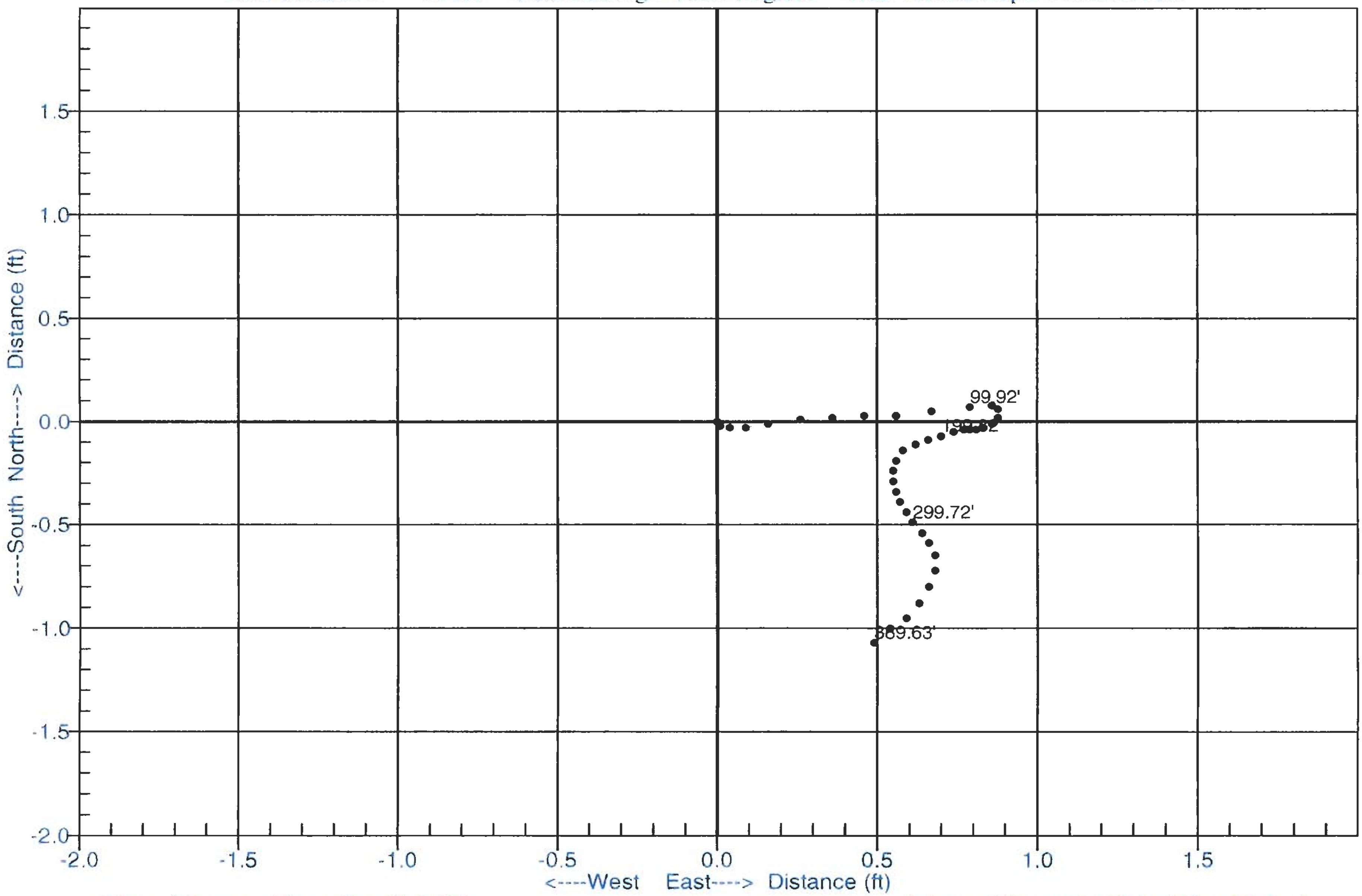
TVD in Feet 389.63 **Final Closure Distance in Feet** 1.18 **Final Closure Bearing in Degrees** 155.40

ENGEO

W-LBC

Drift-Pac Plan View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet



Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

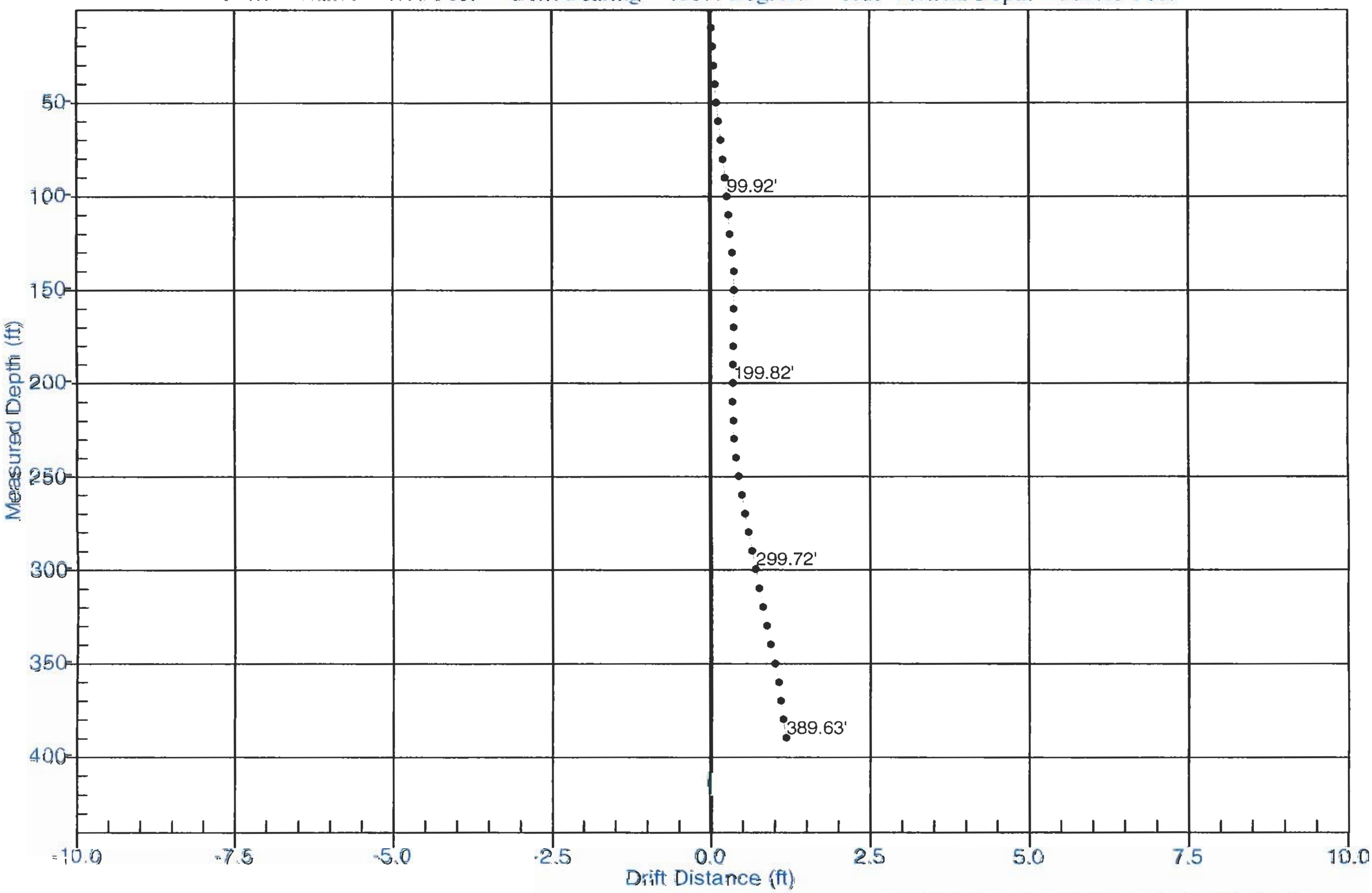
Welenco, Inc. (800) 445-9914

ENGEO

W-LBC

Drift-Pac Plane of Drift View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet



Date of Survey: November 19, 2005

Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

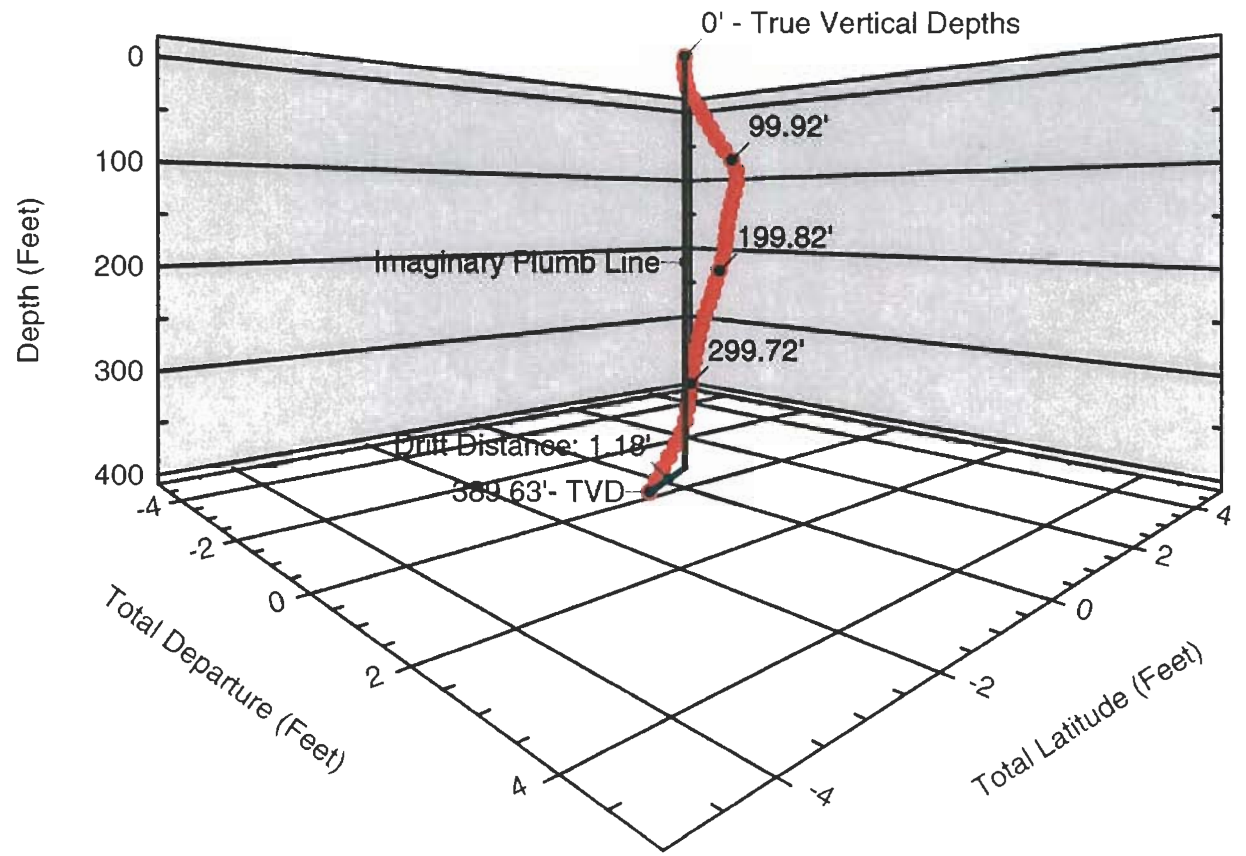
ENGEO

W-LBC

Drift-Pac 3D Projection View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet

226.0



Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

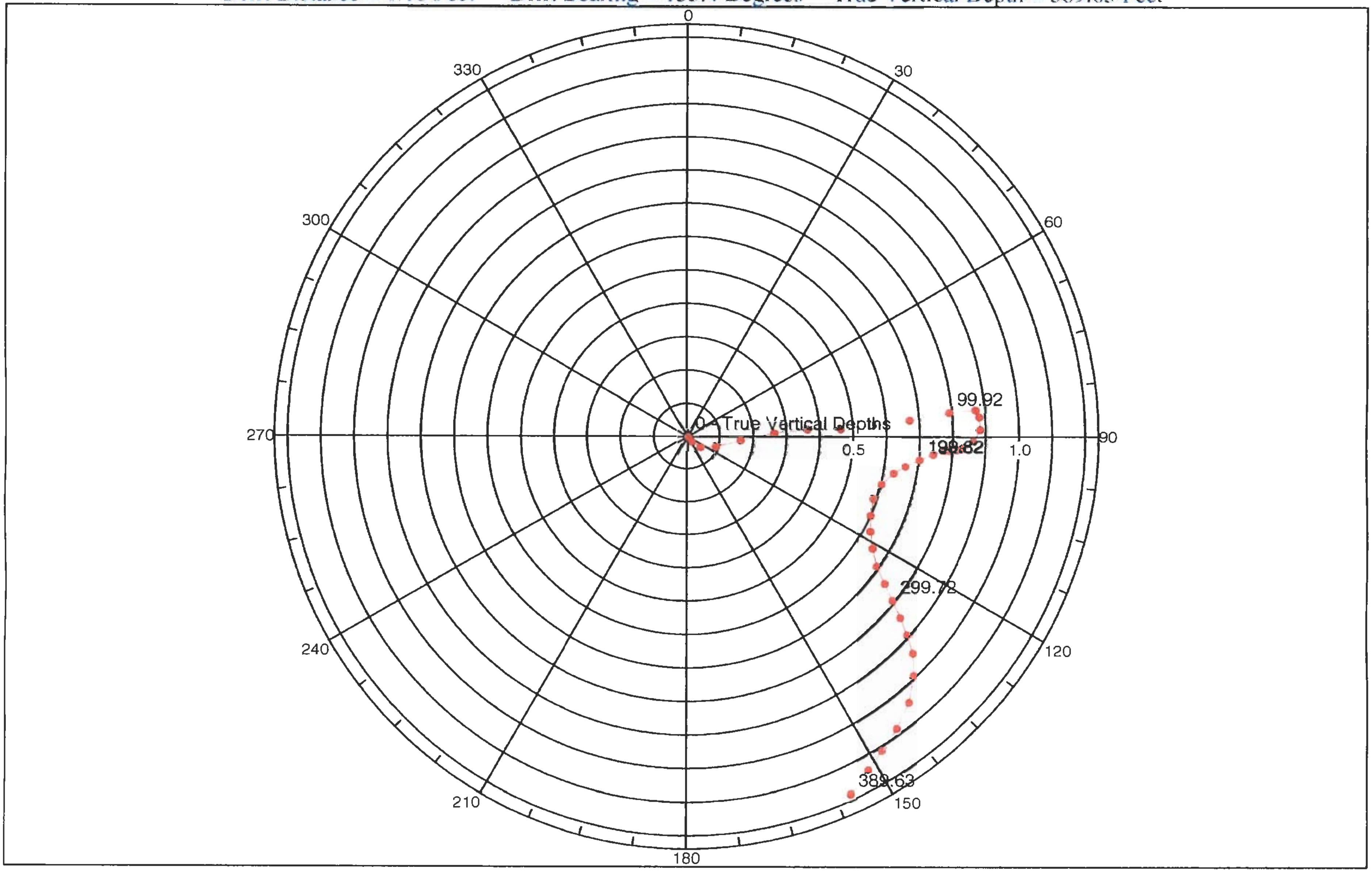
Welenco, Inc. (800) 445-9914

ENGEO

W-LBC

Drift-Pac Polar View

Drift Distance = 1.18 Feet   Drift Bearing = 155.4 Degrees   True Vertical Depth = 389.63 Feet

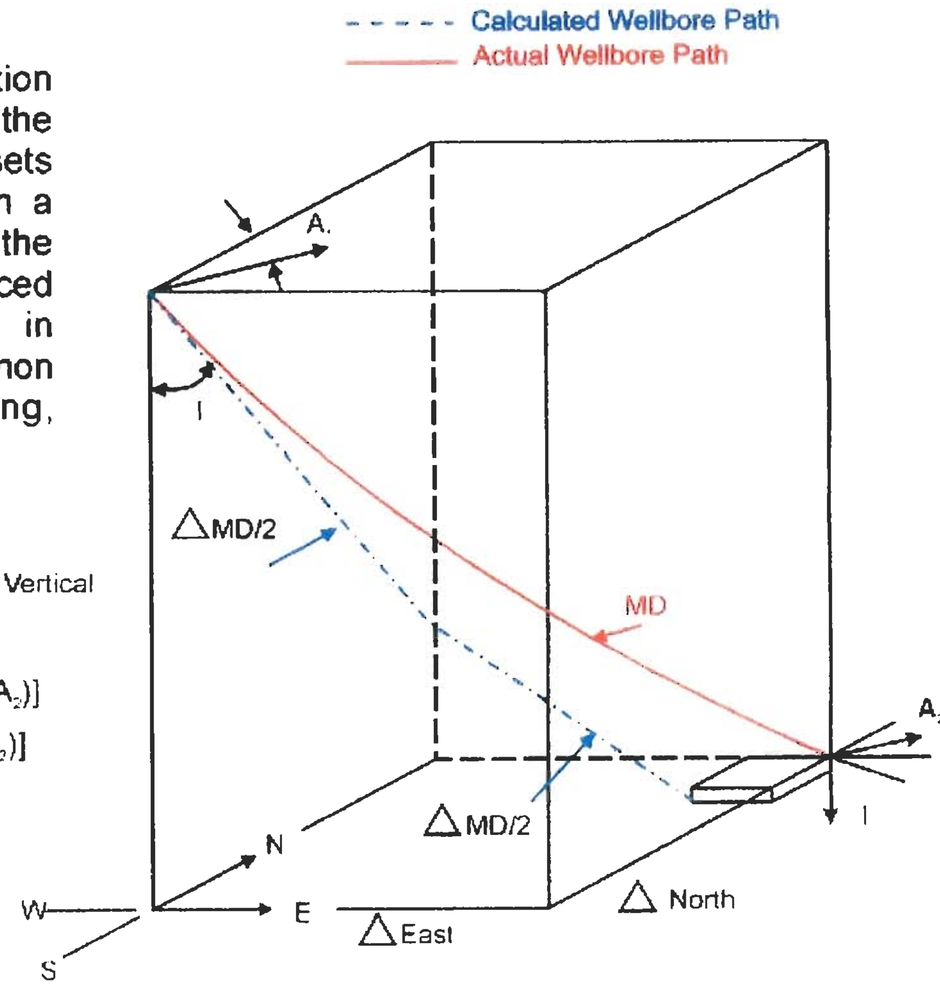


Date of Survey: November 19, 2005   Balanced Tangential Calculation Method

Welenco, Inc. (800) 445-9914

Balanced Tangential Method

The Balanced Tangential Method uses the inclination and direction angles at the upper and lower ends of the course length in a manner so as to balance the two sets of measured angles over a course length. From a theoretical standpoint, this method combines the trigonometric functions to provide the average balanced inclination and direction angles, which are used in standard computational procedures. Other common names for this method are Vector Averaging, Acceleration, and Trapezoidal.



Δ North = [ΔMD/2] x [$\sin(I_1) \times \cos(A_1) + \sin(I_2) \times \cos(A_2)$]

Δ East = [ΔMD/2] x [$\sin(I_1) \times \sin(A_1) + \sin(I_2) \times \sin(A_2)$]

Δ Vertical = [ΔMD/2] x [$\cos(I_2) + \cos(I_1)$]

APPENDIX F

Water Quality Analysis Data
Sutter Medical Center Well
October 2009

APPENDIX F

Analytical Sciences

August 26, 2009

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9082402 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: August 26, 2009

Laboratory Report

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name: **Sutter Medical Center** **6486.200.503**

Lab Project: **9082402**

This 5 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.
Laboratory Director

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Antimony (Sb)	ND	5.0
		Arsenic (As)	6.2	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006202
Date Received:	08/24/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Aluminum (Al)	130	50
		Barium (Ba)	ND	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	ND	2.5
		Iron (Fe)	210	100
		Manganese (Mn)	1000	20
		Nickel (Ni)	ND	10

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	EPA 200.7 4x conc.	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Sodium (Na)	23	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	EPA 200.7	

Silica

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Silica (SiO_2)	69	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	EPA 200.7	

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Calcium (Ca)	19	5.0
		Magnesium (Mg)	14	1.0
		Hardness	100	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	SM 2340 B	

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Mercury (Hg)	ND	0.20

Date Sampled:	08/22/09	Date Analyzed:	08/25/09	QC Batch: B006199
Date Received:	08/24/09	Method:	EPA 245.1	

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9082402-01	**6486 Zone 3**	pH	6.92	1.00

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006237
Date Received:	08/24/09	Method:	SM 4500-H B	

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9082402-01	**6486 Zone 3**	Total Alkalinity	140	5.0
		Bicarbonate Alkalinity	140	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006224
Date Received:	08/24/09	Method:	SM 2320 B	

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Fluoride	0.10	0.10
		Chloride	14	0.40
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50
		Sulfate as SO4	8.4	0.50

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006236
Date Received:	08/24/09	Method:	EPA 300.0	

Total Dissolved Solids

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Total Dissolved Solids	100	10

Date Sampled:	08/22/09	Date Analyzed:	08/25/09	QC Batch: B006197
Date Received:	08/24/09	Method:	SM 2540 C	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Please Note: The drinking water Maximum Contamination Limits (MCL) set by the California Department of Health Services are as follows:

Arsenic (10 ug/L)
Iron (300 ug/L)
Manganese (50 ug/L)
Nitrate (45 mg/L)
Lead (15 ug/L)
Total Coliform (<1 MPN/100 mL)

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 9082402
CLIENT'S PROJECT NAME: Sutter Medical Center
CLIENT'S PROJECT NUMBER:

CLIENT INFORMATION

COMPANY NAME: ENGEO, Inc
ADDRESS: 2010 Crow Canyon Pl Suite 250 San Ramon CA
CONTACT: Brooks Ransdell
PHONE#: 925 570-7782
FAX #: 888 279-2698

BILLING INFORMATION

CONTACT: SAME
COMPANY NAME:
ADDRESS:
PHONE#:
FAX #:

RUSH

TURNAROUND TIME (check one)

SAME DAY ___
24 HOURS ___
48 HOURS X
72 HOURS ___
5 DAYS ___
NORMAL ___

GEOTRACKER EDF: ___Y X N
GLOBAL ID: ___

COOLER TEMPERATURE cool °C

COC

PAGE ___ OF ___

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	Title 22 Primary +	Secondary	TDS, Sulfate	Nitrate Silica	COMMENTS	LAB SAMPLE #
1	6486 Zone 3	8/22/09	10:15		#	No	X	X	X	X	9082402	-01
2	6486 Zone 3	8/22/09	10:15		2	Yes	~~X~~	~~X~~	~~X~~	~~X~~		
3												
4												
5												
6												
7												
8											xe Job	
9											9082107 fw/ast	
10												
11												

SIGNATURES

SAMPLED BY: ___

RELINQUISHED BY: [signature] SIGNATURE — 8/24/09 DATE — 10Am. TIME

RECEIVED BY LABORATORY: Mark A. Valentine SIGNATURE — 8/24/09 DATE — 10:00 TIME

Analytical Sciences

August 25, 2009

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9082107 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Analytical Sciences

Report Date: August 25, 2009

Laboratory Report

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Medical Center**	**6486.200.503**
Lab Project:	**9082107**	

This 15 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Antimony (Sb)	ND	5.0
		Arsenic (As)	3.3	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006202
Date Received:	08/21/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Aluminum (Al)	350	50
		Barium (Ba)	76	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	5.1	2.5
		Iron (Fe)	470	100
		Manganese (Mn)	120	20
		Nickel (Ni)	ND	10

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch: B006180
Date Received:	08/21/09	Method:	EPA 200.7 4x conc.	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Sodium (Na)	160	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/21/09	Method:	EPA 200.7	

Silica

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Silica (SiO_2)	39	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/21/09	Method:	EPA 200.7	

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Calcium (Ca)	18	5.0
		Magnesium (Mg)	6.9	1.0
		Hardness	74	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/21/09	Method:	SM 2340 B	

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Mercury (Hg)	ND	0.20

Date Sampled:	08/21/09	Date Analyzed:	08/25/09	QC Batch: B006199
Date Received:	08/21/09	Method:	EPA 245.1	

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9082107-01	**Well #1**	pH	7.52	1.00

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch: B006192
Date Received:	08/21/09	Method:	SM 4500-H B	

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9082107-01	**Well #1**	Total Alkalinity	350	5.0
		Bicarbonate Alkalinity	350	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006224
Date Received:	08/21/09	Method:	SM 2320 B	

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Fluoride	ND	0.10
		Chloride	29	2.0
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50
		Sulfate as SO4	22	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch: B006223
Date Received:	08/21/09	Method:	EPA 300.0	

Total Dissolved Solids

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Total Dissolved Solids	450	10

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006197
Date Received:	08/21/09	Method:	SM 2540 C	

Quality Assurance Report

Graphite Furnace Metals

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006202 - EPA 200.9										
Blank (B006202-BLK1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	ND	5.0	µg/L							
Arsenic (As)	ND	2.0	µg/L							
Selenium (Se)	ND	5.0	µg/L							
Thallium (Tl)	ND	2.0	µg/L							
LCS (B006202-BS1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	8.9	5.0	µg/L	10.0		89	85-115			
Arsenic (As)	9.4	2.0	µg/L	10.0		94	85-115			
Selenium (Se)	9.61	5.0	µg/L	10.0		96	85-115			
Thallium (Tl)	10.3	2.0	µg/L	10.0		103	85-115			
LCS Dup (B006202-BSD1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	8.8	5.0	µg/L	10.0		88	85-115	1	20	
Arsenic (As)	9.1	2.0	µg/L	10.0		91	85-115	3	20	
Selenium (Se)	10.4	5.0	µg/L	10.0		104	85-115	8	20	
Thallium (Tl)	10.5	2.0	µg/L	10.0		105	85-115	2	20	

Drinking Water Metals (ug/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	ND	50	µg/L							
Barium (Ba)	ND	50	µg/L							
Beryllium (Be)	ND	1.0	µg/L							
Cadmium (Cd)	ND	1.0	µg/L							
Chromium (Cr)	ND	2.5	µg/L							
Iron (Fe)	ND	100	µg/L							
Manganese (Mn)	ND	20	µg/L							
Nickel (Ni)	ND	10	µg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	471	50	µg/L	500		94	70-130			
Barium (Ba)	567	50	µg/L	500		113	70-130			
Beryllium (Be)	512	4.0	µg/L	500		102	70-130			
Cadmium (Cd)	492	4.0	µg/L	500		98	70-130			
Chromium (Cr)	530	10	µg/L	500		106	70-130			
Iron (Fe)	463	100	µg/L	500		93	70-130			
Manganese (Mn)	533	20	µg/L	500		107	70-130			
Nickel (Ni)	527	40	µg/L	500		105	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	466	50	µg/L	500		93	70-130	1	20	
Barium (Ba)	498	50	µg/L	500		100	70-130	13	20	
Beryllium (Be)	467	4.0	µg/L	500		93	70-130	9	20	
Cadmium (Cd)	448	4.0	µg/L	500		90	70-130	9	20	
Chromium (Cr)	485	10	µg/L	500		97	70-130	9	20	
Iron (Fe)	410	100	µg/L	500		82	70-130	12	20	
Manganese (Mn)	488	20	µg/L	500		98	70-130	9	20	
Nickel (Ni)	478	40	µg/L	500		96	70-130	10	20	

Drinking Water Metals (mg/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	ND	0.10	mg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	0.637	0.10	mg/L	0.500		127	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	0.505	0.10	mg/L	0.500		101	70-130	23	24	

Silica

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/24/09						
Silica (SiO2)	ND	0.10	mg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/18/09						
Silica (SiO2)	5.14	0.10	mg/L	5.35		96	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/18/09						
Silica (SiO2)	4.64	0.10	mg/L	5.35		87	70-130	10	20	

Hardness

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Calcium (Ca)	ND	5.0	mg/L							
Magnesium (Mg)	ND	1.0	mg/L							
Hardness	ND	5.0	mg/L							

Mercury

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006199 - EPA 7470A Prep										
Blank (B006199-BLK1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	ND	0.20	µg/L							
LCS (B006199-BS1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120			
LCS Dup (B006199-BSD1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120	0	20	

pH

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006192 - NO PREP										
Duplicate (B006192-DUP1)		**Source: 9081118-01**		Prepared & Analyzed: 08/11/09						
pH	8.45	1.00	pH Units		8.36			1	15	

Alkalinity

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006224 - NO PREP										
Blank (B006224-BLK1)				Prepared: 08/20/09 Analyzed: 08/24/09						
Total Alkalinity	ND	5.0	mg CaC03/L							
Bicarbonate Alkalinity	ND	5.0	mg CaC03/L							
Carbonate Alkalinity	ND	5.0	mg CaC03/L							
Hydroxide Alkalinity	ND	5.0	mg CaC03/L							

Anions

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006223 - NO PREP										
Blank (B006223-BLK1)				Prepared & Analyzed: 08/20/09						
Fluoride	ND	0.10	mg/L							
Chloride	ND	0.20	mg/L							
Nitrite as N	ND	0.15	mg/L							
Nitrate	ND	0.50	mg/L							
Sulfate as SO4	ND	0.50	mg/L							
Matrix Spike (B006223-MS1)		**Source: 9082001-02**		Prepared & Analyzed: 08/20/09						
Fluoride	1.05	0.10	mg/L	1.00	ND	105	75-125			
Chloride	1.90	0.20	mg/L	2.00	0.170	86	75-125			
Nitrite as N	0.377	0.15	mg/L	0.304	ND	124	75-125			
Nitrate	4.26	0.50	mg/L	4.00	ND	106	75-125			
Sulfate as SO4	4.51	0.50	mg/L	4.00	ND	113	75-125			
Matrix Spike Dup (B006223-MSD1)		**Source: 9082001-02**		Prepared & Analyzed: 08/20/09						
Fluoride	1.06	0.10	mg/L	1.00	ND	106	75-125	0.9	20	
Chloride	1.94	0.20	mg/L	2.00	0.170	88	75-125	2	20	
Nitrite as N	0.377	0.15	mg/L	0.304	ND	124	75-125	0	20	
Nitrate	4.12	0.50	mg/L	4.00	ND	103	75-125	3	20	
Sulfate as SO4	4.30	0.50	mg/L	4.00	ND	108	75-125	5	20	

Total Dissolved Solids

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006197 - NO PREP										
Blank (B006197-BLK1)				Prepared & Analyzed: 08/14/09						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (B006197-DUP1)		**Source: 9081401-01**		Prepared & Analyzed: 08/14/09						
Total Dissolved Solids	335	10	mg/L		321			4	10	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 9082107
CLIENT'S PROJECT NAME: 6486.200.503
CLIENT'S PROJECT NUMBER: Sutter medical Center

RUSH

CLIENT INFORMATION

COMPANY NAME: ENGEO
ADDRESS: 2010 Crow Canyon pl. Suite 250, San Ramon, CA 94583
CONTACT: Brooks Ramsdell
PHONE#: 925-570-7782
FAX #: 888-279-2698

BILLING INFORMATION

CONTACT: Brooks Ramsdell
COMPANY NAME: ENGEO
ADDRESS: 2010 Crow Canyon place, Suite 250 San Ramon, CA 94583
PHONE#: 925-570-7782
FAX #: 888-279-2698

TURNAROUND TIME (check one)

SAME DAY ___
24 HOURS ___
48 HOURS X
72 HOURS ___
5 DAYS ___
NORMAL ___

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ___

COOLER TEMPERATURE ___ °C

COC

PAGE ___ OF ___

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	* Title 22													COMMENTS	LAB SAMPLE #
1	well #1	8-21-09	11:51			yes	X														9082107-01
2	well #1	8-21-09	11:52			NO	X														
3																					
4																					
5																					
6																				* Plus	
7																				SO4, TDS, Cl,	
8																				Silica	
9																					
10																					
11																					

SIGNATURES

SAMPLED BY: Jacob White

RELINQUISHED BY: [signature] SIGNATURE; DATE 8-21-09; TIME 12:27

RECEIVED BY LABORATORY: Alonzo SIGNATURE; DATE 8-21-09; TIME 1227

Analytical Sciences

October 19, 2009

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9101517 for your Sutter Well project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: October 19, 2009

Laboratory Report

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name: **Sutter Well** **6486.200.503**

Lab Project: **9101517**

This 3 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-01	**1**	Arsenic (As)	7.0	2.0

Date Sampled:	10/15/09	Date Analyzed:	10/19/09	QC Batch: B006500
Date Received:	10/15/09	Method:	EPA 200.9	

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-02	**2**	Arsenic (As)	4.3	2.0

Date Sampled:	10/15/09	Date Analyzed:	10/19/09	QC Batch: B006500
Date Received:	10/15/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-01	**1**	Manganese (Mn)	810	20

Date Sampled:	10/15/09	Date Analyzed:	10/16/09	QC Batch: B006443
Date Received:	10/15/09	Method:	EPA 200.7	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-02	**2**	Manganese (Mn)	850	20

Date Sampled:	10/15/09	Date Analyzed:	10/16/09	QC Batch: B006443
Date Received:	10/15/09	Method:	EPA 200.7	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Please Note: The drinking water Maximum Contamination Limits (MCL) set by the California Department of Health Services are as follows:

Arsenic (10 ug/L)
Iron (300 ug/L)
Manganese (50 ug/L)
Nitrate (45 mg/L)
Lead (15 ug/L)
Total Coliform (<1 MPN/100 mL)

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

RUSH

LAB PROJECT NUMBER: 910517
CLIENT'S PROJECT NAME: Sutter Well
CLIENT'S PROJECT NUMBER: 6486.200.503

CLIENT INFORMATION

COMPANY NAME: ENGEO INC
ADDRESS: 2010 Crow Canyon PL
Suite 250
CONTACT: Brooks Ransdell
PHONE#: 925 570 7782
FAX #: 888 279 2698

BILLING INFORMATION

CONTACT: Brooks Ransdell
COMPANY NAME: SAME
ADDRESS:
PHONE#:
FAX #:

TURNAROUND TIME (check one)

SAME DAY ____
24 HOURS ____
48 HOURS X
72 HOURS ____
5 DAYS ____
NORMAL ____

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ________

COOLER TEMPERATURE
________ °C

COC

PAGE ____ OF ____

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	Arsenic	Manganese	COMMENTS	LAB SAMPLE #
1	1	10-15	4p			N	X	X	910517	-01
2	2	10-15	4p			N	X	X	↓	-02
3										
4										
5										
6										
7										
8										
9										
10										
11										

SIGNATURES

SAMPLED BY: Eric Grace

RELINQUISHED BY: [signature]
SIGNATURE | DATE 10-15-09 | TIME 4:55 p

Scott – Confirmation sampling for Brooks + Shawn

RECEIVED BY LABORATORY: [signature]
SIGNATURE | DATE 10/15/09 | TIME 1655

Analytical Sciences

November 12, 2009

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9101207 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: November 12, 2009

Laboratory Report

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Medical Center**	**6486.200.503**
Lab Project:	**9101207**	

This 18 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Volatile Hydrocarbons by GC/MS

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Dichlorodifluoromethane (F-12)	ND	0.50
		Chloromethane	ND	0.50
		Vinyl chloride	ND	0.50
		Bromomethane	ND	0.50
		Chloroethane (CE)	ND	0.50
		Trichlorofluoromethane (F-11)	ND	0.50
		1,1-Dichloroethene (1,1-DCE)	ND	0.50
		Trichlorotrifluoroethane (F-113)	ND	0.50
		Methylene chloride	ND	0.50
		Carbon disulfide	ND	0.50
		trans-1,2-Dichloroethene	ND	0.50
		1,1-Dichloroethane (1,1-DCA)	ND	0.50
		cis-1,3-Dichloropropene	ND	0.50
		1,3-Dichloropropene	ND	0.50
		cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.50
		2,2-Dichloropropane	ND	0.50
		Chloroform (THM1)	ND	0.50
		Bromochloromethane	ND	0.50
		1,1,1-Trichloroethane (TCA)	ND	0.50
		1,2-Dichloroethane (EDC)	ND	0.50
		1,1-Dichloropropene	ND	0.50
		Carbon tetrachloride	ND	0.50
		Benzene	ND	0.50
		Trichloroethene (TCE)	ND	0.50
		1,2-Dichloropropane (DCP)	ND	0.50
		Dibromomethane	ND	0.50
		Bromodichloromethane (THM2)	ND	0.50
		Toluene	ND	0.50
		1,1,2-Trichloroethane	ND	0.50
		1,3-Dichloropropane	ND	0.50
		Dibromochloromethane (THM3)	ND	0.50
		Tetrachloroethene (PCE)	ND	0.50
		1,2-Dibromoethane (EDB)	ND	0.50
		Chlorobenzene	ND	0.50
		1,1,1,2-Tetrachloroethane	ND	0.50
		Ethylbenzene	ND	0.50
		m,p-Xylene	ND	0.50
		Styrene	ND	0.50
		o-Xylene	ND	0.50
		Bromoform (THM4)	ND	0.50
		1,1,2,2-Tetrachloroethane	ND	0.50
		Isopropylbenzene	ND	0.50
		1,2,3-Trichloropropane	ND	0.50
		Bromobenzene	ND	0.50
		n-Propyl Benzene	ND	0.50
		2-Chlorotoluene	ND	0.50
		4-Chlorotoluene	ND	0.50
		1,3,5-Trimethylbenzene	ND	0.50
		tert-Butylbenzene	ND	0.50

Volatile Hydrocarbons by GC/MS

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	1,2,4-Trimethylbenzene	ND	0.50
		sec-Butylbenzene	ND	0.50
		1,3-Dichlorobenzene	ND	0.50
		1,4-Dichlorobenzene	ND	0.50
		1,2-Dichlorobenzene	ND	0.50
		p-Isopropyltoluene	ND	0.50
		n-Butylbenzene	ND	0.50
		1,2-Dibromo-3-chloropropane	ND	0.50
		1,2,4-Trichlorobenzene	ND	0.50
		Naphthalene	ND	0.50
		Hexachlorobutadiene	ND	0.50
		1,2,3-Trichlorobenzene	ND	0.50
		Tertiary Butyl Alcohol (TBA)	ND	5.0
		Methyl tert-Butyl Ether (MTBE)	ND	0.50
		Di-isopropyl Ether (DIPE)	ND	0.50
		Ethyl tert-Butyl Ether (ETBE)	ND	0.50
		Tert-Amyl Methyl Ether (TAME)	ND	0.50

Surrogates	Result (µg/L)	% Recovery	Acceptance Range (%)
Bromofluorobenzene	10.4	104	70-130
1,2-Dichlorobenzene-d4	8.94	89	70-130

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006276
Date Received:	10/12/09	Method:	EPA 524.2	

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Antimony (Sb)	ND	5.0
		Arsenic (As)	9.5	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006404
Date Received:	10/12/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Aluminum (Al)	ND	50
		Barium (Ba)	ND	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	ND	2.5
		Iron (Fe)	ND	100
		Manganese (Mn)	870	20
		Nickel (Ni)	ND	10
		Zinc (Zn)	110	50

Date Sampled:	10/12/09	Date Analyzed:	11/12/09	QC Batch: B006443
Date Received:	10/12/09	Method:	EPA 200.7	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Boron (B)	0.15	0.050
		Sodium (Na)	22	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006443
Date Received:	10/12/09	Method:	EPA 200.7	

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Calcium (Ca)	16	5.0
		Magnesium (Mg)	13	1.0
		Hardness	92	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006443
Date Received:	10/12/09	Method:	SM 2340 B	

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Mercury (Hg)	ND	0.20

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006336
Date Received:	10/12/09	Method:	EPA 245.1	

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9101207-01	**1**	pH	6.95	1.00

Date Sampled:	10/12/09	Date Analyzed:	10/12/09	QC Batch: B006424
Date Received:	10/12/09	Method:	SM 4500-H B	

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9101207-01	**1**	Total Alkalinity	140	5.0
		Bicarbonate Alkalinity	140	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006358
Date Received:	10/12/09	Method:	SM 2320 B	

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Fluoride	0.16	0.10
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50

Date Sampled:	10/12/09	Date Analyzed:	10/12/09	QC Batch: B006471
Date Received:	10/12/09	Method:	EPA 300.0	

Perchlorate

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Perchlorate	ND	2.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch:	B006481
Date Received:	10/12/09	Method:	EPA 314.0		

Quality Assurance Report

Volatile Hydrocarbons by GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006276 - EPA 5030 GC/MS										
Blank (B006276-BLK1)				Prepared: 09/01/09 Analyzed: 09/04/09						
Dichlorodifluoromethane (F-12)	ND	0.50	µg/L							
Chloromethane	ND	0.50	µg/L							
Vinyl chloride	ND	0.50	µg/L							
Bromomethane	ND	0.50	µg/L							
Chloroethane (CE)	ND	0.50	µg/L							
Trichlorofluoromethane (F-11)	ND	0.50	µg/L							
1,1-Dichloroethene (1,1-DCE)	ND	0.50	µg/L							
Trichlorotrifluoroethane (F-113)	ND	0.50	µg/L							
Methylene chloride	ND	0.50	µg/L							
Carbon disulfide	ND	0.50	µg/L							
trans-1,2-Dichloroethene	ND	0.50	µg/L							
1,1-Dichloroethane (1,1-DCA)	ND	0.50	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
1,3-Dichloropropene	ND	0.50	µg/L							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.50	µg/L							
2,2-Dichloropropane	ND	0.50	µg/L							
Chloroform (THM1)	ND	0.50	µg/L							
Bromochloromethane	ND	0.50	µg/L							
1,1,1-Trichloroethane (TCA)	ND	0.50	µg/L							
1,2-Dichloroethane (EDC)	ND	0.50	µg/L							
1,1-Dichloropropene	ND	0.50	µg/L							
Carbon tetrachloride	ND	0.50	µg/L							
Benzene	ND	0.50	µg/L							
Trichloroethene (TCE)	ND	0.50	µg/L							
1,2-Dichloropropane (DCP)	ND	0.50	µg/L							
Dibromomethane	ND	0.50	µg/L							
Bromodichloromethane (THM2)	ND	0.50	µg/L							
Toluene	ND	0.50	µg/L							
1,1,2-Trichloroethane	ND	0.50	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
Dibromochloromethane (THM3)	ND	0.50	µg/L							
Tetrachloroethene (PCE)	ND	0.50	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Chlorobenzene	ND	0.50	µg/L							
1,1,1,2-Tetrachloroethane	ND	0.50	µg/L							
Ethylbenzene	ND	0.50	µg/L							
m,p-Xylene	ND	0.50	µg/L							
Styrene	ND	0.50	µg/L							
o-Xylene	ND	0.50	µg/L							
Bromoform (THM4)	ND	0.50	µg/L							
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L							

Volatile Hydrocarbons by GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006276 - EPA 5030 GC/MS										
Blank (B006276-BLK1)				Prepared: 09/01/09 Analyzed: 09/04/09						
Isopropylbenzene	ND	0.50	µg/L							
1,2,3-Trichloropropane	ND	0.50	µg/L							
Bromobenzene	ND	0.50	µg/L							
n-Propyl Benzene	ND	0.50	µg/L							
2-Chlorotoluene	ND	0.50	µg/L							
4-Chlorotoluene	ND	0.50	µg/L							
1,3,5-Trimethylbenzene	ND	0.50	µg/L							
tert-Butylbenzene	ND	0.50	µg/L							
1,2,4-Trimethylbenzene	ND	0.50	µg/L							
sec-Butylbenzene	ND	0.50	µg/L							
1,3-Dichlorobenzene	ND	0.50	µg/L							
1,4-Dichlorobenzene	ND	0.50	µg/L							
1,2-Dichlorobenzene	ND	0.50	µg/L							
p-Isopropyltoluene	ND	0.50	µg/L							
n-Butylbenzene	ND	0.50	µg/L							
1,2-Dibromo-3-chloropropane	ND	0.50	µg/L							
1,2,4-Trichlorobenzene	ND	0.50	µg/L							
Naphthalene	ND	0.50	µg/L							
Hexachlorobutadiene	ND	0.50	µg/L							
1,2,3-Trichlorobenzene	ND	0.50	µg/L							
Tertiary Butyl Alcohol (TBA)	ND	5.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	0.50	µg/L							
Di-isopropyl Ether (DIPE)	ND	0.50	µg/L							
Ethyl tert-Butyl Ether (ETBE)	ND	0.50	µg/L							
Tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Surrogate: Bromofluorobenzene	*9.72*		*µg/L*	*10.0*		*97*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*9.82*		*µg/L*	*10.0*		*98*	*70-130*			

Graphite Furnace Metals

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006404 - EPA 200.9										
Blank (B006404-BLK1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	ND	5.0	µg/L							
Arsenic (As)	ND	2.0	µg/L							
Selenium (Se)	ND	5.0	µg/L							
Thallium (Tl)	ND	2.0	µg/L							
LCS (B006404-BS1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	9.2	5.0	µg/L	10.0		92	85-115			
Arsenic (As)	9.9	2.0	µg/L	10.0		99	85-115			
Selenium (Se)	11.3	5.0	µg/L	10.0		113	85-115			
Thallium (Tl)	9.30	2.0	µg/L	10.0		93	85-115			
LCS Dup (B006404-BSD1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	9.4	5.0	µg/L	10.0		94	85-115	3	20	
Arsenic (As)	9.8	2.0	µg/L	10.0		98	85-115	1	20	
Selenium (Se)	11.0	5.0	µg/L	10.0		110	85-115	3	20	
Thallium (Tl)	9.90	2.0	µg/L	10.0		99	85-115	6	20	

Drinking Water Metals (ug/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	ND	50	µg/L							
Barium (Ba)	ND	50	µg/L							
Beryllium (Be)	ND	1.0	µg/L							
Cadmium (Cd)	ND	1.0	µg/L							
Chromium (Cr)	ND	2.5	µg/L							
Iron (Fe)	ND	100	µg/L							
Manganese (Mn)	ND	20	µg/L							
Nickel (Ni)	ND	40	µg/L							
Zinc (Zn)	ND	50	µg/L							
LCS (B006443-BS1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	470	50	µg/L	500		94	70-130			
Barium (Ba)	481	50	µg/L	500		96	70-130			
Beryllium (Be)	483	4.0	µg/L	500		97	70-130			
Cadmium (Cd)	472	4.0	µg/L	500		94	70-130			
Chromium (Cr)	455	10	µg/L	500		91	70-130			
Iron (Fe)	514	100	µg/L	500		103	70-130			
Manganese (Mn)	465	20	µg/L	500		93	70-130			
Nickel (Ni)	485	40	µg/L	500		97	70-130			
Zinc (Zn)	486	50	µg/L	500		97	80-120			
LCS Dup (B006443-BSD1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	475	50	µg/L	500		95	70-130	1	20	
Barium (Ba)	485	50	µg/L	500		97	70-130	0.7	20	
Beryllium (Be)	482	4.0	µg/L	500		96	70-130	0.2	20	
Cadmium (Cd)	474	4.0	µg/L	500		95	70-130	0.3	20	
Chromium (Cr)	456	10	µg/L	500		91	70-130	0.1	20	
Iron (Fe)	514	100	µg/L	500		103	70-130	0.004	20	
Manganese (Mn)	466	20	µg/L	500		93	70-130	0.3	20	
Nickel (Ni)	486	40	µg/L	500		97	70-130	0.2	20	
Zinc (Zn)	485	50	µg/L	500		97	80-120	0.05	20	

Drinking Water Metals (mg/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	ND	0.050	mg/L							
Sodium (Na)	ND	0.10	mg/L							
LCS (B006443-BS1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	0.504	0.050	mg/L	0.500		101	70-130			
Sodium (Na)	0.427	0.10	mg/L	0.500		85	70-130			
LCS Dup (B006443-BSD1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	0.498	0.050	mg/L	0.500		100	70-130	1	20	
Sodium (Na)	0.437	0.10	mg/L	0.500		87	70-130	2	20	

Hardness

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared & Analyzed: 10/05/09						
Calcium (Ca)	ND	5.0	mg/L							
Magnesium (Mg)	ND	1.0	mg/L							
Hardness	ND	5.0	mg/L							

Mercury

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006336 - EPA 7470A Prep										
Blank (B006336-BLK1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	ND	0.20	µg/L							
LCS (B006336-BS1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	7.00	0.20	µg/L	7.50		93	80-120			
LCS Dup (B006336-BSD1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120	10	20	

pH

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006424 - NO PREP										
Duplicate (B006424-DUP1)		**Source: 9093005-01**		Prepared & Analyzed: 09/30/09						
pH	6.19	1.00	pH Units		6.11			1	15	

Alkalinity

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006358 - NO PREP										
Blank (B006358-BLK1)				Prepared: 09/17/09 Analyzed: 09/22/09						
Total Alkalinity	ND	5.0	mg CaC03/L							
Bicarbonate Alkalinity	ND	5.0	mg CaC03/L							
Carbonate Alkalinity	ND	5.0	mg CaC03/L							
Hydroxide Alkalinity	ND	5.0	mg CaC03/L							

Anions

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006471 - NO PREP										
Blank (B006471-BLK1)				Prepared & Analyzed: 10/09/09						
Fluoride	ND	0.10	mg/L							
Nitrite as N	ND	0.15	mg/L							
Nitrate	ND	0.50	mg/L							
Matrix Spike (B006471-MS1)		**Source: 9101301-01**		Prepared: 10/13/09 Analyzed: 10/14/09						
Fluoride	1.17	0.10	mg/L	1.00	ND	117	75-125			
Nitrite as N	0.380	0.15	mg/L	0.304	ND	125	75-125			
Nitrate	4.16	0.50	mg/L	4.00	0.220	98	75-125			
Matrix Spike Dup (B006471-MSD1)		**Source: 9101301-01**		Prepared: 10/13/09 Analyzed: 10/14/09						
Fluoride	1.08	0.10	mg/L	1.00	ND	108	75-125	8	20	
Nitrite as N	0.356	0.15	mg/L	0.304	ND	117	75-125	7	20	
Nitrate	4.14	0.50	mg/L	4.00	0.220	98	75-125	0.5	20	

Perchlorate

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006481 - NO PREP										
Blank (B006481-BLK1)				Prepared & Analyzed: 10/13/09						
Perchlorate	ND	2.0	µg/L							
Matrix Spike (B006481-MS1)		**Source: 9101207-01**		Prepared & Analyzed: 10/13/09						
Perchlorate	9.13	2.0	µg/L	10.0	ND	91	80-120			
Matrix Spike Dup (B006481-MSD1)		**Source: 9101207-01**		Prepared & Analyzed: 10/13/09						
Perchlorate	9.03	2.0	µg/L	10.0	ND	90	80-120	1	20	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

RUSH

LAB PROJECT NUMBER: 9101207
CLIENT'S PROJECT NAME: 6486.208.503
CLIENT'S PROJECT NUMBER: Sutter medical center

CLIENT INFORMATION	
COMPANY NAME:	ENGEO
ADDRESS:	2010 crow Canyon place San Ramon, CA Suite 250
CONTACT:	Brooks Ramsdell
PHONE#:	925-520-7782
FAX #:	

BILLING INFORMATION	
CONTACT:	
COMPANY NAME:	SAME
ADDRESS:	
PHONE#:	
FAX #:	

TURNAROUND TIME (check one)			
SAME DAY			
24 HOURS			
48 HOURS	X	5 DAYS	
72 HOURS		NORMAL	

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ____________

COOLER TEMPERATURE ______ °C

COC

PAGE ___ OF ___

ANALYSIS *

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	Al, Sb, As, Ba, Be, Cd, Cr	Fl, Hg, Se, Tl, Ni	Perchlorate	Asbestos NO3, NO2 as N	Fe, Mn, Na Alk, Hardness	pH, Gross Alpha	524	525, 515	505	Zinc Boron				COMMENTS	LAB SAMPLE #
1	1	10-12-09	10am				X	X	X	X	X	X	X	X	X	X				15 Bottles	9101207-01
2	Trip Blank	10/12/09																			-02
3																					
4																					
5																					
6																				Asbestos	
7																				Gross Alpha	
8																				525, 515	
9																				505 on	
10																				standard	
11																				TAT	

SIGNATURES * added per Brooks 11/10/09 STAT

SAMPLED BY: Brooks Ramsdell

RELINQUISHED BY:			RECEIVED BY LABORATORY:		
[signature]	10-12-09		[signature]	10-12-09	1425
SIGNATURE	DATE	TIME	SIGNATURE	DATE	TIME

Appendix H3

Preliminary Stormwater Mitigation Plan and Preliminary Hydrology and Storm Water Detention Plan, Sutter Medical Center

Brelje & Race
CONSULTING CIVIL ENGINEERS

October 23, 2009

Nadin Sponamore
Sponamore Associates
2128 Contra Costa Avenue
Santa Rosa, CA 95405

Subject: Sutter Medical Center of Santa Rosa
Preliminary Storm Water Mitigation Plan & Preliminary Hydrology and Storm Water Detention Plan
B&R File No. 3231.01

Dear Nadine:

The enclosed *Preliminary Storm Water Mitigation Plan & Preliminary Hydrology and Storm Water Detention Plan* dated October 22, 2009 is furnished for use as an attachment to the Draft EIR for the subject project. This report also supersedes and is intended to replace the prior report carrying the same title dated January 29, 2009. This report has been revised to update the exhibits to reflect the latest site plan and to provide minor changes to the associated SUSMP BMP treatment control calculations. The enclosed report maintains the same organization and scope of information presented in the prior report and any reader of the prior report should have little difficulty in accepting this most recent report as one that supersedes the prior report.

Please endeavor to inform all parties utilizing this report that any use or reference to the superseded report dated January 29, 2009 may result in conflicting and/or incorrect information being applied to the CEQA process for this project.

Very truly yours,

BRELJE & RACE

John S. Thompson
Associate

PRELIMINARY STORMWATER MITIGATION PLAN AND PRELIMINARY HYDROLOGY AND STORM WATER DETENTION PLAN

NEW REPLACEMENT HOSPITAL PROJECT

SUTTER MEDICAL CENTER OF SANTA ROSA

B&R JOB # 3231.00

OCTOBER 22, 2009

REGISTERED PROFESSIONAL ENGINEER
JOHN STEWART THOMPSON
No. 48600
Exp. 6-30-10
CIVIL
STATE OF CALIFORNIA

10/22/09

Brelje & Race Consulting Engineers
5570 Skylane Blvd., Santa Rosa, CA 95403
v. 707.576.1322 f. 707.576.0469
www.brce.com

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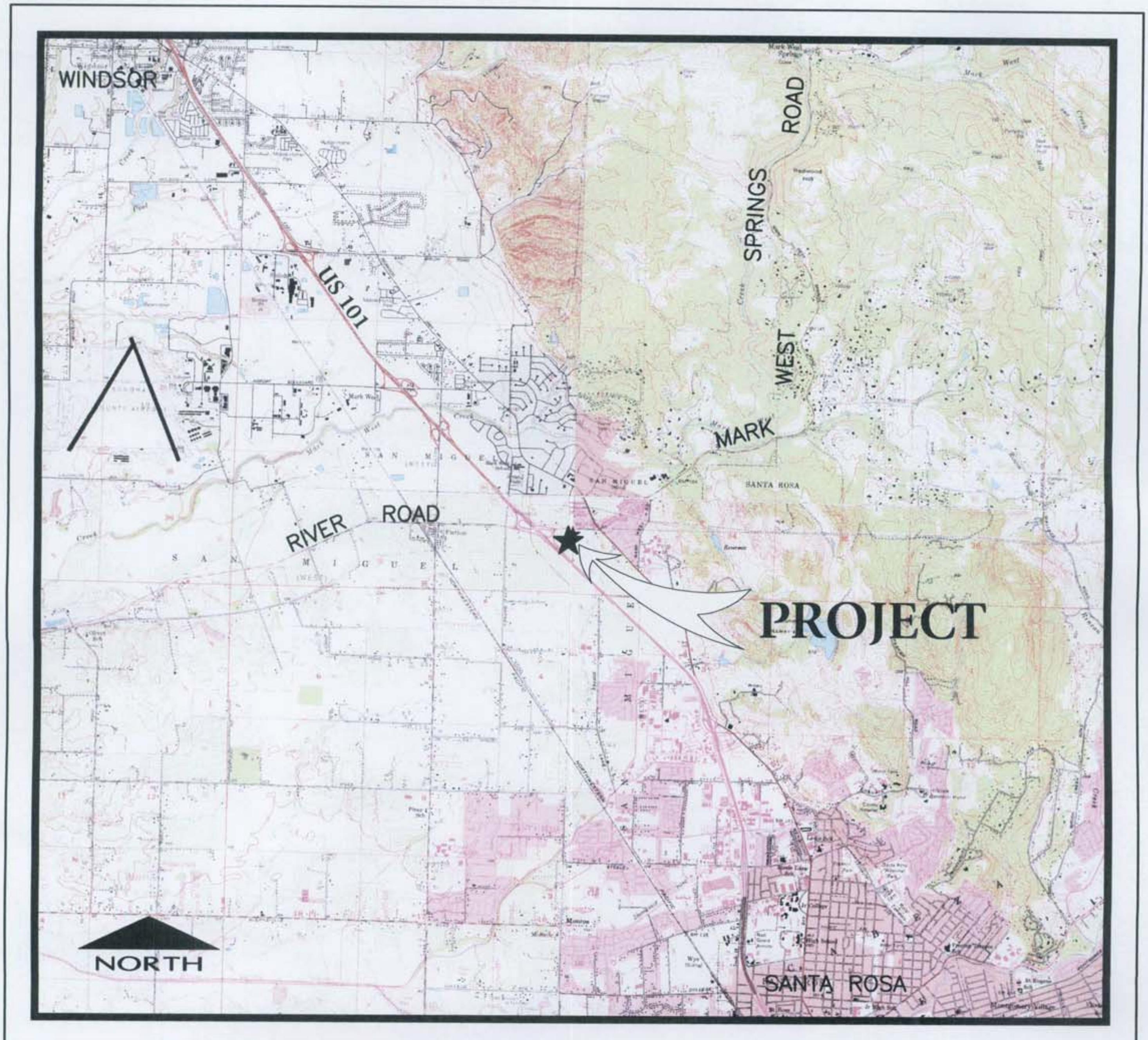
1. Project Description

Sutter Medical Center of Santa Rosa proposes to replace the existing hospital facility in the Chanate Road campus with a new, modern hospital. The proposed hospital, along with an independently operated physicians medical center and medical office building, will be located on what are now two adjacent parcels of mostly vacant land North of the Wells Fargo Center, in the southeast quadrant of the Highway 101 Mark West Springs Road/River Road freeway interchange. The site is currently occupied by a few outbuildings remaining from an otherwise demolished residential building, and is also partially paved where access roads and parking lot pavement for the Wells Fargo Center venue extend onto the property. Sutter Medical Center of Santa Rosa and the Wells Fargo Center are cooperating such that the proposed hospital complex and Wells Fargo Center facilities will be favorably integrated in terms of both separate and shared site improvements. As an initial step in this direction, Sutter Medical Center of Santa Rosa is submitting a Tentative Map depicting the subdivision of their two parcels into five lots appropriately sized, configured and located for the hospital and various support facilities. A sixth parcel will be set aside for construction of a water supply well. In addition to private site development, the proposed project will also include significant improvements within the public right of way, including street widening and highway improvements in Mark West Creek Road and along the Highway 101 northbound River Road exit ramp.

The proposed project will introduce large areas of impervious roof and pavement surface to the site. See the project description worksheet for the tabulation. Because the existing site has less than 50% impervious surface, the project, in addition to providing treatment for storm water runoff, will also need to limit the post-construction "channel-forming" peak discharge (generally accepted as equivalent to the two-year storm event peak flow) to at or below the existing two-year peak flow. See the discussion on existing and post-construction hydrology elsewhere in the subsequent pages of this report.

From research of available drainage records as well as on-site observation it has been determined that the site lies at the uppermost end of a drainage basin that is ultimately tributary to Abramson Creek, but initially drains to an extended network of roadway ditches and culverts in the Northwest Santa Rosa area before actually entering the creek itself. The site surface drains generally from east to west to an array of shallow pipe culverts (an 18" culvert, a 24" culvert, and a 42" culvert) under Highway 101 that discharge to the west into a shallow ditch passing through agricultural lands currently cultivated with vineyards on the far side of the freeway.



VICINITY MAP

NOT TO SCALE

Standard Urban Storm Water Mitigation Plan Questionnaire

NPD-004

PURPOSE: Storm water is the largest source of pollution in creeks and rivers. Projects are required to prevent storm water pollution and clean storm water before it leave a project site. This form is used to determine if a project is subject to special regulation on storm water.

Applicant: ☒ Owner ☐ Engineer ☐ Architect
☐ Landscape Architect ☐ Contractor ☐ Developer

Applicant		Project Site Information:
Sutter Health-Facility Planning & Development		101 Mark West Springs Road
Name		Street Address
100 Rowland Way, Suite 200		Santa Rosa, CA 95403
Mailing Address		City/Town
Novato	CA 94945	058-040-058 & 059
City/Town	State/Zip	Assessor's Parcel Number
707/396-0405 415/899-7484		
Phone	Fax	Permit Number(s)

QUESTIONNAIRE:

To determine if a project is subject to the requirements of SUSMP, please answer the following questions. If you are unable to answer any questions or if you checked unknown, you may consult a PRMD National Pollutant Discharge Elimination System (NPDES) staff member, or your design professional.

☒ Yes ☐ No ☐ Unknown

1. Is the project within either of the two NPDES boundaries? Check the box below for either the North Coast Regional Water Quality Control Board or the San Francisco Bay Regional Water Quality Control Board. See attached map.

   ☒ North Coast ☐ San Francisco Bay

☒ Yes ☐ No ☐ Unknown

2. Does the project create one (1) acre (43,560 square feet) or more of new impervious surface <u>or</u> is it directly adjacent to a waterway <u>or</u> does it require a new storm drain outfall?

☒ Yes ☐ No ☐ Unknown

3. Does the project require a discretionary permit or any ministerial permit(s) related to a discretionary permit (e.g. a grading or building permit for a project subject to a use permit or other discretionary land use approval)?

ACKNOWLEDGMENT:

I, as the applicant, understand that a Yes answer to **all** of the above questions means the project is a SUSMP applicable project subject to the requirements of SUSMP guidelines. Any unknown responses must be resolved to determine if the project is subject to SUSMP requirements. The applicant must complete the Preliminary Storm Water Mitigation Plan Worksheet (NPD-005) for all applicable SUSMP projects.

Signature ______________________ Date ______________________

Preliminary Storm Water Mitigation Plan Worksheet

NPD-005

PURPOSE: This form is used to provide information about Standard Urban Storm Water Mitigation Plan (SUSMP) applicable projects. Two (2) copies of this form must be submitted with two (2) copies of the Preliminary Storm Water Mitigation Plan as part of the planning permit application.

Applicant: ☑ Owner ☐ Engineer ☐ Architect
☐ Landscape Architect ☐ Contractor ☐ Developer

Sutter Med.Ctr.Santa Rosa (Tom Minard)
Name

100 Rowland Way, Suite 200
Mailing Address

Novato, CA 94945
City/Town State/Zip

707-396-0405
Phone Fax

Signature Date

Project Site Information:

100 Mark West Springs Road
Street Address

Santa Rosa
City/Town

058-040-058 / 058-040-059
Assessor's Parcel Number

Permit Number(s)

Type of Application:
☑ Subdivision ☐ Grading Permit ☐ Building Permit
☐ Use Permit ☐ Design Review ☐ Other

I. SUSMP Project Description Worksheet

This worksheet provides fundamental information about the project. The information will be used in understanding the extent of the project and reviewing the project.

1. Total Lot or Parcel area: **653,400+435,600** square feet or **15+10** acres.

2. Existing land use(s):
☐ Commercial ☐ Industrial ☑ Residential ☐ Public ☐ Agricultural ☐ Vacant
Please describe: (number of buildings, use of buildings)

This site is predominantly vacant with a few out buildings remaining on the properties, a sewer treatment plant, and sports fields.

3. Proposed land use(s): ☑ Commercial ☐ Industrial ☐ Residential ☐ Public ☐ Other
Please describe: (number of buildings, use of buildings)

There will be four (4) new buildings on the site. Two separate medical centers, a medical office building and a central utility plant.

4. Does the project include any of the following? (check all that apply):
☐ Vehicle cleaning for fleets or commercial facilities
☐ Vehicle cleaning for multifamily residential developments
☐ Vehicle repair/maintenance
☑ Outdoor process activities (examples of businesses that have outdoor process activities include machine shops, auto repair shops, and industries that have pretreatment facilities)
☐ Fuel dispensing areas
☑ Food service
☑ Refuse disposal areas

5. Describe / name any water body(ies) that will receive storm water flows from the project (Include both the immediate receiving water body, and water bodies further downstream):

The site drainage is split between Abrahamson and Piner Creeks, both eventually flow to Santa Rosa Creek

6. Are any hydrologic features on or directly adjacent to project site? (Examples of hydrologic features include wetlands, seeps, springs, natural waterways, modified natural waterways, constructed channels.)
☐ No ☑ Yes (If yes, describe / name):

Seasonal wetlands

7. Will a new storm drain outfall be constructed as part of the project?
☑ No ☐ Yes (If yes, describe / name):

8. Identify natural features located on site (check all that apply and indicate existing and proposed square footage)

Natural Feature	Existing Size	Proposed Size	Size Change
	Choose: ☐ Square Feet ☑ Acres		Indicate decrease with -symbol
☐ Riparian area[1]			0.00
☑ Wetland	0.452	0.059	-0.393
☐ Steep slopes (10% or greater)			0.00
☐ Areas of native vegetation			0.00
☐ Areas containing tree canopy			0.00
☐ Other:			0.00

9. Attach the project site plan to this completed Project Description Worksheet. At a minimum, site plans must include: (see form CSS-019)
   a. Date, scale, legend and north arrow
   b. Lot lines
   c. Locations of existing buildings, structures and impervious surfaces
   d. Proposed buildings, structures, impervious surfaces and storm water
   e. Best Management Practices (BMPs) device or structures
   f. Existing contours and proposed grades
   g. Locations of existing and proposed natural features (as identified in item 8)
   h. Locations of proposed landscaping
   i. Locations of proposed activities of concern (as identified in item 4)

II. SUSMP Impervious Surface Worksheet

Complete at the planning permit application stage. Project phasing to decrease impervious surface area shall not exempt the project from SUSMP requirements. Incorrect impervious area calculations may delay processing of your project application(s) and/or permit(s).

Type of Impervious Surface Impervious surfaces are all areas where improvements result in a ground surface that significantly limits natural percolation rates including, but not limited to, asphalt, cement, pavers, buildings, and plastic liners	**Pre-Project Impervious Surface**	**Project Impervious Surface** New	**Project Impervious Surface** Reconstructed	**Total of New and Reconstructed Impervious Surface**
	Choose: ☑ Square Feet ☐ Acres			
Main building footprint, including attached garage	111,514.00	156,467.00		156,467.00
Detached garage, carport, shed, other misc. structures	0.00	0.00	0.00	0.00
Patio, impervious decking, pavers and impervious liners	0.00	0.00	0.00	0.00
Impervious driveway, parking lot	424,704.00	533,610.00	27,184.00	560,794.00
Streets, roads, sidewalks and other defined walkways	91,040.00	47,918.00	45,281.00	93,199.00
Off-site impervious improvements	Not Applicable	36,696.00	41,838.00	78,534.00
Total impervious surface in square feet	627,258.00	774,691.00	114,303.00	888,994.00

Check box if the total of new impervious surface plus any reconstructed impervious surface is greater than or equal to: ☑ One (1) acre (43,560 square feet).

If the total of new impervious surface plus any reconstructed impervious surface is greater than or equal to one (1) acre (43,560 square feet), a Storm Water Mitigation Plan is required.

[1] Riparian area means the streambank and floodplain between a stream (or other body of water) and the adjacent upland area.

III. SUSMP Proximity to Waterway(s) Worksheet

Complete at the planning permit application stage for all projects that require a discretionary permit, including any ministerial permits that are based on the discretionary permit, and that are directly adjacent[2] to a natural waterway[3], modified natural waterway[4], or constructed channel[5]. Incorrect information regarding a waterway or channel may delay your project application(s) and/or permit(s).

Method for determining proximity (check all that apply):
- ☑ Conducted site visit
- ☑ USGS map name ____________________
- ☐ Consulted agency personnel (name and agency) ____

Type of Waterway	Name of Waterway or other identifier	Directly adjacent to project?
Natural waterway		☐ Yes ☑ No
Modified natural waterway		☐ Yes ☑ No
Constructed channel		☐ Yes ☑ No

IV. SUSMP Pollutants of Concern Worksheet

This worksheet is used to identify potential pollutants of concern associated with land use and to propose Best Management Practices (BMPs) to reduce pollution of storm water. BMP means a device or program that improves storm water quality. BMPs that prevent storm water from becoming polluted are called source controls. BMPs that remove pollutants from storm water are called treatment controls.

Identify the proposed source and treatment controls intended to reduce pollutants to the maximum extent practicable. Alternatively, explain why the pollutant is not anticipated to be generated by the proposed project.

Check a box to indicate proposed land use.

Land Use	Potential Pollutants of Concern	Proposed BMPs
☑ Lawns, Landscaping and Parks	Sediment (coarse and fine), Nutrients (dissolved and particulate), Pesticide, Pathogens, Trash and Debris	**Vegetated Swales, Bioretention Areas**
☑ Parking lot(s), Driveways	Sediment (fine), Metals (dissolved and particulate), Total Petroleum Hydrocarbons (TPH), Trash	" "
☑ Road Improvements (e.g. left turn lane)	Sediment (coarse and fine), Metals (dissolved and particulate), TPH, Polynuclear Aromatic Hydrocarbons (PAHs), Trash and Debris	" "
☑ Commercial (e.g. wineries, office buildings)	Sediment (coarse and fine), Nutrients (dissolved and particulate), Pesticides	" "
☑ Food-related Commercial (restaurants)	Pathogens, Oil and Grease, Trash	**Covered Trash Areas**
☐ Animal-related Commercial (e.g. dog grooming, horse stables)	Pathogens	
☐ Auto-related Commercial (repair shops, dealerships)	Metals (dissolved and particulate), TPH, PAHs, Surfactants	
☐ Industrial (e.g. metal processing, manufacturing facilities)	Sediment (coarse and fine), Metals (dissolved and particulate), TPH, PAHs, Polychlorinated Biphenyls (PCBs), Ph, Surfactants	

I declare that to the best of my knowledge, the information presented herein is accurate and complete.

Signature ____________________ Date ____________________

[2] "Directly Adjacent" (County of Sonoma) means within a parcel of land that includes or is contiguous with a Natural Waterway, Modified Natural Waterway, or Constructed Channel; and some portion of the proposed development on said parcel must be within 100 feet of the top of bank, and drainage from the proposed development must flow towards and enter a waterway or channel.

[3] "Natural Waterway" means any natural stream of water flowing in a definite course or channel and possessing a bed and banks. It is not necessary that the flow of water be continuous throughout the year. Natural waterways do not include artificially created channels for storm waters, such as street gutters, roadside ditches, and drainage facilities installed in connection with the development of property.

[4] "Modified Natural Waterway" means any natural waterway that has been modified while retaining significant riparian vegetation, fish, wildlife habitat, and/or scenic values. Modified natural waterways do not include artificially created channels for storm waters, such as street gutters, roadside ditches, and drainage facilities installed in connection with the development of property.

[5] "Constructed Channel" means all waterways that are not in closed conduits and do not meet the definition of a "Natural Waterway" or "Modified Natural Waterway". Constructed Channels also include landscaped constructed waterways. Constructed Channels do not include street gutters, roadside ditches, and drainage facilities installed in connection with the development of property.

2. Summary of Pre- and Post-Construction Storm Water Runoff

2.1 EXISTING HYDROLOGY

Each of the culverts under U.S. Route 101 west of the project conveys a portion of the total site drainage. Existing hydrology calculations were performed for **Tributaries "A", "B" and "D"** by determining the existing tributary drainage area for each culvert, and then determining the peak runoff using the rational method analysis. Tributary "C" was not evaluated since no development is proposed to this tributary. These tributary zones have been designated as Tributary Areas "A,"B","C" and "D" and drain to the existing 24", 42", 24" and 18" concrete pipe culverts under Highway 101, (see attached Existing Site Drainage and Hydrology Exhibit – Figure VIII-1). The results of this study for Tributaries "A", "B", and "D" are as follows:

<u>Tributary Area "A" (to 24" culvert) – 13.68 Acres</u>

"K" Factor	1.17
"C" Factor	0.36
"t" Time of Concentration	34.5 min.
"I" 2-year Intensity*	0.87 in/hr
2-year peak flow (existing)	5.0 cfs

<u>Tributary Area "B" (to 42" culvert) – 27.41 Acres</u>

"K" Factor	1.17
"C" Factor	0.53
"t" Time of Concentration	43.8 min.
"I" 2-year Intensity*	0.77 in/hr
2-year peak flow (existing)	13.1 cfs

<u>Tributary Area "D" (to 18" culverts) – 8.46 Acres</u>

"K" Factor	1.17
"C" Factor	0.61
"t" Time of Concentration	23.0 min.
"I" 2-year Intensity*	1.08 in/hr
2-year peak flow (existing)	6.5 cfs

* IY = 5.12Y (0.1469) t(-0.528) : Plate B-2, SCWA Flood Control Manual

2.2 POST-CONSTRUCTION HYDROLOGY - INTRODUCTION

The nature of the project is such that large areas of currently undeveloped land will be covered with impervious building and pavement surfaces, increasing the amount of surface runoff attempting to exit the site during a storm event. In order to limit the peak runoff from the developed site to the existing flow level, a conceptual hydrologic analysis was performed, assuming a drainage design that will: 1.) Limit post-construction runoff entering the northernmost 24" freeway culvert (**Tributary**

"A") to no greater than existing peak flow by reduction of the size of its tributary acreage in proportion to the increase in C factor as a result of the development; 2.) Limit post-construction runoff entering the 42" culvert (**Tributary "B"**) to no greater than existing peak flow by means of prolonging surface runoff throughout the parking areas and routing stormwater through surface detention basins before discharging to the existing 42" storm drain culvert under the freeway.

In addition to the proposed site development, off-site street improvements on Mark West Springs Road and the Highway 101 freeway exit ramp will be constructed in a separate drainage area (**Tributary "D"**) that is part of the River Road overcrossing freeway interchange drainage system north and west of the site. This drainage area currently drains the northbound freeway exit-ramp, Mark West Springs Road and a portion of the project fronting Mark West Springs Road. The configuration of the proposed site development will necessitate that a portion of the on-site drainage area along Mark West Springs Road (historically tributary to the freeway interchange) will be transferred to Tributaries "A" and "B". This reduction of the tributary drainage basin will virtually offset the minor amount of increase in runoff generated by the increase in impervious surface area due to project road widening improvements. Increases in drainage area in tributary basins "A" and "B" have been considered in the analysis of those basins and with the sizing of the detention basin for tributary "B".

The southern portion of the Wells Fargo Center and southern parking lots (**Tributary "C"**) drain to a separate highway culvert crossing (the southern most 24" freeway culvert). There are no changes to this drainage area proposed with the development.

2.3 POST-CONSTRUCTION HYDROLOGY - DETAILS

2.3.1 Tributary "A"

As previously indicated, the post-construction tributary area to the northernmost 24" culvert will be reduced in size such that the peak 10-year discharge will approximate existing pre-construction conditions. In this analysis, flow from the most northern areas of the project site, including pavements, will be collected by vegetated swales located in the parking areas. This stormwater will then be conveyed to the existing 24" culvert via a perimeter vegetated swale along the northerly and westerly boundary. We estimate that the post-construction Tributary "A" drainage area displayed in Figure 1 will generate a peak flow of 4.9± cfs, the same as existing conditions. (see attached Proposed Site Drainage and Storm Water Detention Exhibit – Figure VIII 2):

<u>Tributary Area "A" (to 24" culvert) – 5.91 Acres</u>

"K" Factor	1.17
"C" Factor	0.71
"t" Time of Concentration	26.5min.
"I" 2-year Intensity*	1.00 in/hr
2-year peak flow	4.9 cfs (≈ 5.0 cfs exist.)

2.3.2 Tributary "B"

In this analysis, Tributary "B" is comprised of the largest portion of the site (38.08± acres) including most of the proposed Hospital complex of buildings, roadways and parking, as well as the north westerly half of the Wells Fargo complex. Stormwater from new and replacement pavement areas will be routed through vegetated swales located throughout the proposed parking areas (increasing the time of concentration and reducing the peak flow) and then into surface detention basins prior to being discharged to the existing 42" storm drain culvert crossing Highway 101. In order to evaluate the detention basins, a computer model using a SCS Type 1A rainfall distribution for the 2-year, 24-hour event was used along with historical Sonoma County Water Agency rainfall data. Two detention ponds are proposed, a northern pond approximately 20,600 sq. ft. in area and a southern pond approximately 28,500 sq. ft. in size. The location of the ponds will be in the southwest portion of the parcel between the existing Wells Fargo Center complex and Highway 101. Ponds will have 3:1 side slopes and will be interconnected with dual storm drain culverts. The northern pond has an approximate depth of 4.5' and the southern pond has a depth of 3.5 feet. The relatively flat terrain allows for a large but shallow basin design. The basin outlet structure will be a standpipe-type with orifice openings sized and staged in elevation to address the design storm flow. The detention basins will drain to the highway culvert entrance via gravity through dual 30" outlet pipes. The detention basins will not have an impermeable liner, allowing for (a very minor amount of) infiltration into the underlying clayey soils.

<u>Tributary Area "B" (to 42" culvert) – 38.08 Acres</u>

"K" Factor	1.17
"C" Factor	0.68
"t" Time of Concentration	30 min.
"I" 2-year Intensity*	0.94 in/hr
2-year peak inflow to ponds	28.5 cfs
2-year peak discharge from ponds	10.7 cfs (< 13.1 cfs exist.)

IY = 5.12Y (0.1469) t(-0.528) : Plate B-2, SCWA Flood Control Manual

2.3.3 Tributary "D"

As previously indicated, the post-construction tributary area (Tributary "D") to the northern most 18" culverts will be reduced in size such that the peak 2-year discharge will approximate existing pre-construction conditions. In this analysis, flow from the off-site street improvements on Mark West Springs Road and the Highway 101 freeway exit ramp, will be collected by vegetated swales located in the along the southern portion of Mark West Springs Road and the East side of the northbound Highway 101 offramp. We estimate that the post-construction Tributary "D" drainage area displayed in Figure VIII-1 will generate a peak flow less than existing conditions 6.5± cfs,. (See Proposed Site Drainage & Storm Detention Exhibit – Figure VIII-2)

3. Required Size of Detention Basins for Treatment Purposes

The area of reconstructed and new impervious surface for the proposed project in Tributary Basin "B" totals approximately 639,900 sq. ft., or 14.7 acres. Of this area, approximately 67% of the runoff will initially be directed into parking lot vegetated swales prior to collection by the underground storm drain and conveyance to the detention basins. Approximately 213,600 sq. ft. of roof area drainage, or the remaining 33%, will pass through roof drain leader filters or an in-ground filter structure prior to entering the underground storm drain system. The following calculation would be the required volume if *all* the runoff entering the detention basins is to be fully treated, and is therefore a conservative result given the benefits of the additional treatment provided by the upstream point source BMP's.

Use volume-based formula: V = (0.08)(C)(K)(A)   Pg. 4-13, Guidelines for the Standard Urban Storm Water Mitigation Plan;, June, 2005

V = (0.08)(0.68)(1.17)(14.7 acres) = 0.9356 acre-feet = 40,800 Cu. Ft.

The maximum 2-year water surface elevation (+155.5) in the interconnected detention basins represents a total storage volume of approximately 82,750 Cu. Ft. and are thus more than adequately sized to treat the runoff flowing through them.

4. Source Control Measures

Source control measures shall be incorporated into the construction of the proposed project improvements:

- Storm Drain inlets shall be clearly marked with the words: "No Dumping. Drains to Creek".
- Irrigation systems shall be designed to minimize overspray and runoff
- Plant materials shall be selected such that they may be properly maintained with minimal water use.
- Planter strip planting shall be maintained appropriately to prevent runoff from contacting bare earth and conveying sediment to the storm drain system.
- Trash Enclosure and exterior waste management areas (trash compactor, medical waste, cart wash, food service mat wash) shall be covered. Adjacent grade shall be designed to drain away from, not toward or through, these designated areas.
- Areas identified in the previous item will be served by dedicated sanitary sewer inlets and in the case where food waste is present, grease interceptors with regularly scheduled maintenance servicing.

5. Treatment Control Measures

The parking lots and hardscape within the post-construction area labeled Tributary "A" on the exhibit map will drain either to internal parking islands that contain vegetated swales, or to the perimeter swale along the outer boundary adjacent to the freeway ramp frontage. The internal vegetated swales will be constructed as Type 2, with a subdrain component to enhance filtering efficiency. The flatness of the project terrain necessitates that the perimeter swale will be Type 1 and not supplemented with a subdrain, however, the perimeter swale provides the opportunity for a significantly longer length of treatment for such stormwater that is conveyed it prior to discharge to the 24" freeway culvert.

The buildings are proposed, where feasible, to incorporate media filters on the roof drain downspouts. These could be installed in all exterior wall routed roof drainage piping that are accessible for maintenance of the filters. Alternatively, or in combination with individual roof drain downspout filters, roof drain lateral piping will be connected into a common end of pipe structural BMP system such as "Bay Saver", "Vortechnics" or equivalent, for treatment prior to entering the underground storm drain system. They will provide an initial treatment of a majority of the roof drainage prior to entry into the underground storm drain. The majority of the roof drainage is included within Tributary "B" and will have the opportunity to undergo additional treatment as it passes through the detention basin prior to discharge to the 42" freeway culvert.

The parking lots and hardscape within the post-construction area labeled Tributary "B" on the exhibit map will initially drain to internal parking islands that contain vegetated swales and ultimately to the detention basins. The internal vegetated swales will be constructed with a subdrain component to enhance filtering ability. The detention basins provide an additional opportunity for what would be an extended length of treatment time for such stormwater that is conveyed to them prior to discharge to the 42" freeway culvert, as well as for stormwater that does not happen to initially pass through the parking lot swales.

6. Treatment Control Calculations

Sutter SUSMP Swale Calculations (flow based)

K=	1.17
C Impervious=	0.90
C pervious=	0.35
N=	0.25

Q=(0.21)CAK

Swales Have a minimum 2' bottom, have a minimum depth of 0.5' and 3:1 side slopes

AREA #	Area Pervious (ac)	Area Impervious (ac)	Area Total (ac)	C	Q (cfs)	Slope Swale	Depth of swale (ft)	V (fps)	Length of Swale (ft)	Retention Time (min)
1	0.19	0.25	0.44	0.66	0.072	0.007	0.19	0.142	259	30.4
2	0.15	0.75	0.90	0.81	0.179	0.005	0.35	0.168	208	20.6
3	0.08	0.17	0.25	0.72	0.044	0.007	0.15	0.124	106	14.2
4	0.07	0.26	0.33	0.78	0.064	0.005	0.2	0.123	107	14.5
5	0.17	0.68	0.85	0.79	0.165	0.005	0.34	0.166	205	20.6
6	0.24	0.60	0.84	0.74	0.153	0.005	0.32	0.16	173	18.0
7	0.22	0.26	0.48	0.65	0.076	0.005	0.22	0.13	211	27.1
8	0.15	0.61	0.76	0.79	0.147	0.005	0.31	0.157	181	19.2
12	0.08	0.28	0.36	0.78	0.069	0.005	0.21	0.127	99	13.0
14	0.07	0.14	0.21	0.72	0.037	0.005	0.15	0.105	112	17.8
15	0.16	0.72	0.88	0.80	0.173	0.005	0.34	0.166	163	16.4
18	0.13	0.22	0.35	0.70	0.060	0.005	0.18	0.138	158	19.1
19	0.06	0.23	0.29	0.79	0.056	0.005	0.18	0.11	80	12.1
20	0.1	0.21	0.31	0.72	0.055	0.005	0.19	0.12	87	12.1
26	0.13	0.52	0.65	0.79	0.126	0.005	0.29	0.152	172	18.9
27	0.17	0.22	0.39	0.66	0.063	0.005	0.2	0.123	185	25.1
28	0.15	0.35	0.50	0.74	0.090	0.005	0.24	0.137	108	13.1
29	0.07	0.25	0.32	0.78	0.061	0.005	0.19	0.12	151	21.0
30	0.07	0.23	0.30	0.77	0.057	0.005	0.19	0.12	110	15.3
33	0.08	0.39	0.47	0.81	0.093	0.005	0.25	0.14	159	18.9
34	0.06	0.27	0.33	0.80	0.065	0.005	0.2	0.123	105	14.2
35	0.11	0.40	0.51	0.78	0.098	0.005	0.25	0.14	150	17.9
37	0.08	0.21	0.29	0.75	0.053	0.005	0.18	0.116	147	21.1
38	0.12	0.13	0.25	0.64	0.039	0.005	0.15	0.105	232	36.8
39	0.11	0.51	0.62	0.80	0.122	0.005	0.29	0.152	189	20.7
40	0.14	0.25	0.39	0.70	0.067	0.005	0.21	0.127	143	18.8

Sutter SUSMP Swale Calculations (flow based)

K=	1.17
C Impervious=	0.90
C pervious=	0.35
N=	0.25

Q=(0.21)CAK

Swales Have a minimum 2' bottom, have a minimum depth of 0.5' and 3:1 side slopes

AREA #	Area Pervious (ac)	Area Impervious (ac)	Area Total (ac)	C	Q (cfs)	Slope Swale	Depth of swale (ft)	V (fps)	Length of Swale (ft)	Retention Time (min)
41	0.16	0.05	0.21	0.48	0.025	0.005	0.12	0.092	199	36.1
42	0.25	0.29	0.54	0.65	0.086	0.005	0.24	0.137	107	13.0
43	0.17	0.58	0.75	0.78	0.143	0.005	0.31	0.157	222	23.6
44	0.06	0.16	0.22	0.75	0.041	0.005	0.16	0.109	147	22.5
45	0.50	0.68	1.18	0.67	0.193	0.005	0.37	0.173	1060	102.1
46	0.17	0.38	0.55	0.73	0.099	0.005	0.26	0.143	360	42.0
47	0.11	0.29	0.40	0.78	0.076	0.005	0.22	0.13	120	15.4
48	0.14	0.24	0.38	0.65	0.061	0.005	0.19	0.12	101	14.0
49	0.09	0.27	0.36	0.76	0.067	0.005	0.21	0.127	119	15.6

Note: See Attached Preliminary SUSMP Hydrology Map for Area # location

Sutter SUSMP-Media Filltration Device Flow Calculations (flow based)

K=	1.17
C Impervious	0.90
C pervious	0.35

Q=(0.21)CAK

Area #	Area Pervious (ac)	Area Impervious (ac)	Area Total (ac)	C	Q (cfs)
11	0.63	1.18	1.81	0.71	0.315
13	0.00	0.84	0.84	0.90	0.186
17	0.13	0.36	0.49	0.75	0.091
21	0.11	1.29	1.40	0.86	0.295
22	0.09	0.55	0.64	0.82	0.129
24	0.00	0.85	0.85	0.90	0.188
25	0.03	0.45	0.48	0.87	0.102
32	0.21	0.52	0.73	0.74	0.133
36	0.07	0.34	0.41	0.81	0.081

Note: See Attached Preliminary SUSMP Hydrology Map for Area # location

7. Maintenance of Treatment Control Measures

The maintenance of the project stormwater quality facilities will be the responsibility of the owner of the private hospital facilities, Sutter Medical Center of Santa Rosa. These include regular maintenance of the hospital grounds and parking lots, removing debris and trash and sweeping up dirt and dust accumulation. Vegetated swales will require occasional reconstruction as they become overly clogged with fine dirt particles, but this is not expected to be needed very often, depending on the location and tributary area served. Structural BMP's will need to be organized with a regular inspection schedule, cleaning and rehabilitation, either by maintenance staff or by contract with an outside company specializing in such services. Because the proposed detention ponds are to be located within the Wells Fargo Center property and will serve both the Wells Fargo Center and the proposed hospital campus, Sutter Medical Center of Santa Rosa and the Luther Burbank Memorial Foundation (owners of the Wells Fargo Center) will enter into a joint maintenance agreement for maintenance of the detention ponds. Within the public right of way, the County of Sonoma and Caltrans will maintain the proposed added street improvements and facilities in accordance with their individual Stormwater Management Plans.

8. Project Hydrology Description

The proposed Sutter Medical Center/Wells Fargo Center site is located in the southeast quadrant of Highway 101 Mark West Springs / River Road freeway interchange. From research of available drainage records as well as on-site observation it has been determined that the site lies at the uppermost end of a drainage basin that is ultimately tributary to Abramson Creek in the Northwest of Santa Rosa area. The site (**Tributaries "A", "B"** and **"C"**) drains generally from east to west to an array of three shallow pipe culverts (one 24" culverts, one 42" culvert and one 24" culvert respectively) under Highway 101 that discharge to the west into agricultural lands currently cultivated with vineyards. The downstream drainage facilities are an informal matrix of ditches and culverts over a widespread area of Northwest Santa Rosa that convey local drainage west and south until it approaches the intersection of Barnes and Dennis Lane. A portion of the drainage enters a 54" storm drain in Barnes Road that flows south and discharges to Piner Creek. The other portion of the drainage crosses Barnes Lane through roadside culverts then crosses the Northwestern Pacific Railroad Authority grade through a single 36" culvert near the intersection of Barnes Road and Dennis Lane. The flow then continues on in small open channels, culverts, and through a new subdivision storm drain system at Fulton Road before entering Abramson Creek. The downstream drainage facilities, which are known to experience occasional flooding, are assumed not to have any capacity to convey any increase in runoff from the site resulting from construction of the proposed project. Drainage review requirements for this site, established through discussions with the County of Sonoma drainage review staff, will involve the design of drainage facilities that limit the 10-year storm peak discharge from the site to existing pre-development conditions, or less.

There is an additional tributary drainage basins located north of the project boundary related to proposed offsite improvements. This tributary drainage basin (**Tributary "D"**) conveys the drainage along the south side of Mark West Springs Road and the north bound highway 101 offramp and outlets to a series of 18" storm drain culverts located at the Highway 101 / Mark West Springs / River Road interchange. This drainage then goes westerly under Highway 101 and flows north along the southerly on-ramp and then west along River Road and eventually to Fulton Creek.

9. Summary of Pre- and Post-Construction Storm Water Runoff

9.1 EXISTING HYDROLOGY (10-YEAR STORM)

Each of the culverts under U.S. Route 101 west of the project conveys a portion of the total site drainage. Existing hydrology calculations were performed for **Tributaries "A", "B" and "D"** by determining the existing tributary drainage area for each culvert, and then determining the peak runoff using the rational method analysis. Tributary "C" was not evaluated since no development is proposed to this tributary. These tributary zones have been designated as Tributary Areas "A,"B","C" and "D" and drain to the existing 24", 42", 24" and 18" concrete pipe culverts under Highway 101, (see attached Existing Site Drainage and Hydrology Exhibit – Figure VIII-1). The results of this study for Tributaries "A", "B", and "D" are as follows:

<u>Tributary Area "A" (to 24" culvert) – 13.68 Acres</u>

"K" Factor	1.17
"C" Factor	0.36
"t" Time of Concentration	34.5 min.
"I" 10-year Intensity*	1.10 in/hr
10-year peak flow (existing)	6.3 cfs

<u>Tributary Area "B" (to 42" culvert) – 27.41 Acres</u>

"K" Factor	1.17
"C" Factor	0.53
"t" Time of Concentration	43.8 min.
"I" 10-year Intensity*	0.97 in/hr
10-year peak flow (existing)	16.5 cfs

<u>Tributary Area "D" (to 18" culverts) – 8.46 Acres</u>

"K" Factor	1.17
"C" Factor	0.61
"t" Time of Concentration	23.0 min.
"I" 10-year Intensity*	1.36 in/hr
10-year peak flow (existing)	8.2 cfs

(See attached Existing Hydrology Calculations)

9.2 POST-CONSTRUCTION HYDROLOGY (10-YEAR STORM)- INTRODUCTION

The nature of the project is such that large areas of currently undeveloped land will be covered with impervious building and pavement surfaces, increasing the amount of surface runoff attempting to exit the site during a storm event. In order to limit the peak 10-year runoff from the developed site to the existing flow level, a conceptual hydrologic analysis was performed, assuming a drainage design that will: 1.) Limit post-construction runoff entering the northernmost 24" freeway culvert (**Tributary "A"**) to no greater than existing 10-year peak flow by reduction of the size of its tributary acreage in proportion to the increase in C factor as a result of the development; 2.) Limit post-construction runoff entering the 42" culvert (**Tributary "B"**) to no greater than existing 10-year peak flow by means of developing vegetated swales throughout the parking areas and surface detention basins located near the existing 42" storm drain culvert under Highway 101.

In addition to the proposed site development, off-site street improvements on Mark West Springs Road and the Highway 101 freeway exit ramp will be constructed in a separate drainage area (**Tributary "D")** that is part of the River Road overcrossing freeway interchange drainage system north and west of the site. This drainage area currently drains the northbound freeway exit-ramp, Mark West Springs Road and a portion of the project fronting Mark West Springs Road. The configuration of the proposed site development will necessitate that a portion of the on-site drainage area along Mark West Springs Road (historically tributary to the freeway interchange) will be transferred to Tributaries "A" and "B". This reduction of the tributary drainage basin will virtually offset the minor amount of increase in runoff generated by the increase in impervious surface area due to project road widening improvements. Increases in drainage area in tributary basins "A" and "B" have been considered in the post-construction analysis (for the 10-year storm event) of those basins and with the size of Tributary "A" and the design of the detention basin for tributary "B".

The southern portion of the Wells Fargo Center and southern parking lots (**Tributary "C")** drain to a separate highway culvert crossing (the southern most 24" freeway culvert). There are no changes to this drainage area proposed with the development.

9.3 POST-CONSTRUCTION HYDROLOGY (10-YEAR STORM) - DETAILS

9.3.1 Tributary "A"

As previously indicated, the post-construction tributary area to the northernmost 24" culvert will be reduced in size such that the peak 10-year discharge will approximate existing pre-construction conditions. In this analysis, flow from the most northern areas of the project site, including pavements, will be collected by vegetated swales located in the parking areas. This drainage will then be conveyed to the existing 24" culvert via a perimeter vegetated swale along the northerly and westerly boundary. We estimate that the post-construction Tributary "A" drainage area displayed in Figure 1 will generate a peak flow of 6.2± cfs, slightly less than existing conditions. (See Proposed Site Drainage & Storm Detention Exhibit – Figure VIII-2)

<u>Tributary Area "A" (to 24" culvert) – 5.91 Acres</u>

"K" Factor	1.17
"C" Factor	0.71
"t" Time of Concentration	26.5min.
"I" 10-year Intensity*	1.26 in/hr
10-year peak flow	6.2 cfs (≈ 6.3 cfs exist.)

9.3.2 Tributary "B"

In this analysis, Tributary "B" is comprised of the largest portion of the site (38.08± acres) including most of the proposed Hospital buildings, roadways and parking, as well as the north westerly half of the Wells Fargo complex. Stormwater from new and replacement pavement areas will be routed through vegetated swales located throughout the proposed parking areas (increasing the time of concentration and reducing the peak flow) and then into surface detention basins prior to being discharged to the existing 42" storm drain culvert crossing Highway 101. To achieve pre-construction peak discharge the detention basins will be sized to reduce peak discharge to at or below existing conditions for the 10-Year design storm event. In order to tentatively size the detention basins, a computer model using a SCS Type 1A rainfall distribution based on the Sonoma County Water Agency rainfall intensity vs. duration curve volume for the 10 year 24 hour event was used. A 10-Year, 24 hour storm hydrograph for Tributary "B" was created based on a CN of 91.0 (runoff factor) and an assumed time of concentration of approximately 30 minutes utilizing Hydraflow "Hydrographs 2004", version 8.0. Two interconnected detention ponds are proposed, a northern pond approximately 20,600 sq. ft. in area and a southern pond approximately 28,500 sq. ft. in size. The location of the ponds will be in the southwest portion of the parcel between the existing Wells Fargo Center complex and Highway 101. Ponds will have 3:1 side slopes and are interconnected with dual storm drain culverts. The northern pond has an approximate depth of 4.5' and the southern pond has a depth of 3.5 feet. The relatively flat terrain allows for a large but shallow basin design. The basin outlet structure will be a standpipe-type with orifice openings sized and staged in elevation to address the design storm flow. The detention basins will drain to the highway culvert entrance via gravity through dual 30" outlet pipes. The hydrograph for this tributary area was then superimposed upon the stage/storage/discharge hydrograph of the assumed ponds design. The area of the graph above the discharge hydrograph and below the 10-year, 24hr storm hydrograph in the hydrograph plot entitled "Sutter Ponds" represents the resultant estimated required storage volume of 106,834cubic feet (2.45 acre-feet) which in this design translates into an average peak pond depth of just about 3.2 feet. Twin 30" pipes were assumed as outlets from the basin for analysis which result in a reduction of the outgoing peak flow to 15.2± cfs (in this analysis) which is slightly less than the pre-development peak flow of 16.5± cfs. The detention basins will primarily drain via gravity drainage through the dual 30" outlet pipes. These detention basins will not have an impermeable liner allowing for a minor amount of infiltration into the underlying soils.

This model represents only one of several combinations of pond geometry that may be applied to achieve equivalent results. The site grading and drainage design will be further developed during detailed site design.

<u>Tributary Area "B" (to 42" culvert) – 38.08 Acres</u>

"K" Factor	1.17
"C" Factor	0.68
"t" Time of Concentration	30 min.
"I" 10-year Intensity*	1.18 in/hr
10-year peak inflow to ponds	35.9 cfs

10-year peak discharge from ponds 15.2 cfs (< 16.5 cfs exist.)

9.3.3 Tributary "D"

As previously indicated, the post-construction tributary area (**Tributary "D")** to the northern most 18" culverts will be reduced in size such that the peak 10-year discharge will approximate existing pre-construction conditions. In this analysis, flow from the off-site street improvements on Mark West Springs Road and the Highway 101 freeway exit ramp, will be collected by vegetated swales located in the along the southern portion of Mark West Springs Road and the East side of the northbound Highway 101 offramp. We estimate that the post-construction Tributary "D" drainage area displayed in Figure VIII-1 will generate a peak flow less than existing conditions 8.2± cfs,. (See Proposed Site Drainage & Storm Detention Exhibit – Figure VIII -2)

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*                                                                                 *
*                             HYDROLOGIC STUDY                                    *
*                                   by                                            *
*                             BRELJE AND RACE                                     *
*                          5341 SKYLANE BOULEVARD                                 *
*                          SANTA ROSA, CA 95403                                   *
*                                                                                 *
*  JOB      : LBC - SUTTER MEDICAL CENTER                                         *
*  OPERATOR : JST                                                                 *
*  DATE     : 12-5-04                                                             *
*                                                                                 *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

K = 1.17

F	TIME (min)	I (in/hr)		ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)

POINT : A1&2
****

				2.390	0.443						
10	15.00	1.70		2.390	0.443	2.11	VLY	0.0015	600.0	0.67	
25	15.00	1.95				2.42				0.69	
100	15.00	2.42				3.00				0.73	

POINT : A3
****

			+	3.000	0.300						
10	29.87	1.19		5.390	0.363	2.72	VLY	0.0078	450.0	1.61	
25	29.44	1.38				3.16				1.66	
100	28.78	1.72				3.93				1.75	

POINT : A4
****

			+	8.290	0.350						
10	34.53	1.10		13.680	0.355	6.25	PIPE	24.00	148.0	1.99	
25	33.94	1.28				7.29				2.32	
100	33.07	1.59				9.07				2.89	

HYDROLOGIC STUDY
by
BRELJE AND RACE
5341 SKYLANE BOULEVARD
SANTA ROSA, CA 95403

JOB : LBC - SUTTER MEDICAL CENTER
OPERATOR : JST
DATE : 12-5-04

K = 1.17

F	TIME (min)	I (in/hr)		ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)

POINT : B1
****

				0.530	0.300						
10	10.00	2.11		0.530	0.300	0.39	VLY	0.0022	336.0	0.56	
25	10.00	2.41				0.45				0.58	
100	10.00	3.00				0.56				0.61	

POINT : B2
****

			+	5.030	0.390						
10	19.92	1.47		5.560	0.381	3.64	PIPE	18.00	90.0	2.06	
25	19.64	1.70				4.22				2.39	
100	19.19	2.13				5.28				2.99	

POINT : B3
****

			+	0.730	0.900						
10	20.65	1.44		6.290	0.442	4.68	DES	0.0004	526.0	0.53	
25	20.27	1.67				5.43				0.55	
100	19.69	2.10				6.82				0.58	

F	TIME (min)	I (in/hr)	ACRES	C	Q (cfs)	TYPE	SLOPE (or DIAM)	L (ft)	VEL (fps)	d (ft)

POINT : B4
****

		+	11.680	0.390						
10	37.09	1.06	17.970	0.408	9.08	PIPE	26.00	369.0	2.46	
25	36.18	1.24			10.64				2.89	
100	34.84	1.55			13.31				3.61	

POINT : B4.1
****

		+	0.001	0.300						
10	39.59	1.02	17.971	0.408	8.77	VLY	0.0020	250.0	1.06	
25	38.31	1.20			10.33				1.09	
100	36.55	1.51			12.98				1.17	

POINT : B5
****

		+	9.440	0.750						
10	43.53	0.97	27.411	0.526	16.41	PIPE	42.00	134.0	1.71	
25	42.13	1.15			19.33				2.01	
100	40.12	1.44			24.28				2.52	

Hydrograph Plot

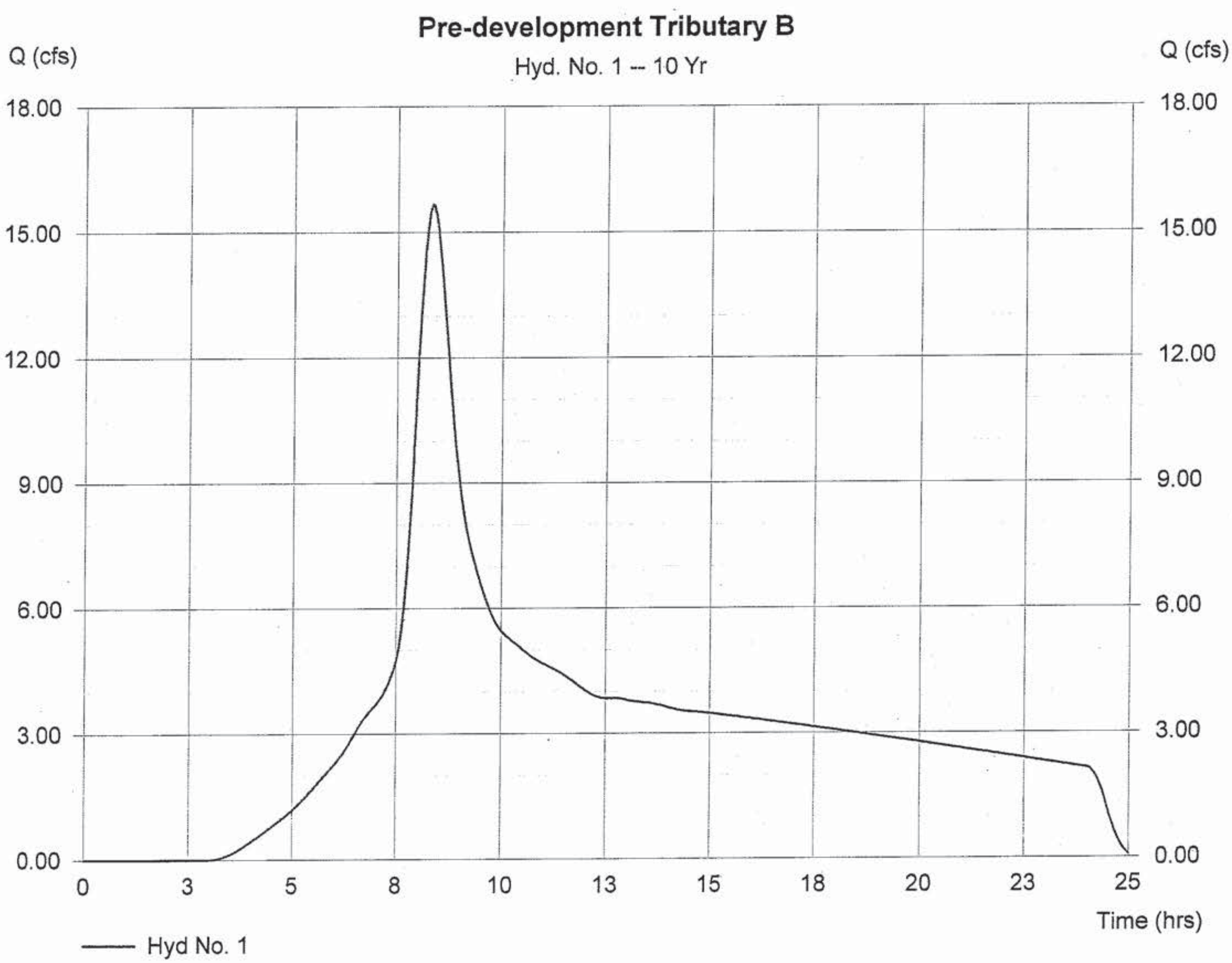
Hydraflow Hydrographs by Intelisolve | Thursday, Jan 29 2009, 3:21 PM

Hyd. No. 1

Pre-development Tributary B

Hydrograph type	= SCS Runoff	Peak discharge	= 15.66 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 27.41 ac	Curve number	= 85.9
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 43.5 min
Total precip.	= 4.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 283,259 cuft



Hydrograph Plot

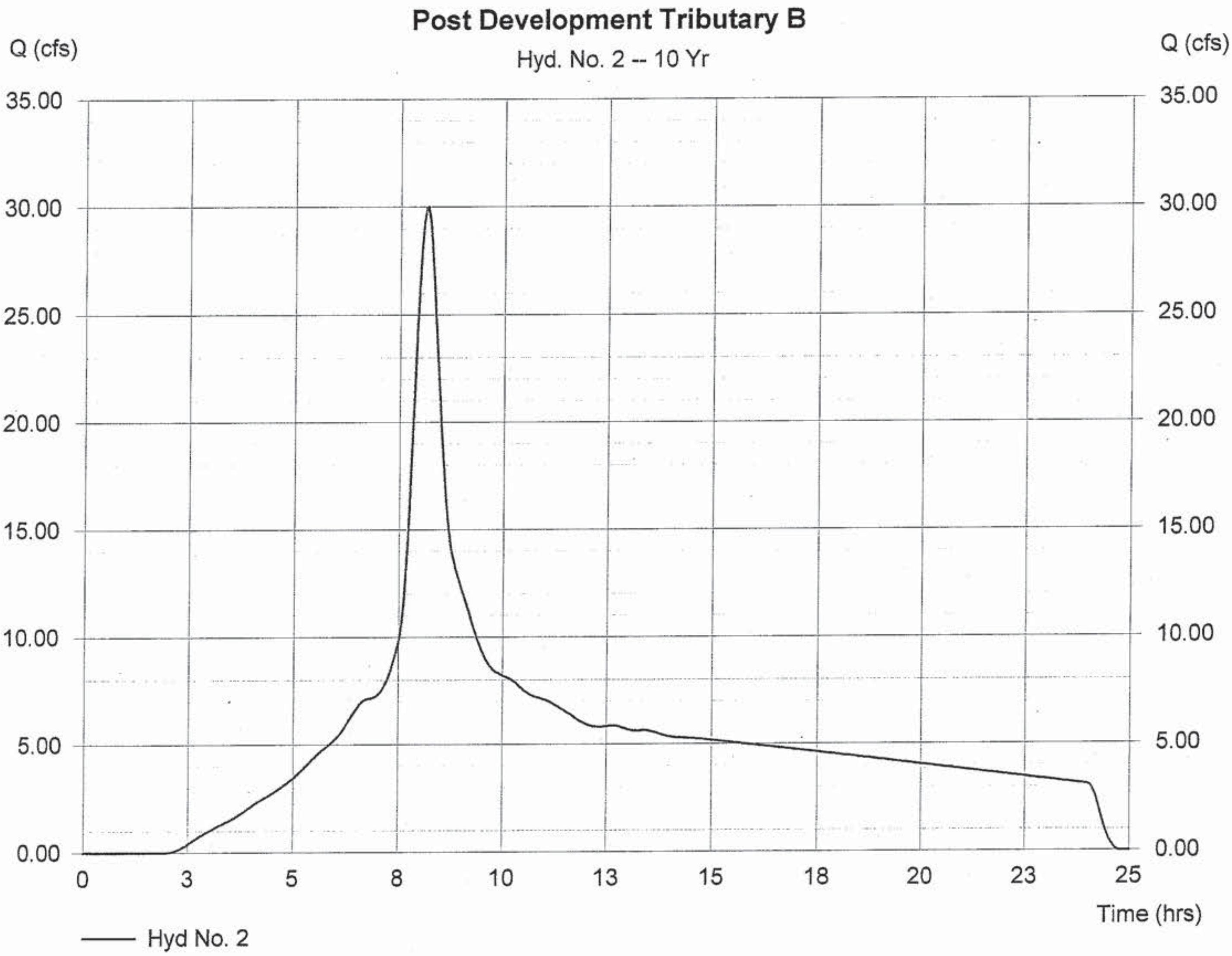
Hydraflow Hydrographs by Intelisolve — Thursday, Jan 29 2009, 3:22 PM

Hyd. No. 2

Post Development Tributary B

Hydrograph type	= SCS Runoff	Peak discharge	= 30.01 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Drainage area	= 38.08 ac	Curve number	= 91
Basin Slope	= 0.0 %	Hydraulic length	= 0 ft
Tc method	= USER	Time of conc. (Tc)	= 30 min
Total precip.	= 4.34 in	Distribution	= Type IA
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 462,217 cuft



Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Thursday, Jan 29 2009, 3:22 PM

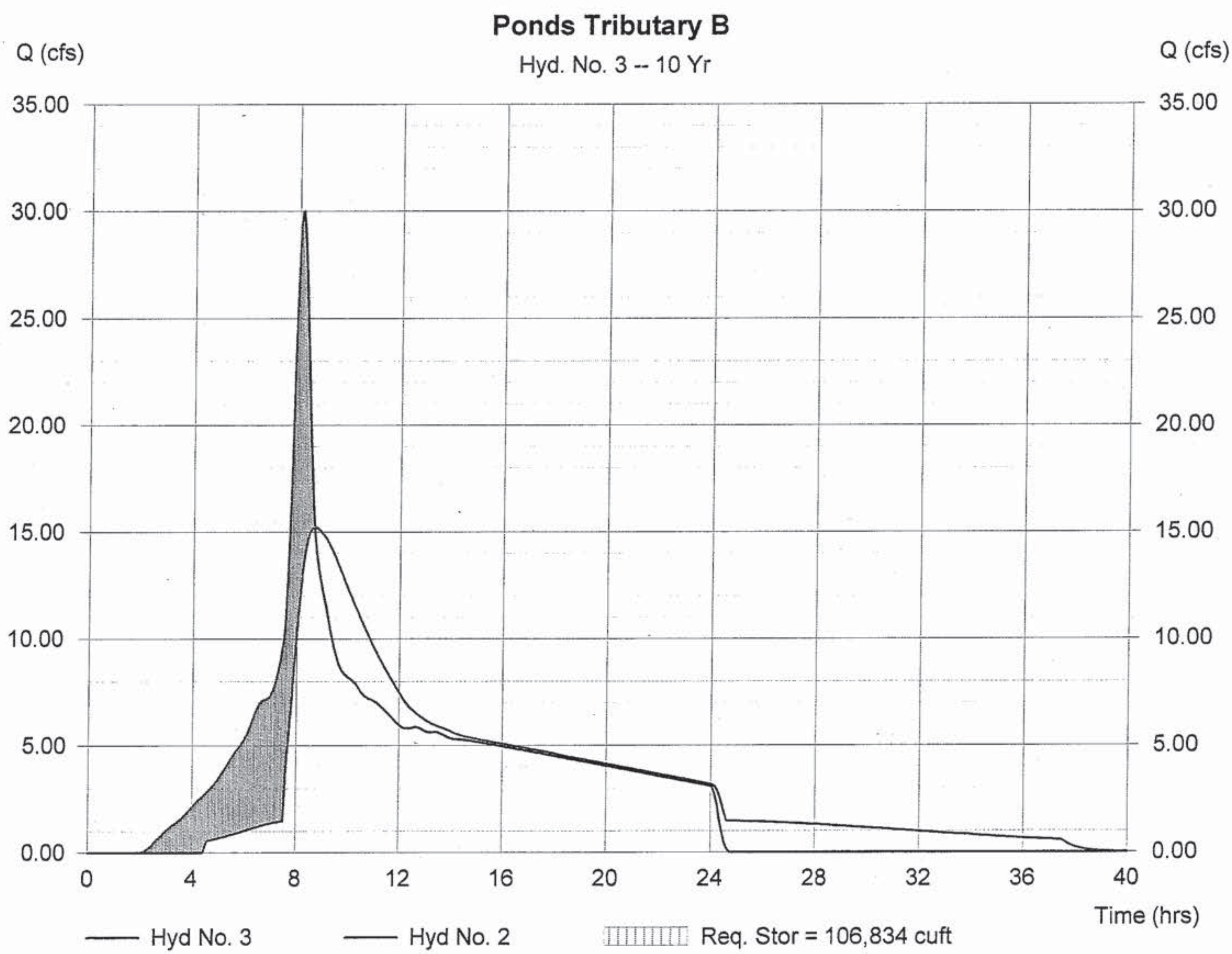
Hyd. No. 3

Ponds Tributary B

Hydrograph type	= Reservoir	Peak discharge	= 15.23 cfs
Storm frequency	= 10 yrs	Time interval	= 3 min
Inflow hyd. No.	= 2	Max. Elevation	= 157.08 ft
Reservoir name	= Ponds Tributary B	Max. Storage	= 106,834 cuft

Storage Indication method used.

Hydrograph Volume = 451,375 cuft



Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	-------	-------	10.76	-------	-------	15.66	-------	-------	25.23	Pre-development Tributary B
2	SCS Runoff	-------	-------	21.95	-------	-------	30.01	-------	-------	45.24	Post Development Tributary B
3	Reservoir	2	-------	10.67	-------	-------	15.23	-------	-------	38.15	Ponds Tributary B

Proj. file: 3231 090126.gpw

Thursday, Jan 29 2009, 3:23 PM

Hydraflow Hydrographs by Intelisolve

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	15.66	3	498	283,259	----	------	------	Pre-development Tributary B
2	SCS Runoff	30.01	3	489	462,217	----	------	------	Post Development Tributary B
3	Reservoir	15.23	3	519	451,375	2	157.08	106,834	Ponds Tributary B

3231 090126.gpw	Return Period: 10 Year	Thursday, Jan 29 2009, 3:23 PM

Pond Report

Hydraflow Hydrographs by Intelisolve — Thursday, Jan 29 2009, 3:23 PM

Pond No. 1 - Ponds Tributary B

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	153.50	00	0	0
0.50	154.00	12,802	3,201	3,201
1.00	154.50	17,753	7,639	10,839
1.50	155.00	32,173	12,482	23,321
2.00	155.50	38,380	17,638	40,959
2.50	156.00	40,461	19,710	60,669
3.00	156.50	42,560	20,755	81,425
3.50	157.00	44,467	21,757	103,181
4.00	157.50	46,862	22,832	126,014
4.50	158.00	47,732	23,649	149,662

Culvert / Orifice Structures

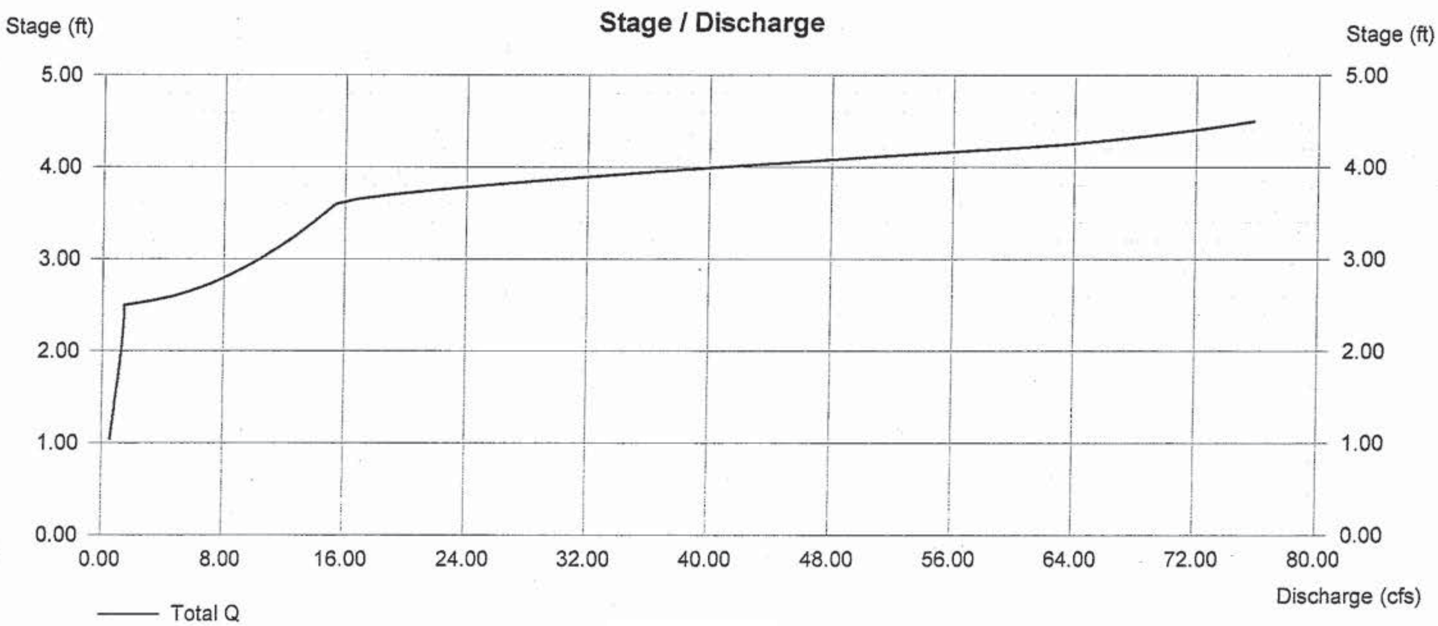
	[A]	[B]	[C]	[D]
Rise (in)	= 30.00	12.00	12.00	0.00
Span (in)	= 30.00	12.00	12.00	0.00
No. Barrels	= 2	1	3	0
Invert El. (ft)	= 153.50	153.50	155.00	0.00
Length (ft)	= 30.50	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	0.00
N-Value	= .013	.013	.013	.013
Orif. Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 30.00	0.00	0.00	0.00
Crest El. (ft)	= 157.10	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	0.00	0.00
Weir Type	= Riser	---	---	---
Multi-Stage	= Yes	No	No	No

Exfiltration = 0.000 in/hr (Contour) Tailwater Elev. = 154.50 ft

Note: Culvert/Orifice outflows have been analyzed under inlet and outlet control. Weir riser checked for orifice conditions.



SUTTER MEDICAL CENTER

EXISTING SITE DRAINAGE HYDROLOGY EXHIBIT

JANUARY 2009

LEGEND

- EXISTING PROPERTY LINES
- EXISTING TRIBUTARY DRAINAGE BASIN
- SUB-BASIN AREA
- EXISTING SWALE
- (A) TRIBUTARY COLLECTION LOCATION

TRIBUTARY AREA 'A'

- TOTAL AREA =13.68 ACRES C=0.36
- EXISTING 10-YEAR STORM FLOW = 6.3± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 5.0± CFS (PEAK FLOW)

TRIBUTARY AREA 'B'

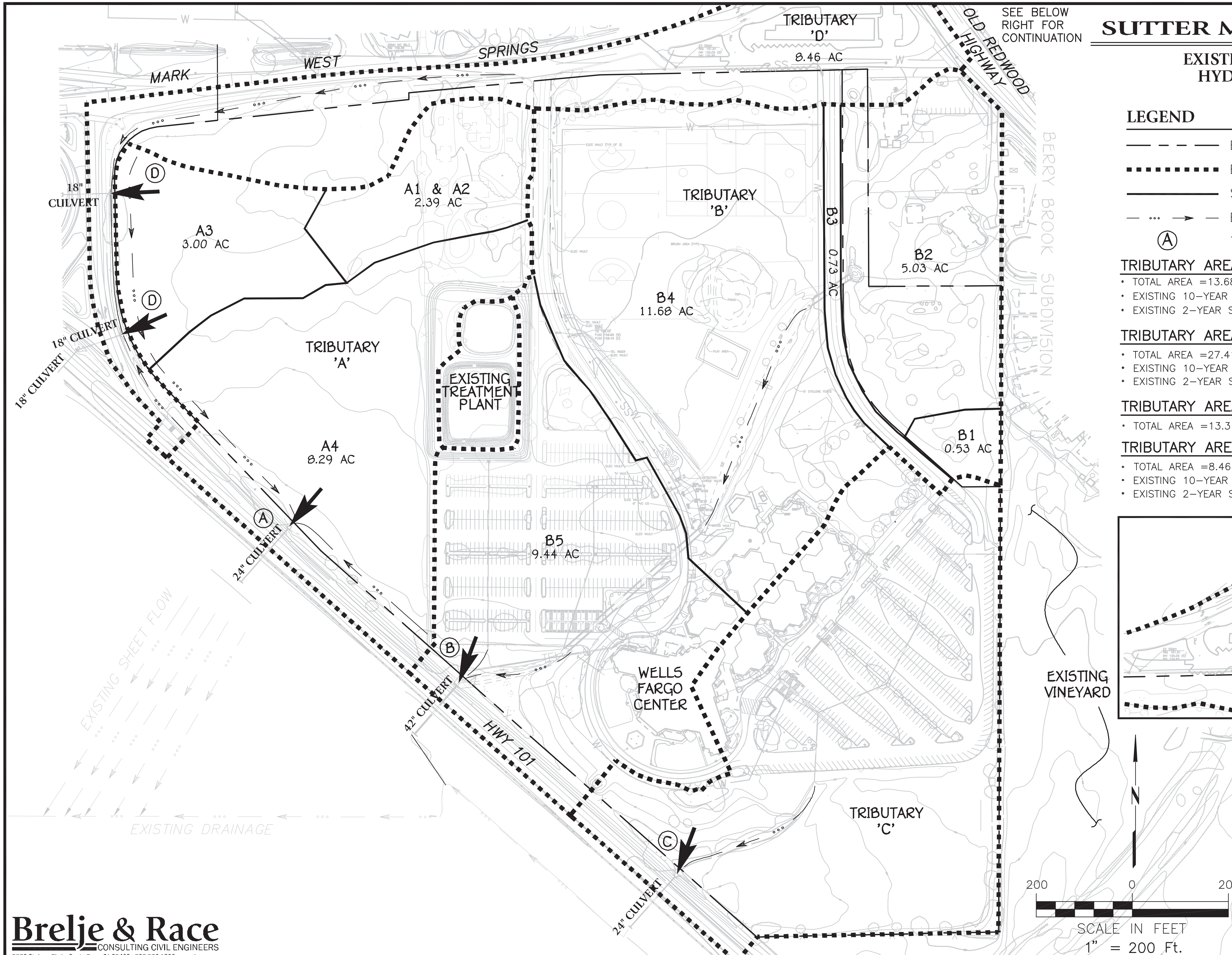
- TOTAL AREA =27.41 ACRES C=0.53
- EXISTING 10-YEAR STORM FLOW = 16.5± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 13.1± CFS (PEAK FLOW)

TRIBUTARY AREA 'C'

- TOTAL AREA =13.3 ACRES C=0.59

TRIBUTARY AREA 'D'

- TOTAL AREA =8.46 ACRES C=0.61
- EXISTING 10-YEAR STORM FLOW = 8.2± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 6.5± CFS (PEAK FLOW)



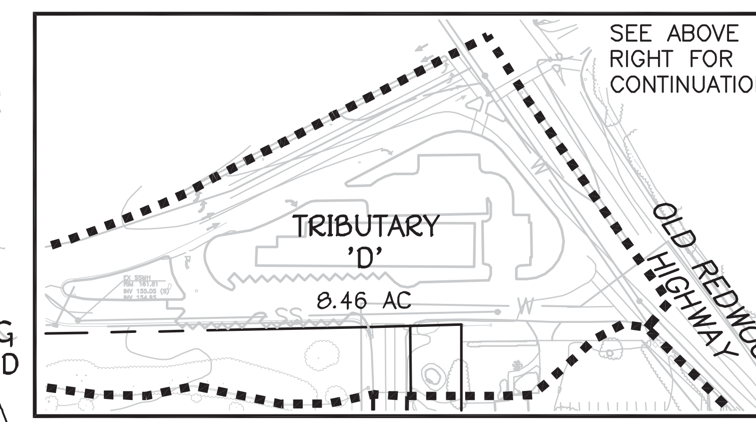


FIGURE VIII-1

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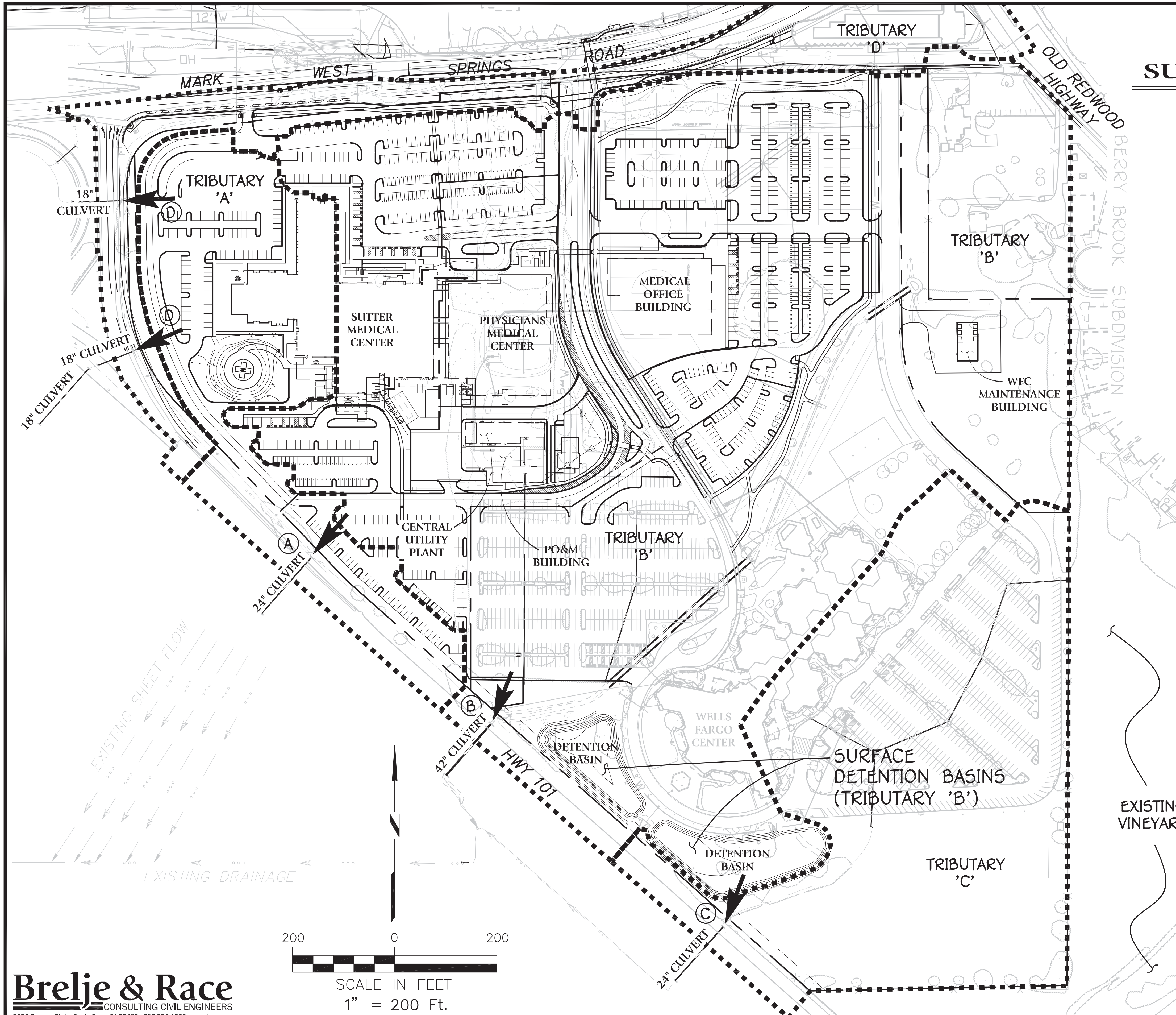


SUTTER MEDICAL CENTER

PROPOSED SITE DRAINAGE & STORM WATER DETENTION EXHIBIT

JANUARY 2009
REVISED OCTOBER 22, 2009

LEGEND

- TRIBUTARY DRAINAGE BASIN
- EXISTING SWALE
- (A) TRIBUTARY COLLECTION LOCATION
- EXISTING PROPERTY LINE

TRIBUTARY AREA 'A'

THE POST DEVELOPMENT FLOW IS BASED ON A SMALLER DRAINAGE AREA THAN THE EXISTING DRAINAGE AREA WHICH HAS BEEN SIZED TO APPROXIMATE EXISTING PEAK FLOW.

- EXISTING 10–YEAR STORM FLOW = 6.3± CFS (PEAK FLOW)
- EXISTING 2–YEAR STORM FLOW = 5.0± CFS (PEAK FLOW)
- POST DEVELOPMENT 10–YEAR STORM FLOW = 6.2± CFS (PEAK FLOW)
- POST DEVELOPMENT 2–YEAR STORM FLOW = 4.9± CFS (PEAK FLOW)

TRIBUTARY AREA 'B'

A SURFACE STORM WATER DETENTION POND IS PROPOSED TO REDUCE PEAK FLOW TO AT OR BELOW EXISTING PEAK FLOW. (2.84 ACRE–FT OF STORAGE PROPOSED)

- EXISTING 10–YEAR STORM FLOW = 16.5± CFS (PEAK FLOW)
- EXISTING 2–YEAR STORM FLOW = 13.1± CFS (PEAK FLOW)
- POST DEVELOPMENT 10–YEAR STORM FLOW = 15.2± CFS (PEAK FLOW)
- POST DEVELOPMENT 2–YEAR STORM FLOW = 10.7± CFS (PEAK FLOW)

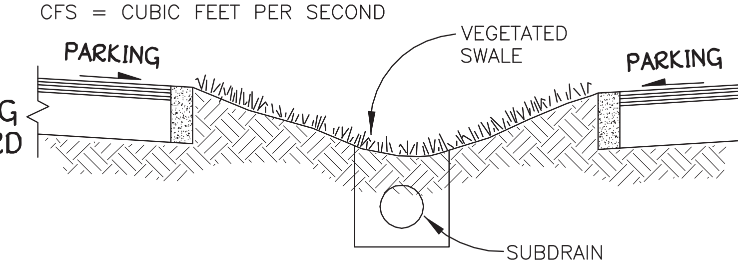
TRIBUTARY AREA 'C'

NO CHANGES ARE MADE TO TRIBUTARY AREA 'C' AS A RESULT OF THE PROJECT.

TRIBUTARY AREA 'D'

REDUCTION IN TRIBUTARY AREA OFFSETS INCREASE IN IMPERVIOUS AREA RESULTING IN A APPROXIMATE ZERO NET CHANGE IN PEAK FLOW.

CFS = CUBIC FEET PER SECOND



TYPICAL VEGETATED SWALE DETAIL
NOT TO SCALE

NOTE:
VEGETATED SWALES WILL BE IMPLEMENTED THROUGHOUT THE PROPOSED PARKING AREAS WHERE FEASIBLE AND AT THE OUTSIDE EDGES OF PARKING ADJOINING LANDSCAPED AREAS. THIS IS PROPOSED AS A POST CONSTRUCTION BEST MANAGEMENT PRACTICE TO IMPROVE STORM WATER QUALITY.

FIGURE VIII-2

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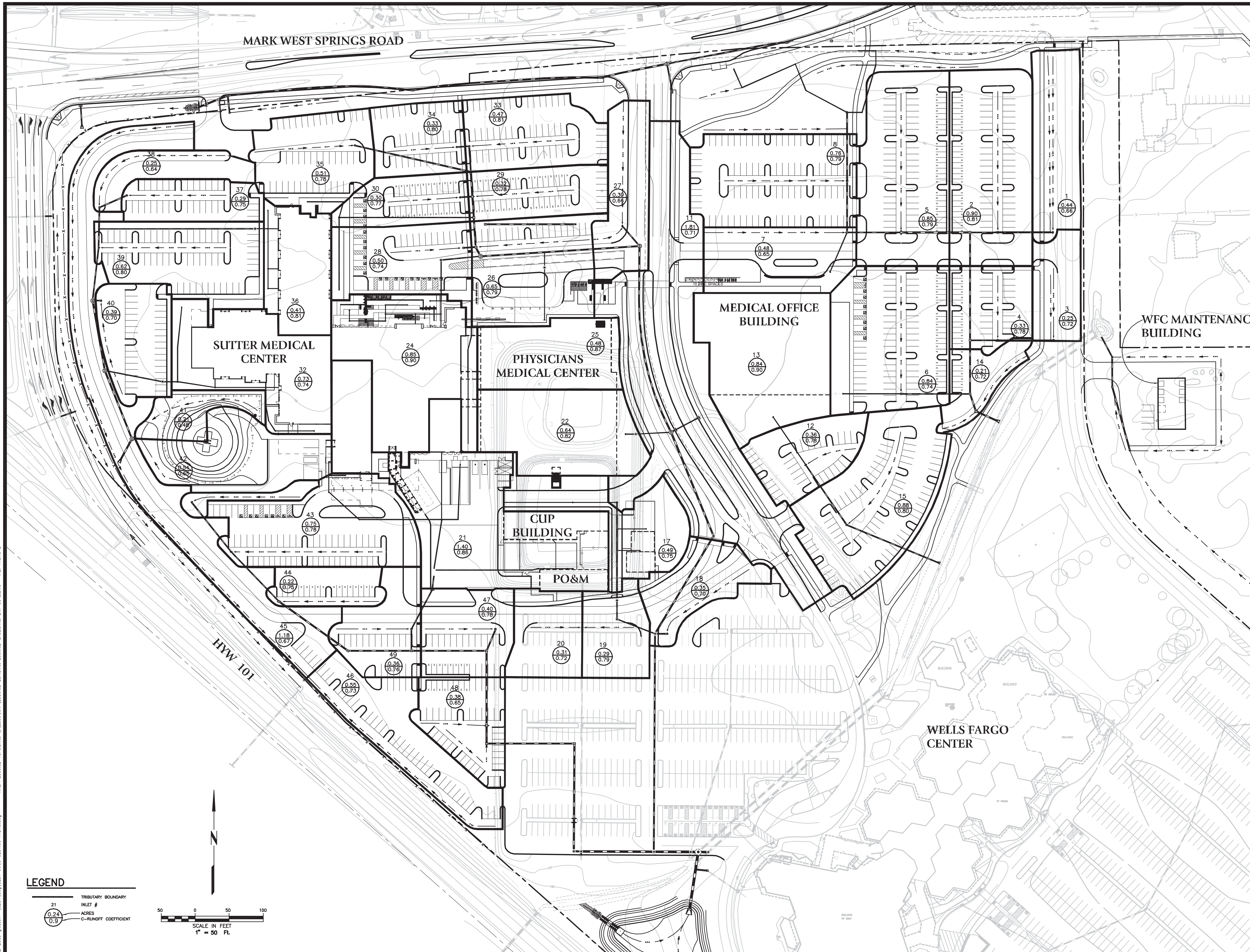

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REGISTERED PROFESSIONAL ENGINEER
THOMAS R. JONES
No. 30129
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

SUTTER MEDICAL CENTER

100 MARK WEST SPRINGS ROAD
SANTA ROSA, CALIFORNIA

PRELIMINARY
FOR STUDY PURPOSES ONLY
DATE 10-22-2009

REVISIONS

NO.	DATE	DESCRIPTION

ON A FULL-SCALE DRAWING, LENGTH OF BAR BELOW IS 1-INCH. IF BAR MEASURES LESS THAN 1-INCH, THIS SHEET WAS PLOTTED AT A REDUCED SCALE, WHICH MAY REQUIRE ADJUSTMENT OF SCALE(S) SHOWN ON DRAWING.

PROJECT 3231.00	DATE OCTOBER 22, 2009
DRAWN BY	CHECKED BY

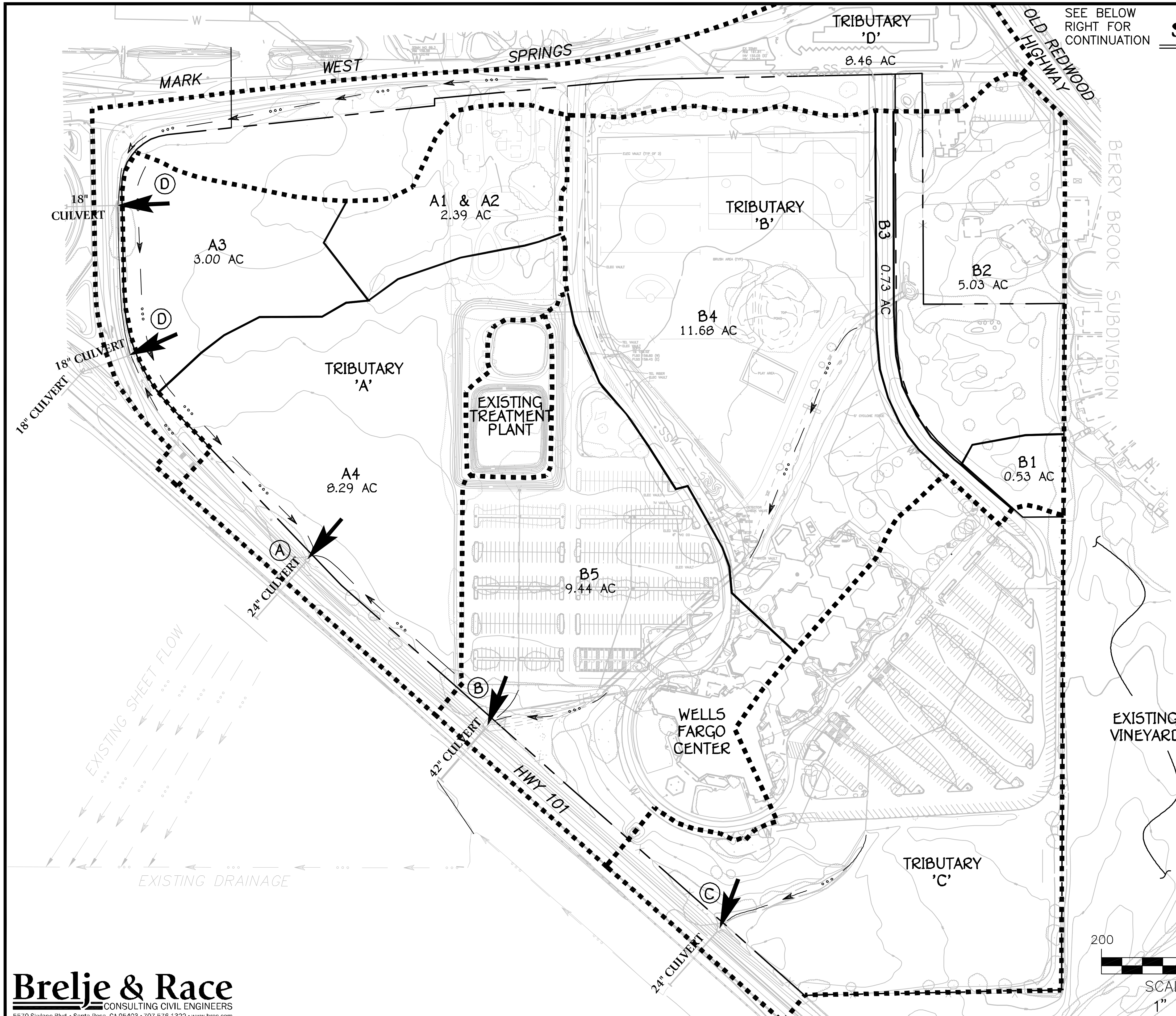
PRELIMINARY SUSMP HYDROLOGY MAP

SHEET NO.
1 OF 1

SUTTER MEDICAL CENTER

EXISTING SITE DRAINAGE HYDROLOGY EXHIBIT

JANUARY 2009



LEGEND

— — —	EXISTING PROPERTY LINES
▪▪▪▪▪▪	EXISTING TRIBUTARY DRAINAGE BASIN
———	SUB-BASIN AREA
— ··· → —	EXISTING SWALE
A	TRIBUTARY COLLECTION LOCATION

TRIBUTARY AREA 'A'

- TOTAL AREA =13.68 ACRES C=0.36
- EXISTING 10-YEAR STORM FLOW = 6.3± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 5.0± CFS (PEAK FLOW)

TRIBUTARY AREA 'B'

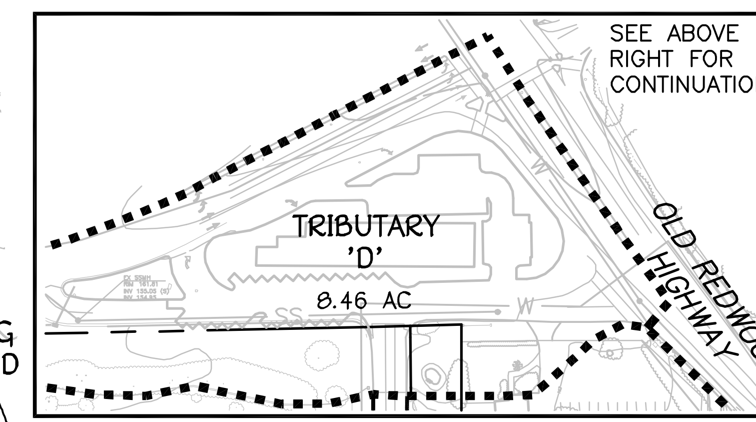
- TOTAL AREA =27.41 ACRES C=0.53
- EXISTING 10-YEAR STORM FLOW = 16.5± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 13.1± CFS (PEAK FLOW)

TRIBUTARY AREA 'C'

- TOTAL AREA =13.3 ACRES C=0.59

TRIBUTARY AREA 'D'

- TOTAL AREA =8.46 ACRES C=0.61
- EXISTING 10-YEAR STORM FLOW = 8.2± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 6.5± CFS (PEAK FLOW)



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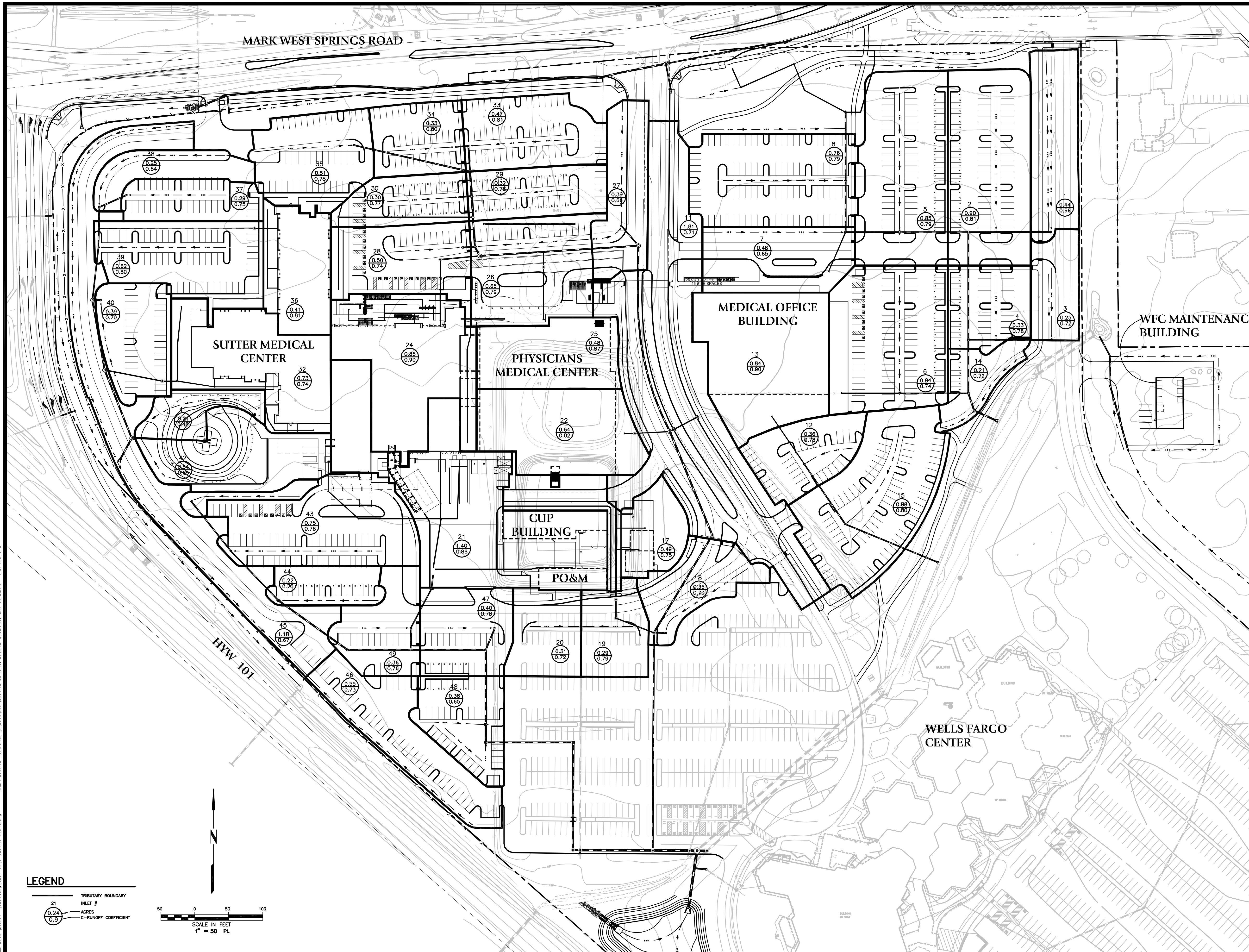
01-29-09 kiflizghi \3231\dwg\3231 00\3231.00 EXHIBIT.dwg TAB: EX-HYDRO

FIGURE VIII-1



Brelje & Race
CONSULTING CIVIL ENGINEERS

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REGISTERED PROFESSIONAL ENGINEER
THOMAS R. JONES
No. 30129
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

SUTTER MEDICAL CENTER

100 MARK WEST SPRINGS ROAD
SANTA ROSA, CALIFORNIA

PRELIMINARY
FOR STUDY PURPOSES ONLY
DATE 10-22-2009

REVISIONS		
NO.	DATE	DESCRIPTION

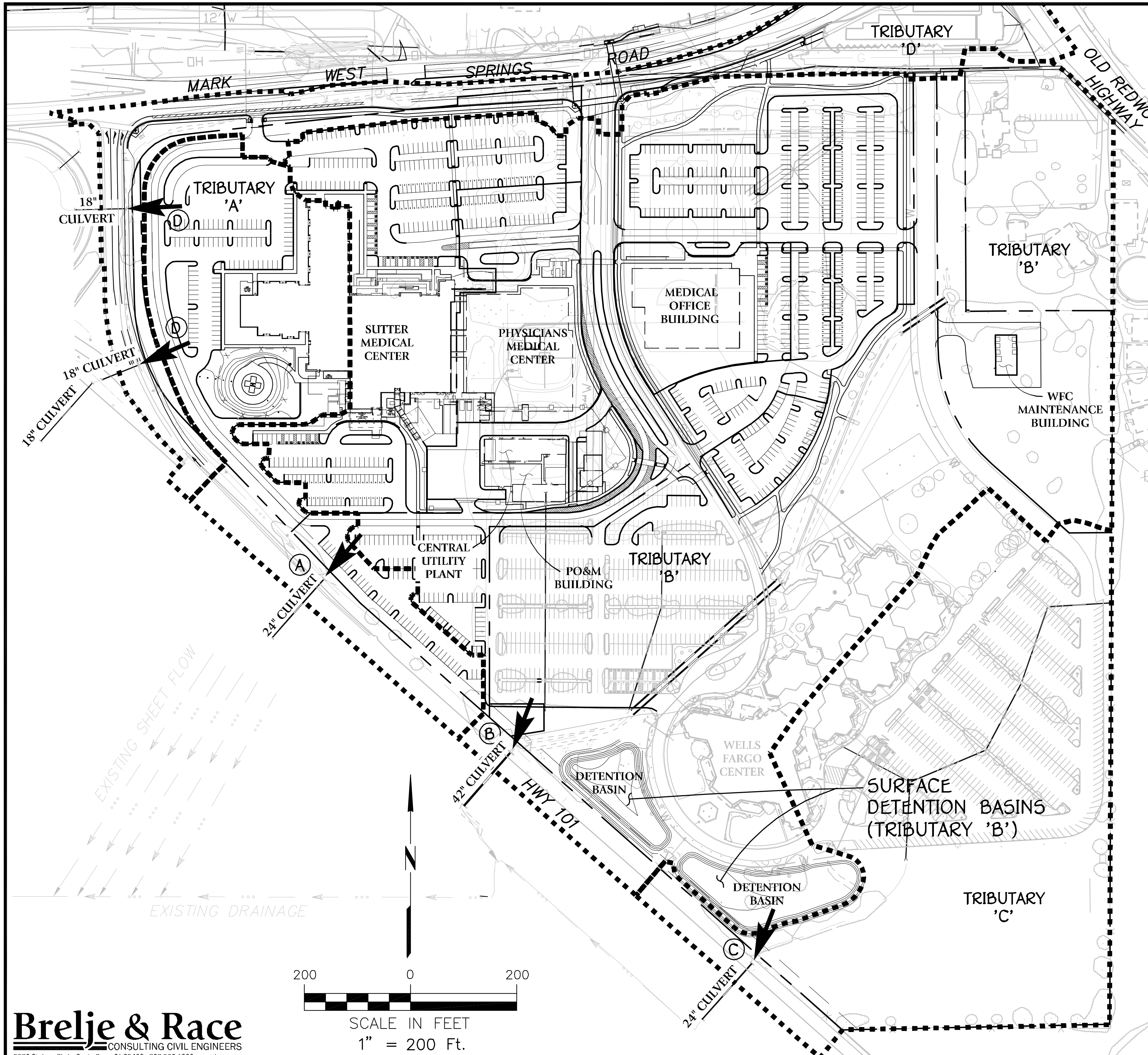
ON A FULL-SCALE DRAWING, LENGTH OF BAR BELOW IS 1-INCH. IF BAR MEASURES LESS THAN 1-INCH, THIS SHEET WAS PLOTTED AT A REDUCED SCALE, WHICH MAY REQUIRE ADJUSTMENT OF SCALE(S) SHOWN ON DRAWING.

PROJECT	DATE
3231.00	OCTOBER 22, 2009
DRAWN BY	CHECKED BY

PRELIMINARY SUSMP HYDROLOGY MAP

SHEET NO.

1 OF 1



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10-22-09 gleason \3231\dwg\3231 00\C-3231.00 EXHIBIT-misc.dwg TAB: DETENTION

SUTTER MEDICAL CENTER

PROPOSED SITE DRAINAGE & STORM WATER DETENTION EXHIBIT

JANUARY 2009
REVISED OCTOBER 22, 2009

LEGEND

- TRIBUTARY DRAINAGE BASIN
- EXISTING SWALE
- (A) TRIBUTARY COLLECTION LOCATION
- EXISTING PROPERTY LINE

TRIBUTARY AREA 'A'

THE POST DEVELOPMENT FLOW IS BASED ON A SMALLER DRAINAGE AREA THAN THE EXISTING DRAINAGE AREA WHICH HAS BEEN SIZED TO APPROXIMATE EXISTING PEAK FLOW.

- EXISTING 10-YEAR STORM FLOW = 6.3± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 5.0± CFS (PEAK FLOW)
- POST DEVELOPMENT 10-YEAR STORM FLOW = 6.2± CFS (PEAK FLOW)
- POST DEVELOPMENT 2-YEAR STORM FLOW = 4.9± CFS (PEAK FLOW)

TRIBUTARY AREA 'B'

A SURFACE STORM WATER DETENTION POND IS PROPOSED TO REDUCE PEAK FLOW TO AT OR BELOW EXISTING PEAK FLOW. (2.84 ACRE-FT OF STORAGE PROPOSED)

- EXISTING 10-YEAR STORM FLOW = 16.5± CFS (PEAK FLOW)
- EXISTING 2-YEAR STORM FLOW = 13.1± CFS (PEAK FLOW)
- POST DEVELOPMENT 10-YEAR STORM FLOW = 15.2± CFS (PEAK FLOW)
- POST DEVELOPMENT 2-YEAR STORM FLOW = 10.7± CFS (PEAK FLOW)

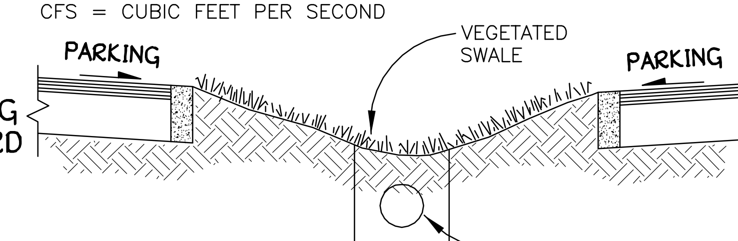
TRIBUTARY AREA 'C'

NO CHANGES ARE MADE TO TRIBUTARY AREA 'C' AS A RESULT OF THE PROJECT.

TRIBUTARY AREA 'D'

REDUCTION IN TRIBUTARY AREA OFFSETS INCREASE IN IMPERVIOUS AREA RESULTING IN A APPROXIMATE ZERO NET CHANGE IN PEAK FLOW.

CFS = CUBIC FEET PER SECOND



TYPICAL VEGETATED SWALE DETAIL
NOT TO SCALE

NOTE:
VEGETATED SWALES WILL BE IMPLEMENTED THROUGHOUT THE PROPOSED PARKING AREAS WHERE FEASIBLE AND AT THE OUTSIDE EDGES OF PARKING ADJOINING LANDSCAPED AREAS. THIS IS PROPOSED AS A POST CONSTRUCTION BEST MANAGEMENT PRACTICE TO IMPROVE STORM WATER QUALITY.

FIGURE VIII-2

Appendix H4

Well Installation and Testing, Sutter Water Supply Well, Sutter Medical Center

WELL INSTALLATION AND TESTING

SUTTER WATER SUPPLY WELL
SUTTER MEDICAL CENTER OF SANTA ROSA
SONOMA COUNTY, CALIFORNIA

Submitted to:

Sutter Health Facility Planning and Development
3325 Chanate Road
Santa Rosa, CA 94504

Prepared by:
ENGEO Incorporated

November 13, 2009
Project No. 6486.200.503

- Expect Excellence -

INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
6486.200.503

November 13, 2009

Mr. Tom Minard, Director
Facility Planning and Development
Sutter Medical Center of Santa Rosa
3325 Chanate Road
Santa Rosa, CA 95404

Subject: Sutter Water Supply Well
Sutter Medical Center of Santa Rosa
Sonoma County, California

WELL INSTALLATION AND TESTING

Dear Mr. Minard:

With your authorization, we completed this well installation and testing report for the recently installed water supply well for the proposed Sutter Medical Center of Santa Rosa, located in Sonoma County, California. The accompanying report presents data and information together with our conclusions regarding the installation, testing and water quality analyses for the well.

Sincerely,

ENGEO Incorporated

Brooks Ramsdell, CEG
br/jf:well

PROFESSIONAL GEOLOGIST
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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION AND SITE LOCATION

ENGEO Incorporated has prepared this groundwater well installation and testing report on behalf of Sutter Health for a recently installed groundwater supply well associated with the proposed Sutter Medical Center (SMC) in Santa Rosa, California. The proposed Sutter Medical Center site is located at 50 Mark West Springs Road in Santa Rosa, Sonoma County, California (Latitude of 38.4953 degrees North; Longitude of 122.7520 degrees West). The approximate site location is shown on the Site Vicinity Map (Figure 1).

The projected average water demand for the proposed medical center not including the 2020+ future expansion is approximately 27,710 gallons per day (Brelje and Race 2009). Including the 2020+ future expansion the estimate water demand for the medical facility is approximately 35,220 gallons per day. Estimated peak irrigation demand for the first year is about 9,000,000 gallons, assuming a late spring or summer landscape plant installation (Brelje and Race 2009). As plants become established, estimated irrigation demands will diminish to about 6,100,000 gallons (Brelje and Race 2009). For the purpose of this study, we have assumed that the overall volume of water to be pumped from the proposed wells annually will be about 58 AFY (based on average water use including 2020+ expansion).

According to the Water/Wastewater report prepared by Brelje and Race, the civil engineering firm designing the proposed well system, the peak pumping rate to meet the maximum demand for the medical facility including irrigation is estimated to be 90 gpm over a 10 to 16 hour period for the establishment year, and just under 70 gpm in subsequent years.

The recently installed SMC Well is located at the southwest corner of the Sutter property which is located within an area of the Santa Rosa Plain Sub-Basin generally referred to as the Larkfield Storage Unit (DWR 1975). In general, the Larkfield Storage Unit comprises three known aquifers that are referred to as Shallow, Intermediate, and Deep. The sources of groundwater for the Larkfield District Wells are typically the Intermediate and Deep aquifers. The source of groundwater for the proposed SMC wells will also be the Intermediate and Deep Aquifers. Based on the geology of the water bearing formations in the area, the two lower aquifers appear to be semi-confined to confined and connected on a regional scale.

1.2 PREVIOUS STUDIES

ENGEO incorporated recently completed a groundwater study (October 2009) in support of the Environmental Impact Report for the proposed Sutter Medical Center. This study included a detailed description of the hydrogeologic setting, an evaluation of the potential pumping impacts on nearby wells, and a detailed water balance.

ENGEO Incorporated previously published a groundwater aquifer test and water quality analysis report (2006) for the existing Wells Fargo Center well (formerly Luther Burbank Center well) located at the site. The existing agriculture groundwater supply well, W-WFC, is located near the center of the property at an elevation of approximately 160 feet above mean sea level (Figure 2). The well is situated approximately 740 feet from the recently installed SMC well. Reportedly, the WFC well was installed by Les Petersen Drilling and Pump, Inc., of Santa Rosa, California, in August 2000. The results of the ENGEO 2006 report indicated that the demand of the proposed Sutter Medical Center was met by the existing agriculture production well.

The 24-hour pumping test data from 2006 was conducted to determine characteristics of the aquifer underlying the project site. Transmissivity (**T**) is a measure of the aquifer's ability to transmit water (i.e. how permeable it is). The transmissivity calculated from the previous pump test was 4,396 gallons per day per foot (gpd/ft). This calculated value is characteristic for the type of materials encountered in the area (typically alluvial materials).

The storage coefficient (**S**), or storativity, is the volume of water released from or taken into storage per unit surface area per unit change of the hydraulic head; it is a measure of the aquifer's ability to release groundwater from storage. During the previous 24-hour pumping test, the observation well located approximately 1,200 feet away, felt no effect from the continual pumping in W-WFC, and as a result, the calculations for storativity were limited.

2.0 GROUNDWATER SUPPLY CONSIDERATIONS

2.1 REGIONAL AND LOCAL GEOLOGY

The SMC Well is located within the Coast Ranges geologic province of California, a series of northwest-trending ridges and valleys. Bedrock in the province has been folded and faulted during regional uplift beginning in the Pliocene period, about 4 million years before present. Locally, the site is mapped as underlain by Holocene- Alluvium as shown on Figure 3 (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). This alluvium consists of unconsolidated deposits of sand, silt, gravel, and clay derived from the bedrock uplands to the east and older unconsolidated deposits. The alluvial deposits in this area are typically greater than 100 feet in thickness. Underlying the Holocene alluvium is the Glen Ellen Formation (Cardwell, 1958). The Glen Ellen Formation was deposited during late Pliocene and early Pleistocene time as alluvial fans shed from the east towards shallow bays or lagoons (Cardwell, 1958). The Glen Ellen Formation typically comprises lenticular beds of poorly sorted gravel, sand, silt and clay. As is characteristic of alluvial fan deposits, individual beds vary widely in thickness, are not horizontally continuous, and typically grade into one another over short distances. Locally underlying and interfingering with the Glen Ellen Formation are the late Pliocene Wilson Grove (Merced) Formation and in some instances the Sonoma Volcanics (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). The marine Wilson Grove Formation generally comprises massive sandstone with thin claystone and siltstone interbeds and occasional gravels lenses (Cardwell, 1958). The Glen Ellen and Wilson Grove formations are the primary water-bearing Formations in the study area.

2.2 LOCAL HYDROGEOLOGY

The well is located within the northern portion of the Santa Rosa Plain groundwater Sub-Basin 1-55.01. The groundwater sub-basin occupies a surface area of approximately 125 square miles and is located beneath an approximately 22-mile-long and 5- to 9-mile-wide northwest-trending fault bound valley which extends from near the town of Cotati in the south to near the town of Healdsburg in the north (DWR, 2004). The Rodgers Creek and Healdsburg faults are located along the east side of the basin and the Tolay and Bloomfield faults are located to the west (Jennings, 1975). The basin is bordered by the Mayacama and Sonoma mountains on the east and the Mendocino Range on the west. According to DWR (2004), most of the groundwater within the Santa Rosa Plain subbasin is at water table conditions with few local exceptions where folding and faulting creates confined conditions.

Geologic units within the area include the Jura-Cretaceous Franciscan Complex, the Pliocene and Miocene Sonoma Volcanics, Petaluma and Wilson Grove Formation (Merced Formation), the Plio-Pleistocene Glen Ellen Formation and Pleistocene - Holocene alluvial fan and fluvial terrace deposits (Figure 3).

The basement rocks within the vicinity of the well are mapped as undifferentiated mélange of the Central Belt of the Franciscan Complex (McLaughlin et al., 2008; Graymer, 2006; Blake, 2002; Wagner and Bortugno, 1982; Cardwell, 1958). In general, these rocks comprise highly sheared, sandstone and argillite with varying sized blocks of various lithologies throughout (McLaughlin et al., 2008). In general, rocks of the Franciscan Complex are well consolidated and not considered water bearing, except in very localized areas where fracture zones are well developed. The subject well does not rely on the Franciscan rocks as a source of groundwater.

The Pliocene and Miocene Petaluma Formation is mapped as unconformably overlying the Franciscan Complex and is interpreted to be underlying a large percentage of the Santa Rosa Plain (McLaughlin et al., 2008). The Petaluma Formation is predominantly composed of sandy to silty gravel, silty sandstone, siltstone, and mudstone that were deposited in fluvial, lacustrine and brackish to estuarine environments (McLaughlin et al., 2008; Cardwell, 1958). In general, water yields are low in this formation, and consequently, this unit does not represent an important water-bearing formation.

The Pliocene and Miocene Sonoma Volcanics comprise a series of bimodal volcanic units that range from basalt flows to rhyolitic tuffs that accumulated over a 30-mile (east-west) by 40-mile (north-south) area. Most recent interpretations based on more extensive age dating indicate that these volcanic units were deposited contemporaneously with the Petaluma, Wilson Grove (Merced) and lower Glen Ellen Formations (McLaughlin, et al., 2008). The water yielding capacity of units of the Sonoma Volcanics vary widely depending on lithology, with higher yields from the tuff units (Cardwell, 1958). The Sonoma Volcanics are not a significant hydrogeologic formation in the vicinity of the subject well.

The Pliocene and late Miocene Wilson Grove Formation (Merced Formation, Cardwell, 1958) comprises marine pebbly sandstone, siltstone and pebbly gravel (McLaughlin et al., 2008). The

Wilson Grove Formation is mapped as underlying a large portion of the Santa Rosa Plain, predominantly along the western half of the Valley (McLaughlin et al. 2008 and Cardwell, 1958). This formation is considered one of the major water-bearing units within the Santa Rosa Plain subbasin, with specific yields that range from 10 to 20 percent (DWR, 2004). According to Cardwell (1958) semi-confined to confined conditions may exist locally where clay lenses are present. Recharge is mainly from the southwestern portion of the basin; however, within the vicinity of the well, much of the recharge likely comes from the overlying Glen Ellen Formation (DWR, 2004). This formation is a source of groundwater, particularly the agricultural wells located west of the recently installed SMC Well.

Overlying the Wilson Grove Formation in the study area is the Plio-Pleistocene Glen Ellen Formation, which represents the primary source of groundwater for the subject well and existing wells in the vicinity of the proposed Sutter Medical Center. The Glen Ellen Formation typically comprises non-marine, lenticular beds of poorly sorted gravel, sandstone, siltstone and mudstone (McLaughlin et al., 2008 and Cardwell, 1958). As characteristic of alluvial fan deposits, individual beds vary widely in thickness, are not horizontally continuous, and typically grade into one another over short distances. The Glen Ellen Formation was deposited during late Pliocence and early Pleistocene time as alluvial fans shed from the east towards shallow bays or lagoons (Cardwell, 1958). Average specific yields range from 3 to 7 percent (DWR, 2004). Because the Glen Ellen Formation crops out in many areas within the Santa Rosa Plain, recharge is thought to occur readily, except where overlain by low permeability soils (DWR, 2004).

Pleistocene and Holocene alluvial fan and fluvial terrace deposits blanket the Santa Rosa Plain. These deposits generally comprise poorly sorted gravel, sand, silt, and clay and have a maximum exposed thickness of 100 feet (Cardwell, 1958). These units typically have specific yields that range between 8 and 17 percent and are tapped by some shallow wells within the vicinity of the subject well

2.3 GROUNDWATER AVAILABILITY

Based on DWR (1982) calculations, the groundwater storage capacity of the entire Santa Rosa Plain Subbasin is approximately 4,313,000 acre-feet. As previously discussed, the well is located within the Larkfield Storage Unit within the larger Santa Rosa Plain Subbasin (DWR, 1975). According to DWR estimates, the Larkfield Storage Unit has a groundwater storage capacity of roughly 600,000 acre-feet (DWR, 1975).

2.4 EXISTING GROUNDWATER SUPPLY WELLS

Groundwater is an important source of water for both domestic and agriculture uses within the Larkfield area. The Cal-American water company (Cal-Am) currently pumps groundwater from four wells in the Larkfield district (Larkfield 1A, 3A, 4A and 5). Cal-Am distributions and private domestic wells are the primary water source of water in the Larkfield area. Cal-Am distributes water pumped from its wells and imported water deliveries it receives from the Sonoma County Water Agency (SCWA).

As part of the ENGEO (October 2009) groundwater study for the proposed medical center, DWR well completion reports were reviewed for well locations and construction and for information on aquifer properties. A summary of these well completion reports is included in the ENGEO groundwater study report.

2.5 GROUNDWATER LEVELS

According to DWR (2004), the groundwater within the Santa Rosa Plain Subbasin as a whole is approximately in balance, with increased groundwater levels in the northeast (in the vicinity of the proposed SMC) and decreased groundwater levels in the south. Cardwell (1958) produced the most comprehensive study of groundwater and hydrogeology in the basin, including a groundwater contour map that covers the study area. Based on Cardwell's (1958) groundwater contour map, groundwater levels within the study area are highest in the west (approximately160 feet above mean sea level) and gradually decrease towards the west to an elevation of around 50 feet near the Laguna de Santa Rosa, generally conforming to the topography across the Santa Rosa Valley.

As part of the ENGEO (2009) groundwater study for the proposed SMC project, a generalized groundwater contour map was developed for the area in the vicinity of the SMC Well based on available spring 2007 groundwater level data from DWR monitoring wells, GEI (2007) spring groundwater contours, and 2009 groundwater levels from the existing Wells Fargo and Sutter Vineyard wells (with reference to regional groundwater contour mapping from Cardwell). The groundwater contour mapping shows the same general groundwater trend across the western portion of the study area that Cardwell depicted in 1958, and relatively low groundwater levels in the Larkfield District portion of the study area. These decreased groundwater levels indicate that a pumping depression has developed in this area since the time of Cardwell's study. Review of available groundwater pumping data suggests that this pumping depression is relatively stable.

Available groundwater level hydrographs from the existing Cal-Am and DWR wells were reviewed as part of the ENGEO (2009) groundwater study. Based on this review, ENGEO (2009) concluded that groundwater levels in the northeastern portion of the Santa Rosa Plain Subbasin are in relative balance, with possibly a slight increase in storage due to decreases in groundwater pumping.

2.6 REGIONAL AND LOCAL GROUNDWATER QUALITY

According to a DWR study (1982), from the many wells tested within the Santa Rosa Plain subbasin, only a few wells contained constituents over the recommended concentrations for drinking water. DWR has concluded that in general, the water quality within the Santa Rosa Plain subbasin is good (DWR, 2004).

More locally, groundwater sampling results from existing wells at the subject site (ENGEO, 2006) indicated that the majority of samples when compared to the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs) were below the DHS MCLs. Appendix C of the ENGEO 2006

Groundwater Aquifer Test and Water Quality Analysis report provides water quality sample results for the two on-site wells from which water samples were collected (W-LBC and W-SV-July 2005 and November 2005).

The initial water quality samples collected in July 2005 were analyzed to evaluate the following water quality parameters: total hardness as $CaCO_3$, total dissolved solids (TDS), total alkalinity as $CaCO_3$, pH; total silica, electrical conductivity, manganese, iron, and arsenic. The samples collected in November 2005 included additional constituents that were not analyzed in the initial samples, including total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, hardness, pH, electrical conductivity, TDS, antimony, arsenic, barium, beryllium, cadmium, total chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc, and silica.

More recent groundwater sampling and analysis was conducted for the recently installed W-SMC and these results are discussed in Section 7.0 of this report.

3.0 BOREHOLE DRILLING

3.1 DRILLING METHODS

Prior to commencement of reverse circulation drilling, 20-inch-diameter steel conductor casing was installed to a depth of approximately 33.5 feet bgs. The borehole for the conductor casing was advanced using a Lo-Drill equipped excavator with a 30-inch-diameter auger. The annulus between the conductor casing and the borehole was backfilled with cement.

Zim Industries from Fresno, California was the well drilling contractor for the project. The borehole for the well was advanced to a depth of approximately 610 feet bgs utilizing a Failing JED-A drill rig equipped for reverse circulation rotary drilling methods. A 16-inch-diameter borehole was advanced using a rotary tri-cone bit and drill collars. Drilling advance was purposely slow and performed with no more than 2,000 to 3,000 lbs. of down pressure to minimize the risk of deviation. The borehole was eventually reamed to 17.5 inches in diameter following geophysical logging and zone testing. Drilling fluid generally consisted of freshwater with a borehole stabilizing dry polymer additive.

3.2 FORMATION SAMPLING AND ANALYSIS

Samples of drill cuttings were collected at a maximum interval of 10 feet and several additional samples were collected from expected producing zones during drilling. Samples were collected from a sediment trap connected to the end of the discharge pipe. Samples were bagged and labeled according to interval depth bgs. A boring log was constructed based on cutting samples, drilling rates, rig chatter and other drilling notes (Appendix A). Samples were selected for laboratory grain-size analysis from specific intervals based on lithology, the geophysical log, water production, and water quality analysis acquired from zone testing. Grain-size analysis results are attached in Appendix B of this report.

The subsurface geology encountered during drilling for the SMC-Well is summarized below:

- Predominantly silty clay, and sandy clay was encountered to a depth of approximately 50 feet below the ground surface (bgs).

- Well-graded sand to silty sand was encountered from a depth of approximately 50 to 75 feet bgs.

- Silty sand with clay to silty clay was encountered from a depth of approximately 75 to 110 feet bgs.

- A sequence of interbedded silty sand and sandy clay with occasional thin gravel beds was encountered from a depth of approximately 110 to 165 feet bgs.

- Sandy clay was encountered from a depth of approximately 165 to 175 feet bgs.

- Interbedded sand and gravel was encountered from a depth of approximately 175 to 205 feet bgs.

- An interbedded sequence of silty sand and clayey sand with occasional thin gravel beds was encountered from approximately 205 to 330 feet bgs.

- Sandy clay with minor interbeds of silty sand was encountered from approximately 330 to 370 feet bgs.

- An interbedded sequence of silty sand clayey sand with minor gravel interbeds was encountered from approximately 370 to 400 feet bgs.

- Below a depth of 400 feet bgs predominantly thin units of clayey sand interbedded with thick clay units were encountered.

4.0 GEOPHYSICAL LOGGING AND ZONE TESTING

4.1 GEOPHYSICAL LOGGING

Following drilling the 16-inch-diameter borehole and circulating to remove excess suspended sediments from the drilling fluid, a geophysical log was conducted by Welenco on August 16, 2009. The geophysical log included the following.

- Gamma Ray
- Spontaneous Potential
- 64-Inch Normal Resistivity
- 16-Inch Normal Resistivity
- Single-Point Resistivity
- Temperature Profile

The resulting geophysical well log is presented on Figure 4.

Gamma Ray logs measure the natural radioactivity in the formations penetrated by the borehole and as a result can be useful in identifying lithologies and lithologic changes. The spontaneous potential log (SP), the 64-Inch Normal Resistivity log, the 16-Inch Normal Resistivity log and the Single-Point resistivity log are very useful in identifying permeable and impermeable zones within a borehole as well as the location of lithologic changes and relative water quality.

4.2 ZONE TESTING

Based on review of the boring log, cutting samples and the geophysical log, three depth intervals were selected for zone testing. Zone testing was conducted using a tool attached to the end of the drill string. The tool consisted of a 22-foot-long section of 5-inch-diameter, perforated, steel pipe. Prior to zone testing, the tool was centered in the desired zone to be tested, a bentonite seal was set at the base of the zone, pea gravel was then backfilled around the tool and a bentonite seal was set at the top of the zone. Zone testing was performed by airlifting with compressed air for initial developments, followed by installation of a submersible pump.

The first zone test was performed in the deeper portion of the borehole centered between the depths of approximately 550 and 590 feet bgs. Minimal water (less than 10 gpm) was produced during this test, and because of the lack of water in this zone, no water samples were collected for water quality analysis.

A second zone test was conducted, centered between the depths of approximately 420 and 460 feet bgs. This zone was producing roughly 20 to 25 gpm towards the end of the test. Water samples were collected for water quality analysis and transported to the lab for testing.

The final zone test was conducted in the intermediate aquifer, centered between the depths of approximately 170 and 210 feet bgs. This zone was producing roughly 130 gpm towards the end of the test. Water samples were collected for water quality analysis and transported to the lab for testing. Water quality analysis results from the zone testing are included in Appendix D of this report.

5.0 WELL DESIGN, INSTALLATION AND DEVELOPMENT

5.1 WELL DESIGN AND INSTALLATION

Design of the SMC well was based on review of the boring log, geophysical log, grain-size analysis, zone testing, and water quality analysis. The boring log and geophysical log indicate a zone of sand and silty sand between a depth of approximately 50 and 75 feet bgs interpreted as the shallow aquifer. Because of potential for poor water quality, it was decided that the well would not be designed to derive water from the shallow aquifer. Below the base of the shallow aquifer, the logs indicate the presence of a clay-rich zone between a depth of 75 and 110 feet bgs. This clay-rich layer is interpreted as a confining layer overlying the intermediate aquifer. Below this clay-rich layer, the logs indicate a sequence of interbedded silty sand with clay and occasional gravel beds to a depth of about 330 feet bgs, interpreted as the intermediate aquifer. Within the intermediate aquifer, the logs indicate a pervasive layer of water-producing sand and gravel between a depth of 175 and 205 feet bgs. Below the base of the intermediate aquifer, the logs indicate the presence of interbedded sandy clay and silty sand to a depth of approximately 370 feet bgs, interpreted as a confining layer overlying the deeper aquifer. Below this confining layer, the logs indicate an interbedded sequence of silty sand and clayey sand with occasional thin gravel interbeds and more pervasive thick clay layers below a depth of 500 feet bgs.

Based on the above interpretation, the well was designed and constructed with the following screen and blank intervals, filter pack and seals (Figure 4).

- Solid stainless steel casing to a depth of approximately 170 feet bgs with an approximately 100-foot sand-cement grout seal from the ground surface.
- Stainless steel wire wrap 0.045-inch well screen between 170 and 310 feet bgs.
- Solid stainless steel casing between 310 and 360 feet bgs.
- Stainless steel wire wrap 0.045-inch well screen between 360 and 395 feet bgs.
- Solid stainless steel casing between 395 and 430 feet bgs.
- Stainless steel wire wrap 0.045-inch well screen between 430 and 490 feet bgs.
- Solid stainless steel casing to a depth of 510 feet bgs.
- A bentonite seal was placed from approximately 515 to 525 feet bgs.
- SRI 5:1 PF#12 filter pack was placed from approximately 105 to 515 feet bgs with intervening bentonite seals between approximately 398 and 403 feet bgs and between roughly 330 and 340 feet bgs.

The stainless steel casing and screen joints were welded by a two-man crew of certified professional welders. The well string was hung to a depth of approximately 510 feet bgs. Seals and granular filter pack were placed in the annulus via a tremie pipe connected to a gravel pump. Depth of filter pack and seals were monitored and recorded using a weighted wire-line depth sounder.

5.2 WELL HYDRAULIC DEVELOPMENT

Initial well development was performed by the drilling crew following well construction. Well development is performed to maximize well yields through various processes that both repair damage to the formation caused by drilling and change the physical characteristics of the aquifer near the borehole to increase the hydraulic conductivity in the zone immediately adjacent to the well. The initial development included airlifting and swabbing. More extensive well development was conducted by the pump crew with the use of a submersible pump. A 250 gallon per minute (gpm), 50 horsepower, electric, 14-stage submersible pump was installed at a depth of approximately 320 feet in the well. The pump was connected to a 6-inch-diameter discharge pipe equipped with an electric flow meter. On September 29, 2009, the well was developed over a period of around 12 hours by surging three times and then operating the pump at 10-minute intervals at a rate of around 320-330 gpm. During development, data on sand content was collected using a Rossum Sand Tester. Sand content results decreased throughout the development process and varied from around 10 ppm to less than 1 ppm towards the end of development.

6.0 WELL PRODUCTION AND AQUIFER TESTING

6.1 BACKGROUND WATER LEVELS AND MONITORING WELLS

The water level of the SMC Well was recorded following installation and over a period of several weeks leading up to the pump test. The water level averaged a depth of 58 feet below top of casing (btc), which roughly correlates to an elevation of 100 feet above mean sea level (msl). The top of casing is approximately 16 inches above ground surface.

The water levels within the two primary monitoring wells, Wells Fargo Center Well (W-WFC) and the Vintners Inn Well (W-VI), were recorded with vented vibrating wire piezometers installed in the two wells for several weeks leading up to the pump test. The W-WFC is located approximately 740 feet east northeast of the W-SMC and the W-VI is located approximately 800 feet west of the W-SMC. Based on the DWR well completion report, it is our understanding that the W-WFC was constructed with three screened intervals, installed at 100 to 160 feet below the ground surface (bgs), 180 to 320 feet bgs, and 360 to 400 feet bgs. The pump within the W-WFC is set at a depth of approximately 325 feet bgs. Measurements indicate that the non-pumping water level in the W-WFC was approximately 40 feet below the ground surface in June 2009 and the water level gradually decreased through the summer months to around 50 feet below the ground surface in September 2009. This water level decrease is indicative of the seasonal water level variations expected as a result of increased pumping and lack of recharge to the aquifer during the late spring and summer. It should be noted that non-pumping water levels within the W-WFC declined from around 50 feet bgs to around 58 feet bgs over a period of eight days prior to the start of the constant rate pump test. The decline in water level in this well appears to be related to an eight-day period of intensive pumping of this well for irrigation purposes. Prior to starting the SMC well pump test, the W-WFC well had recovered to approximately 55.5 feet bgs over a 30-hour period after the pump in the well was shut off.

Based on the DWR well completion report, the W-VI well was constructed with three screened intervals, installed at 80 to 280 feet below the ground surface (bgs), 320 to 400 feet bgs, and 480 to 700 feet bgs. During the month of September 2009, the non-pumping water level in W-VI averaged a depth of approximately 56 feet bgs, which roughly correlates to an elevation of approximately 98 feet above mean sea level. It should be noted that our piezometer data from the W-VI appears to indicate that during a period of eight days prior to the pump test W-VI was in operation such that a non-pumping water level was not attained due to intensive pumping for vineyard irrigation. Prior to starting the pump test on October 9, 2009, at 10:10 AM this well had recovered to approximately 62 feet bgs over a 24-hour period after the pump in the well was shut off.

Two secondary monitoring wells were observed during the constant rate pump test. These two wells included the Sutter Vineyard Well (W-SV) located approximately 1890 feet east of W-SMC and the Cargile residence well (W-C) located approximately 1480 feet northeast of the W-SMC. Detailed information about the construction of these two wells is unknown. Based on discussion with the Cargile residence owner, it is our understanding that the W-C is about 160 feet deep. Prior to the start of the pump test on October 9, 2009, the water level in W-C was measured at approximately 18.75 feet. Prior to the start of the pump test, the water level was measured in the W-SV at approximately 48.10 feet below the top of the casing.

6.2 CONSTANT RATE SMC WELL PUMPING TEST

A 72-hour pump test was initiated on the morning of October 9, 2009, at 10:10AM. Prior to the initiation of the pump test, groundwater levels were initially measured at pumping well W-SMC and the four monitoring wells. The pumping concluded on October 12, 2009, at 10:10AM. A flow rate meter and volume discharge meter was attached to the pump. The flow rate was maintained at ±155 gallons/minute. The flow rate was regularly verified by evaluating the measured totalizer data readings. The actual average pumping rate throughout the test, after evaluating the total gallons pumped during the 72 hours, was roughly 153 gpm. The water levels in the Pumping Well W-SMC were recorded with an electrical conducting water level meter, which were measured to the nearest hundredth of a foot.

Once the pump test commenced, the depth to groundwater was recorded at the W-SMC as follows: every minute for the first 15 minutes; every 5 minutes from 15 to 60 minutes; every 10 minutes from 30 to 100 minutes; every 30 minutes from 100 to 300 minutes; every 60 minutes from 300 to 4320 minutes. After 72 hours of continuous pumping, a recovery test began immediately following the shut down of the pump. The depth was recorded during recovery in the same intervals as during the pumping test to approximately 95% recovery and then at roughly 8-hour intervals. The field-recorded measurements of the drawdown and recovery, as well as observations and notes, are attached as Appendix C.

During the pump test, water levels within the two primary monitoring wells (W-WFC and W-VI) were recorded with vented vibrating wire piezometers equipped with mini-loggers at 1 minute intervals. After 72 hours of continuous of pumping, recovery data was recorded at 1 minute intervals in the two primary monitoring wells.

Water levels in the two secondary wells monitored during the pump test (W-SV and W-C) were recorded with an electrical conducting water level meter and were to the nearest hundredth of a foot. During the pump test water, level measurements were recorded at roughly 10-minute intervals for the first 120 minutes; roughly every 30 minutes from 120 to 300 minutes; roughly every 60 minutes from 300 to 1440 minutes and roughly every 480 minutes from 1440 to

4320 minutes. After 72 hours of continuous of pumping, recovery data was recorded at generally the same intervals as during the pump test.

The W-C exhibited less than a tenth of an inch of drawdown during the 72-hour pump test, and it is not possible to determine whether this minor water level change is related to pumping of the W-SMC or some other more nearby wells. The W-SV exhibited around 0.5 foot of water level rise during the 72-hour pump test. This appears to indicate that the aquifer in the vicinity of this well was in a state of recovery during the pump test and that pumping of the W-SMC exhibited little to no influence on the water level in this well.

ENGEO measured sand content with a Rossum Sand Tester at the beginning and end of the 72-hour pumping test. The results of the sand test yielded very few grains of sand, and the total amount of sand recovered was below the initial reading line of 1 part per million (ppm). The observations and notes from the sand test are included in Appendix C as part of the test data.

6.3 AQUIFER ANALYSIS

Using the pumping test records, we analyzed the aquifer characteristics, specifically, the transmissivity (**T**) and the storage coefficient (**S**). We have assumed in our analysis, based on data and information collected during drilling and installation of the W-SMC, the aquifer is partially confined to confined and the thickness of the aquifers that the W-SMC is designed to withdrawal water from extends from about 100 to 510 feet bgs to the bottom of the well for a total thickness of roughly 410 feet. The drawdown data obtained from the aquifer test was used to analyze the aquifer using the Cooper-Jacob methods to determine the transmissivity. A brief explanation of the different methods is included in Appendix C.

Transmissivity (**T**) is the hydraulic conductivity of the full thickness of the aquifer; it is a measure of the aquifer's ability to transmit water (i.e. how permeable it is). The values of transmissivity obtained from the Cooper-Jacob drawdown method was 5,049 gallons per day per foot (gpd/ft).

The storage coefficient (**S**), or storativity, is the volume of water released from or taken into storage per unit surface area per unit change of the hydraulic head; it is a measure of the aquifer's ability to release groundwater from storage. Three of our observation wells (W-WFC, W-VI and W-SV) exhibited an effect from the continual pumping in W-SMC; however, because of an apparent local aquifer-wide recovery and other bias in the data, we were not able to obtain a reliable storativity value from the pump test data.

The following table presents the results of our analysis:

TABLE 1 – AQUIFER CHARACTERISTICS

METHOD OF ANALYSIS	TRANSMISSIVITY T gpd/ft	STORAGE COEFFICIENT S
Cooper-Jacob Drawdown Method (W-SMC)	5,049	NA

Based on the empirical equation Q/s = T/2000; where Q = 153 gpm, s = drawdown, and T = transmissivity, we find that the theoretical specific capacity for a 100% efficient well is around 2.5 gpm/ft. Based on a review of the pump test drawdown data, the actual 1-day specific capacity of the W-SMC is approximately 2 gpm/ft, indicating that the true well efficiency is approximately 80%.

Using the calculated value of transmissivity from the W-SMC of 5,049 gpd/ft and a reasonable range of storativity values for confined to partially confined aquifers, we estimated a range of theoretical radii of influence (see Table 2 below). The Radius of influence of a well is the horizontal distance from the center of the well to the limit of the cone of depression that develops in relation to pumping the well; in other words, it is the horizontal distance at which drawdown related to the well is theoretically zero. The range of storativity values cited below appears reasonable for the aquifer in the area. Kleinfelder (2009) used a storativity value of.0004 for drawdown calculation associated with the Faught Road test well, which is located in the same aquifer as the W-SMC. In addition, drawdown in the W-WFC monitoring well, although not able to be used to calculate a precise storativity value, appears to support a value within the middle of this range (an S value of approximately .0005) when the theoretical drawdown is calculated and compared with the observed drawdown using the transmissivity value obtained from the W-SMC.

TABLE 2 – ESTIMATED THEORETICAL RADIUS OF INFLUENCE BASED ON A RANGE OF STORATIVITY VALUES FOR THE AQUIFER

STORATIVITY S	THEORETICAL RADIUS OF INFLUENCE (feet) (Based on W-SMC pumping rate of 80 gpm for 18 hours) T = 5,049 gpd/ft
.001	1,066
.0008	1,192
.0006	1,376
.0005	1,507
.0004	1,685
.0002	2,388

7.0 WATER QUALITY SAMPLING AND ANALYSIS

Near the end of the October 2009 pump test, water quality samples collected were analyzed to evaluate the following water quality parameters: total alkalinity, bicarbonate as $CaCO_3$, carbonate as $CaCO_3$, hydroxide as $CaCO_3$, antimony, arsenic, aluminum, barium, beryllium, calcium, cadmium, chromium, fluoride, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, nitrate, nitrite, selenium, sodium, thallium, boron, zinc, volatile hydrocarbons, perchlorate, total hardness, pH, asbestos, organics and gross alpha (Appendix D). Water quality analysis results indicate that the samples, when compared to the California Department of Health Services (DHS) Drinking Water Standards and Secondary Standard Maximum Contaminant Levels (MCLs), were below the DHS MCLs, with the exception of Manganese. Manganese was reported at 870 ug/L. Arsenic reported at 9.5 ug/L was 0.5 ug/L below the MCL. Three days after the completion of the pump test, two water samples were recovered to confirm the arsenic and manganese concentrations (Appendix D). These analyses reported arsenic at 7.0 ug/L and 4.3 ug/L and Manganese at 810 ug/L and 850 ug/L, which in general is consistent with the initial results.

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FIGURES

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Figure 2 Site Plan

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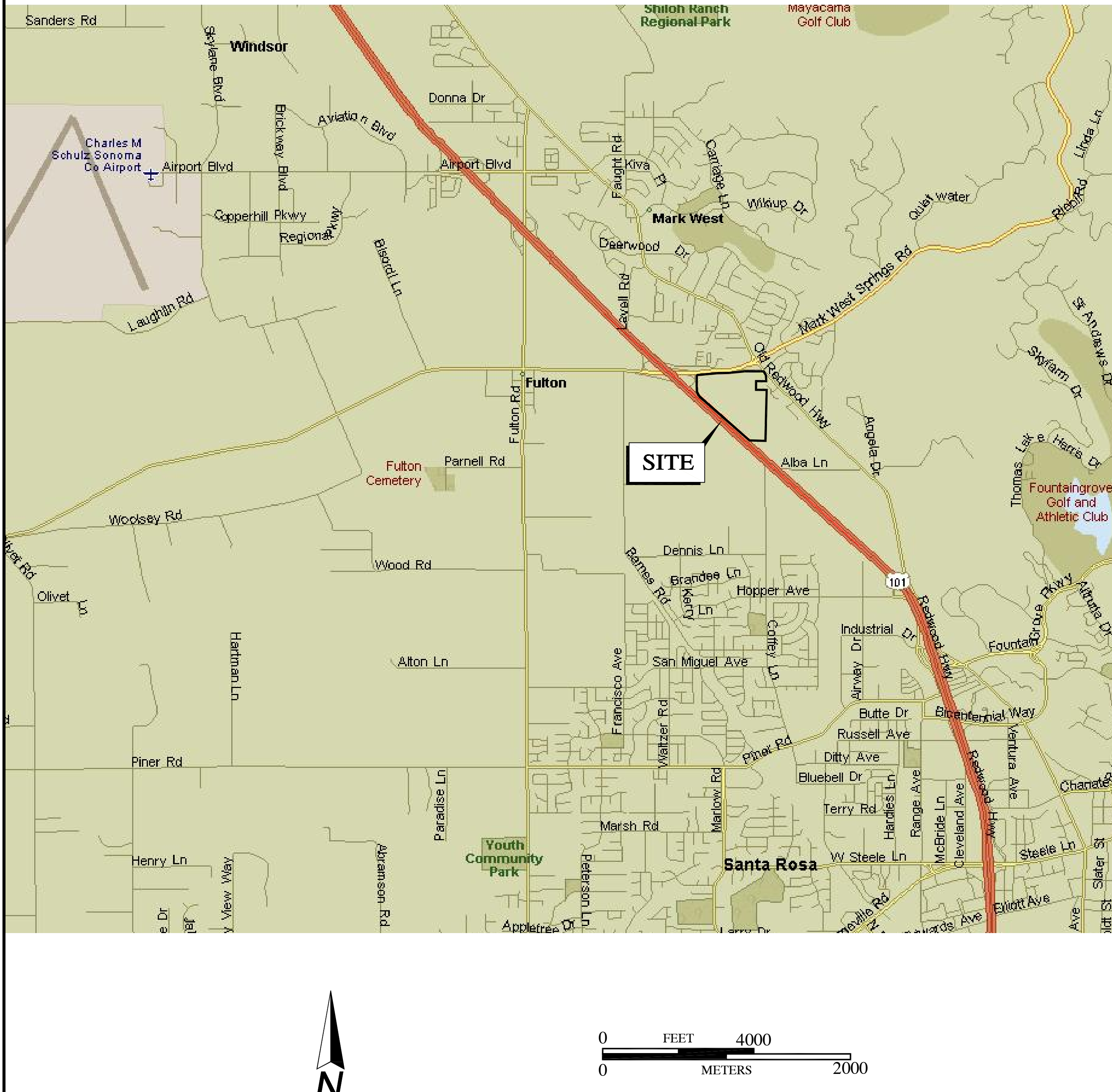
Figure 4 Sutter Medical Center Well



BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO — Expect Excellence	VICINITY MAP WELL INSTALLATION AND TESTING SUTTER MEDICAL CENTER WELL SONOMA COUNTY, CALIFORNIA	PROJECT NO.: 6486.200.503		FIGURE NO. 1
		DATE: NOVEMBER 2009		
		DRAWN BY: DLB	CHECKED BY: SM	

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ORIGINAL FIGURE PRINTED IN COLOR

EXPLANATION

SMC WELL	APPROXIMATE LOCATION OF SUTTER MEDICAL CENTER WELL
W-WFC	APPROXIMATE LOCATION OF WELLS FARGO CENTER WELL
W-SV	APPROXIMATE LOCATION OF SUTTER VINEYARD WELL
W-VI	APPROXIMATE LOCATION OF VINTNERS INN WELL
W-C	APPROXIMATE LOCATION OF CARGILE WELL

N

0 FEET 500
0 METERS 250

BASE MAP SOURCE: NAIP SONOMA COUNTY AERIAL MOSAIC, 2009

ENGEO
Expect Excellence

SITE PLAN
WELL INSTALLATION AND TESTING
SUTTER MEDICAL CENTER WELL
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.503		FIGURE NO. 2
DATE: NOVEMBER 2009		
DRAWN BY: PC	CHECKED BY: SM	

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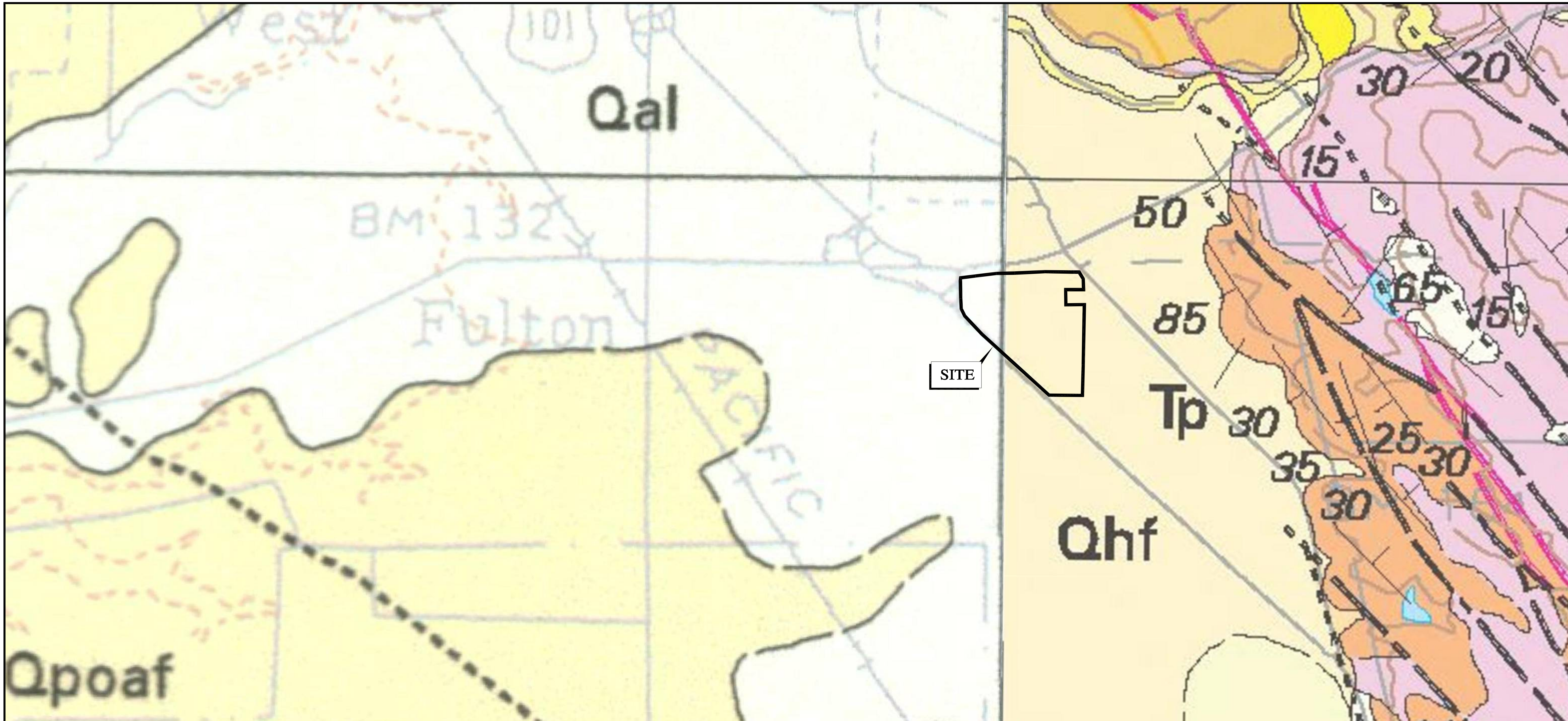
ORIGINAL FIGURE PRINTED IN COLOR



BASE MAP SOURCE: GRAYMER, 1999–2001 ◄ ► BASE MAP SOURCE: GRAYMER, 2007

EXPLANATION

GRAYMER GEOLOGY, 1999–2001		GRAYMER GEOLOGY, 2007	
Qal	ALLUVIAL FAN AND FLUVIAL DEPOSITS	Qhf	ALLUVIAL FAN DEPOSITS
Qpoaf	OLDER ALLUVIAL FAN DEPOSITS	Qhb	BASIN DEPOSITS
Twg	WILSON GROVE FORMATION	QThg	HUICHICA AND GLEN ELLEN FORMATION
Tp	PETALUMA FORMATION	Tsa	ANDESITE TO BASALT LAVA FLOWS
KJfs	GRAYWACKE AND MELANGE	Tp	PETALUMA FORMATION
		Kfm	METAGRAYWACKE

N

0 FEET 3000
0 METERS 1500

ENGEO
Expect Excellence

GEOLOGIC MAP
WELL INSTALLATION AND TESTING
SUTTER MEDICAL CENTER
SONOMA COUNTY, CALIFORNIA

PROJECT NO.: 6486.200.503
DATE: NOVEMBER 2009
DRAWN BY: DLB CHECKED BY: SM
FIGURE NO. 3

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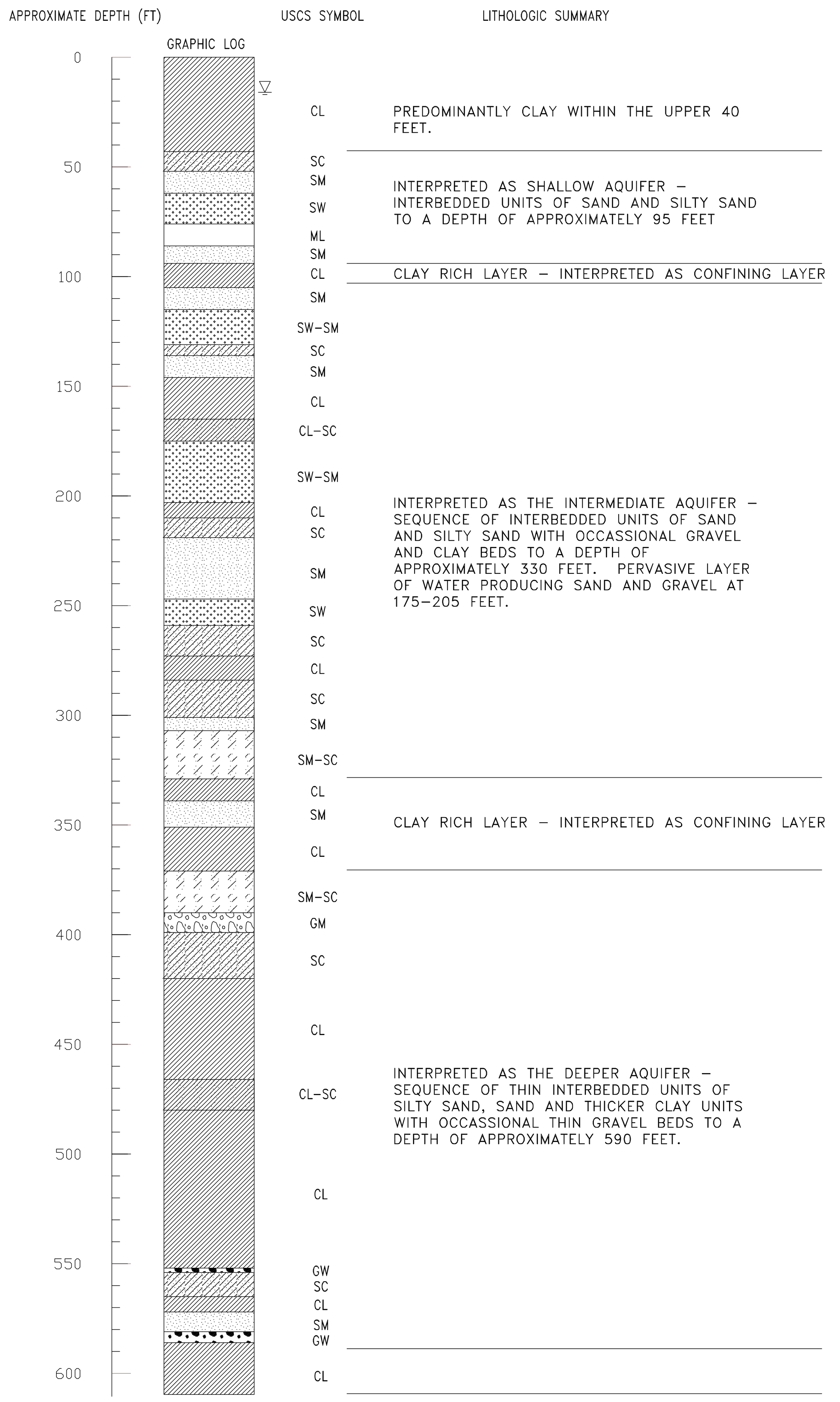
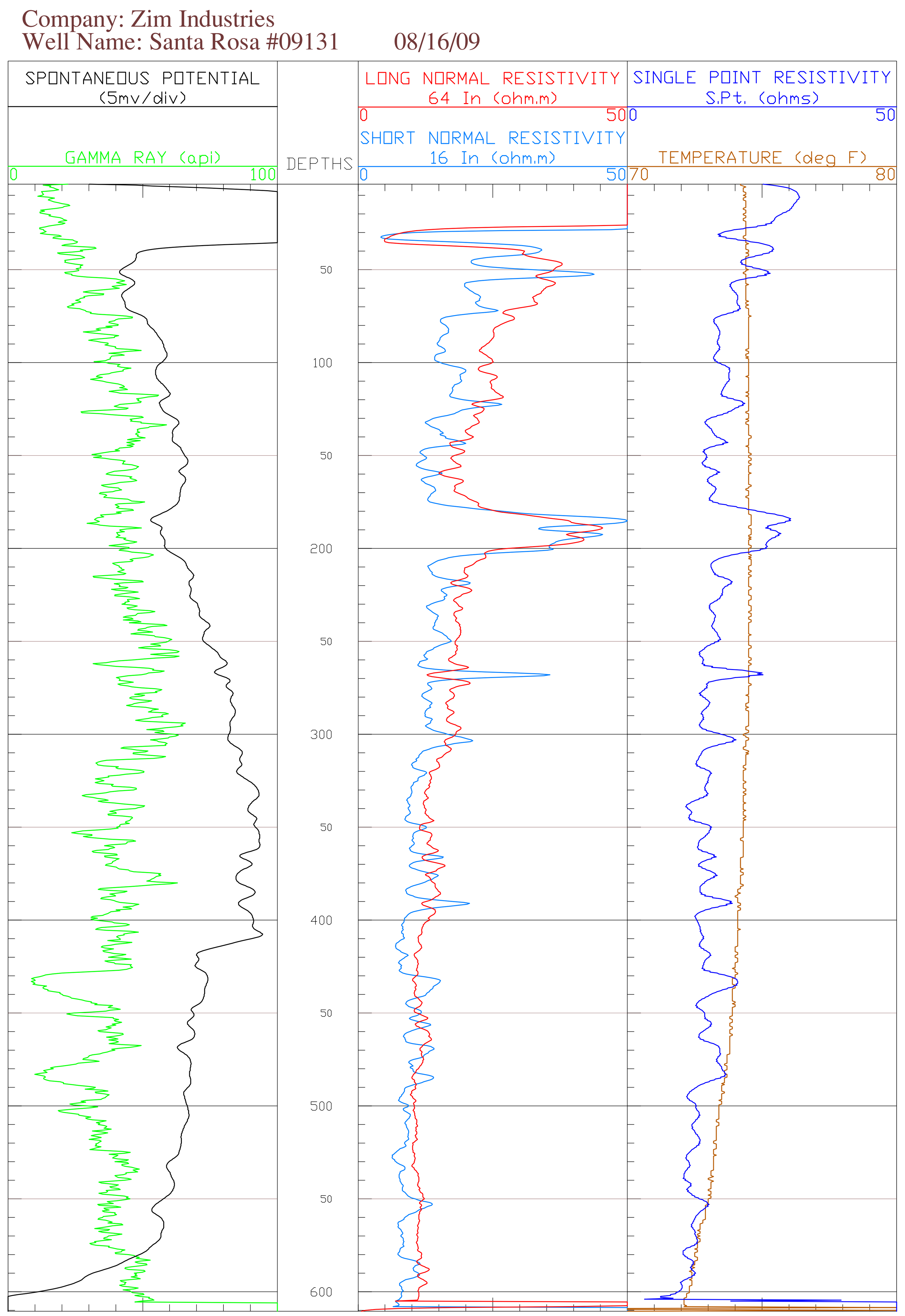
ORIGINAL FIGURE PRINTED IN COLOR

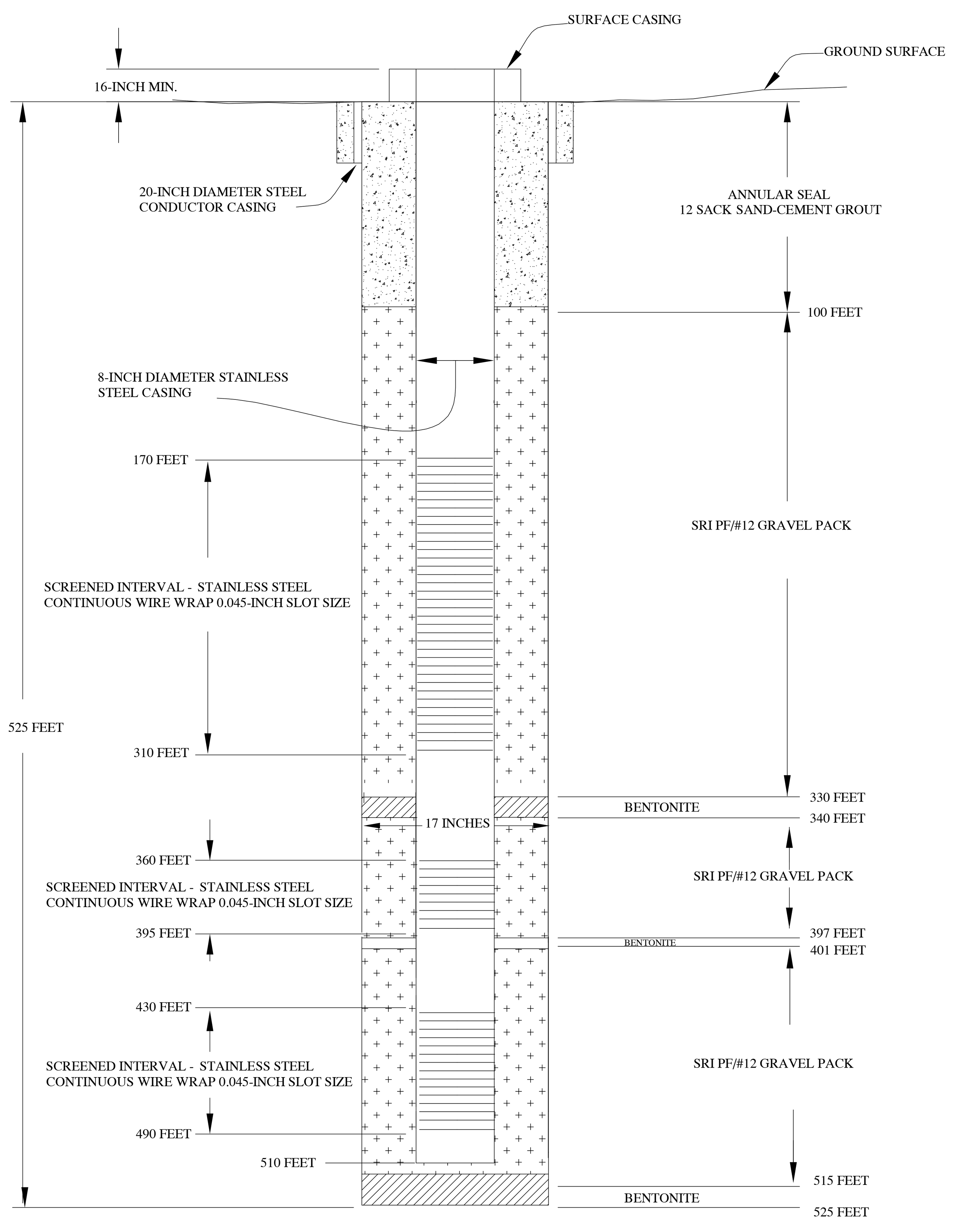
LITHOLOGIC INTERPRETATION BASED ON DRILL CUTTINGS AND GEOPYSICAL LOG



GEOPHYSICAL LOG - CONDUCTED BY WELENCO



SCHEMATIC WELL CONSTRUCTION DETAIL



ENGEO Expect Excellence	SUTTER MEDICAL CENTER WELL WELL INSTALLATION AND TESTING SANTA ROSA, CALIFORNIA	PROJECT NO.: 6486.200.503 DATE: NOVEMBER 2009 DRAWN BY: SRP CHECKED BY: SM	FIGURE NO. 4

APPENDIX A

Boring Log

APPENDIX A

LOG OF BORING W-1

ENGEO INCORPORATED

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009
HOLE DEPTH: Approx. 609¼ ft.
HOLE DIAMETER:
SURF ELEV (msl): Approx. 158 ft.
LOGGED / REVIEWED BY: B. Ramsdell / TPB
DRILLING CONTRACTOR:
DRILLING METHOD: Reverse Circulation
HAMMER TYPE: N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	1, 2			Start 8/6/09 SILTY CLAY (CL), dark brown, stiff, moist, trace sand.			Started with LoDrill equipped Kobelco excavator, 30 inch auger.
10	3, 4, 5, 6		∇	SANDY CLAY (CL), brown, stiff, moist, trace fine gravel.			No caving. groundwater encountered at 16 feet, measured at 12 feet after drilling.
20	7, 8			SILTY CLAY (CL), brown, soft, wet, some sand, trace gravel.			Stiff drilling down to 33 feet.
30	9			SANDY CLAY (CL), brown, stiff, wet, trace gravel.			
	10			SILTY CLAY (CL), brown, some fine sand, trace fine gravel.			
40	11, 12, 13			Stop at 33.5 feet, continue on 8/13/09 with reverse circulation.	5 6 6 5 5 4 4 4 4 4		Installed 20 inch conductor casing, start reverse circulation, 16 inch milltooth bit.
50	14, 15			CLAYEY SAND (SC), brown, some fine gravel, trace coarse angular gravel, fine to coarse grained sand. Increase in gravel.	18 16 8 9 9 9 8		Bag Sample #1 collected, 35-45 feet.
60	16, 17, 18			SILTY SAND (SM), brown, some clay, trace fine and coarse gravel, fine to medium grained sand.	7 7 4 4 3 4 4 4 4 4		Bag Sample #2 collected, 45-55 feet.
	19			SAND (SW), brown, with silt, trace clay, trace fine gravel, occasional cobble, medium grained sand.	4 7 5		

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED:	8/6/2009	LOGGED / REVIEWED BY:	B. Ramsdell / TPB
HOLE DEPTH:	Approx. 609¼ ft.	DRILLING CONTRACTOR:	
HOLE DIAMETER:		DRILLING METHOD:	Reverse Circulation
SURF ELEV (msl):	Approx. 158 ft.	HAMMER TYPE:	N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
70	20, 21, 22, 23			SAND (SW), brown, with silt, trace clay, trace fine gravel, occasional cobble, medium grained sand.	7, 7, 9, 9, 10, 5, 5, 3, 6, 3, 4		Bag Sample #3 collected, 55-65 feet. Night shift begins. Rig chatter from 73 to 74 feet. Bag Sample #4 collected, 65-75 feet.
80	24, 25, 26			SANDY SILT (ML), dark gray, with clay, trace gravel, sand is fine grained.	2, 2, 3, 2, 2, 2, 2, 4, 5, 5		
90	27, 28			SILTY SAND (SM), dark gray, with clay, trace gravel, fine grained sand.	5, 5, 3, 6, 4, 3, 6, 4		Bag Sample #5 collected, 75-85 feet. Rig chatter from 86 to 89 feet.
100	29, 30, 31, 32			SILTY CLAY (CL), brown, with sand, trace gravel and fine grained sand.	4, 5, 4, 5, 7, 9, 8, 5, 5, 4, 4		Bag Sample #6 collected, 85-95 feet.
110	33, 34, 35			SILTY SAND (SM), brown, trace to some clay, fine grained sand.	4, 2, 2, 2, 3, 2, 2, 1, 1, 1		Rig chatter from 104 to 105 feet. Bag Sample #7 collected, 95-105 feet.
120, 130	36, 37, 38, 39			SAND (SW-SM), brown, with silt and gravel, medium grained sand, gravel up to 2.5 inches. Increasing gravel content.	1, 2, 2, 2, 2, 1, 1, 2, 2, 3, 2, 2, 2, 1, 1		Bag Sample #8 collected, 105-115 feet. Rig chatter at 122 feet. Bag Sample #9 collected, 115-125 feet.

LOG - GEOTECHNICAL - CUTTINGS ONLY 6486200503 GINT LOG.GPJ ENGEO INC.GDT 8/28/09

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009
HOLE DEPTH: Approx. 609¼ ft.
HOLE DIAMETER:
SURF ELEV (msl): Approx. 158 ft.

LOGGED / REVIEWED BY: B. Ramsdell / TPB
DRILLING CONTRACTOR:
DRILLING METHOD: Reverse Circulation
HAMMER TYPE: N/A

Column headings: Depth in Feet | Depth in Meters | Log Symbol | Water Level | DESCRIPTION | DRILL RATE (S/FT) | FLUID PRESSURE (PSI) | DRILLING NOTES

Depth in Feet: 140, 150, 160, 170, 180, 190

Depth in Meters: 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59

DESCRIPTION

CLAYEY SAND (SC), brown, fine grained sand.

SILTY SAND (SM), dark grayish brown, with gravel, fine to coarse grained sand.

SANDY CLAY (CL), dark gray, trace gravel, fine to medium grained sand.

SILTY CLAY (CL), dark grayish brown, with fine grained sand.

SANDY CLAY to CLAYEY SAND (CL-SC), dark grayish brown, fine grained sand.

SAND (SW-SM), with gravel and silt, grayish brown, medium to coarse grained sand, gravel is fine to coarse up to 2 inches.

Increasing gravel content.

DRILL RATE (S/FT)

1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 1, 1, 2, 2, 4, 4, 3, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 2, 3, 4, 2, 2, 1, 1, 2, 2, 1, 1, 2, 2, 2, 2, 2, 2, 1, 4, 11, 10, 10, 10, 4, 3, 3, 2, 2, 3

DRILLING NOTES

Rig chatter from 131 to 132 feet.

Bag Sample #10 collected, 125-135 feet.

Rig chatter from 141 to 142 feet.

Rig chatter from 144 to 146 feet.
Bag Sample #11 collected, 135-145 feet.

Bag Sample #12 collected, 145-155 feet.

Bag Sample #13 collected, 155-165 feet.

Bag Sample #14 collected, 165-175 feet.

Some water loss, added Poly Bore to drilling fluid.

Bag Sample #15 collected, 175-185 feet.

LOG OF BORING W-1

ENGEO INCORPORATED

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED:	8/6/2009	LOGGED / REVIEWED BY:	B. Ramsdell / TPB
HOLE DEPTH:	Approx. 609¼ ft.	DRILLING CONTRACTOR:	
HOLE DIAMETER:		DRILLING METHOD:	Reverse Circulation
SURF ELEV (msl):	Approx. 158 ft.	HAMMER TYPE:	N/A

Depth in Feet: 200, 210, 220, 230, 240, 250, 260
Depth in Meters: 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
				SAND (SW-SM), with gravel and silt, grayish brown, medium to coarse grained sand, gravel is fine to coarse up to 2 inches. Decreasing gravel content.			Bag Sample #14 collected, 165-175 feet. Bag Sample #16 collected, 185-195 feet.
				SANDY CLAY (CL), grayish brown, medium to coarse grained sand, well graded.			Bag Sample #17 collected, 195-205 feet.
				CLAYEY SAND (SC), grayish brown, trace gravel, fine to coarse grained sand.			Rig chatter at 212 feet. Bag Sample #18 collected, 205-215 feet.
				SILTY SAND (SM), grayish brown, trace fine and coarse gravel, fine to medium grained sand. Trace gravel 1 to 2 inches. Trace clay.			Rig chatter at 220 feet. Bag Sample #19 collected, 215-225 feet. Day shift begins. Bag Sample #20 collected, 225-235 feet. Minor rig chatter at 238 feet. Bag Sample #21 collected, 235-245 feet.
				SAND (SW), gray, with silt, trace fine gravel, trace clay, very fine grained sand.			Bag Sample #22 collected, 245-255 feet.

DRILL RATE (S/FT), top to bottom: 2 2 2 2 1 1 1 1 1 2 2 1 1 2 1 2 1 2 2 2 2 2 2 2 2 3 3 4 1 1 1 1 1 1 1 1 2 2 1 1 1 2 2 1 1 1 2 1 2 2 2 1 1 1 1 1 1 1 1 2 1 1 1 2 2

LOG OF BORING W-1

ENGEO INCORPORATED

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009	LOGGED / REVIEWED BY: B. Ramsdell / TPB
HOLE DEPTH: Approx. 609¼ ft.	DRILLING CONTRACTOR:
HOLE DIAMETER:	DRILLING METHOD: Reverse Circulation
SURF ELEV (msl): Approx. 158 ft.	HAMMER TYPE: N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	80, 81, 82, 83			CLAYEY SAND (SC), gray, some fine gravel, trace coarse gravel, medium grained sand.			Bag Sample #23 collected, 255-265 feet. Minor rig chatter at 266 feet.
270	84, 85, 86			SANDY SILTY CLAY (CL), grayish brown, trace fine and coarse gravel, fine to coarse grained sand, angular to subangular gravel.			Bag Sample #24 collected, 265-275 feet.
280	87, 88, 89			CLAYEY SAND (SC), brown, some fine and coarse gravel, fine to coarse grained sand.			Bag Sample #25 collected, 275-285 feet.
290	90, 91			Becomes grayish brown, trace fine gravel, occasional coarse gravel.			Bag Sample #26 collected, 285-295 feet.
300	92, 93			SILTY SAND (SM), gray, with fine gravel, fine to coarse grained sand.			Harder drilling and rig chatter at 301 feet. Bag Sample #27 collected, 295-305 feet.
310, 320	94, 95, 96, 97, 98, 99			SILTY SAND to CLAYEY SAND (SM-SC), gray, trace fine gravel, fine to coarse grained sand.			Added water. Bag Sample #28 collected, 305-315 feet.

DRILL RATE (S/FT), top to bottom: 1, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 1, 2, 1, 1, 1, 2, 2, 4, 3, 1, 1, 2, 2, 1, 2, 1, 1, 2, 2, 2, 3, 2, 2, 3, 3, 3, 3, 1, 1, 2

LOG OF BORING W-1

ENGEO INCORPORATED

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009
HOLE DEPTH: Approx. 609¼ ft.
HOLE DIAMETER:
SURF ELEV (msl): Approx. 158 ft.
LOGGED / REVIEWED BY: B. Ramsdell / TPB
DRILLING CONTRACTOR:
DRILLING METHOD: Reverse Circulation
HAMMER TYPE: N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	100			SILTY SAND to CLAYEY SAND (SM-SC), gray, trace fine gravel, fine to coarse grained sand. Trace coarse gravel and clay, coarse grained sand.	1 1 2 2 2 2		Bag Sample #29 collected, 315-325 feet.
330	101, 102, 103			SANDY CLAY (CL), gray, some silt, trace fine gravel, fine to medium grained sand.	1 2 2 2 2 2 2 2 2 2		Added water. Bag Sample #30 collected, 325-335 feet.
340	104, 105, 106			SILTY SAND (SM), gray, some clay, trace fine gravel, fine to coarse grained sand.	2 2 2 2 2 2 2 2 2 2 2 2		Bag Sample #31 collected, 335-345 feet.
350, 360	107, 108, 109, 110, 111, 112, 113			SANDY CLAY (CL), brown to grayish brown, trace fine gravel, fine to coarse grained sand. Becomes gray.	2 2 3 3 3 4 3 4 3 3 3 4 2 2 1 2 2 3 2 2		Bag Sample #32 collected, 345-355 feet. Added water. Bag Sample #33 collected, 355-365 feet.
370, 380, 390	114, 115, 116, 117, 118			SILTY SAND to CLAYEY SAND (SM-SC), gray, trace fine gravel, occasional coarse gravel, fine to coarse grained sand. Trace to some fine gravel.	3 4 3 4 4 3 4 3 3 4 2 2 2 2 2 2 2 2 2		Added water and 2 gallons of Poly Bore. Bag Sample #34 collected, 365-375 feet. Bag Sample #35 collected, 375-385 feet.

LOG - GEOTECHNICAL - CUTTINGS ONLY 6486200503 GINT LOG.GPJ ENGEO INC.GDT 8/28/09

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009
HOLE DEPTH: Approx. 609¼ ft.
HOLE DIAMETER:
SURF ELEV (msl): Approx. 158 ft.
LOGGED / REVIEWED BY: B. Ramsdell / TPB
DRILLING CONTRACTOR:
DRILLING METHOD: Reverse Circulation
HAMMER TYPE: N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	120, 121			SANDY GRAVEL (GM), gray, some clay and silt, fine to coarse angular gravel, fine to coarse sand.	2 2 3 2 2 2 2 3 2		Minor rig chatter at 390 feet. Bag Sample #36 collected, 385-395 feet.
400, 410	122, 123, 124, 125, 126, 127			CLAYEY SAND (SC), gray, some gravel, fine to coarse grained sand.	2 3 2 2 3 2 2 2 3 2 2 2 4 4 3 3 2 3 3 3 3		Bag Sample #37 collected, 395-405 feet. Bag Sample #38 collected, 405-415 feet.
420	128, 129, 130			SANDY CLAY (CL), dark gray, trace gravel, fine to medium grained sand.	3 1 1 1 1 2 2 1 1 2		Night shift begins. Bag Sample #39 collected, 415-425 feet.
430, 440	131, 132, 133, 134, 135			SILTY CLAY (CL), gray, trace fine sand. Becomes dark gray. Increasing sand content.	2 2 3 4 3 2 3 3 3 2 1 1 2 2 2 2		Bag Sample #40 collected, 425-435 feet.
450	136, 137, 138			SILTY CLAY (CL), gray, with fine to medium grained sand.	2 2 2 2 2 2 2 2 2		Bag Sample #41 collected, 435-445 feet.

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED: 8/6/2009
HOLE DEPTH: Approx. 609¼ ft.
HOLE DIAMETER:
SURF ELEV (msl): Approx. 158 ft.
LOGGED / REVIEWED BY: B. Ramsdell / TPB
DRILLING CONTRACTOR:
DRILLING METHOD: Reverse Circulation
HAMMER TYPE: N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES

DESCRIPTION

SILTY CLAY (CL), gray, with fine to medium grained sand.

Increasing gravel content.

Some fine and coarse gravel.

CLAYEY SAND to SANDY CLAY (SC-CL), grayish brown, some fine to coarse gravel, medium grained sand.

SILTY CLAY (CL), dark grayish brown, trace fine grained sand.

SILTY CLAY (CL), brown, some sand, some fine to coarse gravel, claystone fragments.

Decreasing sand content.

DRILL RATE (S/FT)

2 2 2 2 1 1 1 2 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 1 2 2 3 2 1 2 2 2 2 3 2 2 2 1 1 1 1 1 2 3 1 3 2 2 2 4 5 3 2 2 2 2 2 2 1 1 1 1 1 3

DRILLING NOTES

Bag Sample #42 collected, 445-455 feet.

Bag Sample #43 collected, 455-465 feet.

Bag Sample #44 collected, 465-475 feet.

Bag Sample #45 collected, 475-485 feet.

Minor rig chatter at 494 feet.
Bag Sample #46 collected, 485-495 feet.

Bag Sample #47 collected, 495-505 feet.
Minor rig chatter from 506 to 507 feet.

Bag Sample #48 collected, 505-515 feet.

Depth in Feet: 460, 470, 480, 490, 500, 510, 520

Depth in Meters: 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED:	8/6/2009	LOGGED / REVIEWED BY:	B. Ramsdell / TPB
HOLE DEPTH:	Approx. 609¼ ft.	DRILLING CONTRACTOR:	
HOLE DIAMETER:		DRILLING METHOD:	Reverse Circulation
SURF ELEV (msl):	Approx. 158 ft.	HAMMER TYPE:	N/A

Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	159			SILTY CLAY (CL), brown, some sand, some fine to coarse gravel, claystone fragments.	3 2 2 2 2 2 2		
	160			Trace sand and gravel.	3 4		Bag Sample #49 collected, 515-525 feet.
	161				2 2		
530	162				1 1 1		
	163			Trace fine sand.	2 1 1		Bag Sample #50 collected, 525-535 feet.
	164				2 2 2		
540	165				2 2 2		
	166				2 2 2		Bag Sample #51 collected, 535-545 feet.
	167				2 2 1		
550	168				1 1 1		
	169			SANDY GRAVEL (GW), grayish brown, with clay, medium to coarse grained sand.	1 1 1		Rig chatter at 552 feet.
				CLAYEY SAND (SC), grayish brown, fine to coarse grained sand.			Bag Sample #52 collected, 545-555 feet.
	170				1 1 1		
560	171				1 1 2		
	172				4 4 5		
	173			SANDY CLAY (CL), grayish brown, with silt, trace sand and gravel, fine grained sand.	3 3 3		Bag Sample #53 collected, 555-565 feet.
570	174				2 1 1		
	175			SILTY SAND (SM), grayish brown, some fine gravel, trace coarse gravel.	2 2 2		
	176				2 2 2		Bag Sample #54 collected, 565-575 feet.
580	177				3 3 3 3		
	178			GRAVEL (GW), graysh brown, with sand, some clay, fine to medium grained sand.	2 2 3 3		MInor rig chatter at 581 feet. Rig chatter from 583 to 586 feet.

ENGEO INCORPORATED

LOG OF BORING W-1

Well Installation
Sutter Medical Center
Santa Rosa, California
6486.200.503

DATE DRILLED:	8/6/2009	LOGGED / REVIEWED BY:	B. Ramsdell / TPB
HOLE DEPTH:	Approx. 609¼ ft.	DRILLING CONTRACTOR:	
HOLE DIAMETER:		DRILLING METHOD:	Reverse Circulation
SURF ELEV (msl):	Approx. 158 ft.	HAMMER TYPE:	N/A

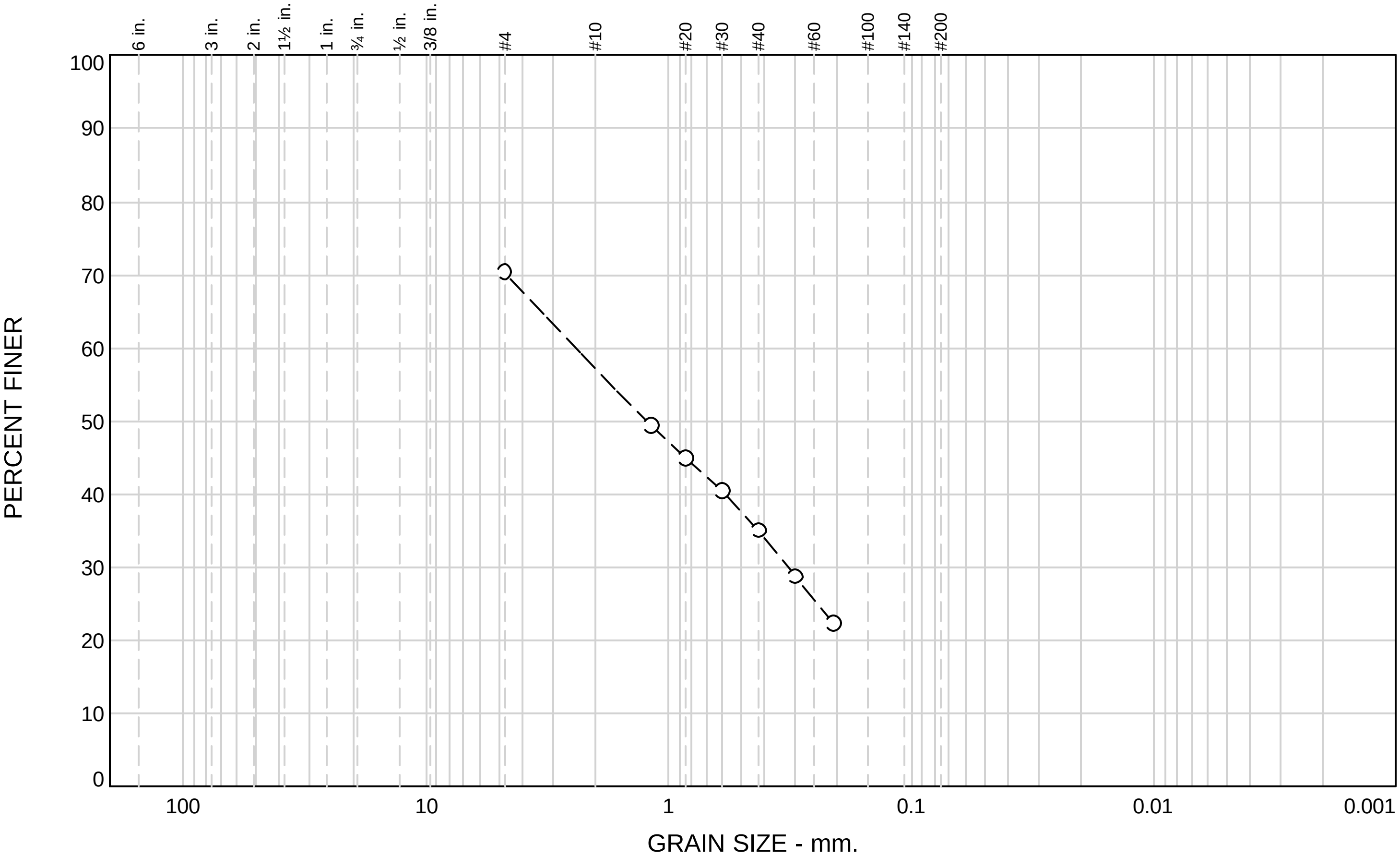
Depth in Feet	Depth in Meters	Log Symbol	Water Level	DESCRIPTION	DRILL RATE (S/FT)	FLUID PRESSURE (PSI)	DRILLING NOTES
	179			SILTY CLAY (CL), gray, some medium to coarse grained sand, claystone fragments.	2 2 3 3 4 3 2 2 2 2 2 2 2 2		Bag Sample #55 collected, 575-585 feet.
590	180						
	181						Bag Sample #56 collected, 585-595 feet. Rig chatter at 596 feet.
	182						
600	183			SANDY CLAY (CL), grayish brown, trace fine gravel.	1 1 1 1 2 2 2 1 1 1 1		
	184						
	185						Bag Sample #57 collected, 595-605 feet.
				Bottom of boring at 609.37 feet, groundwater encountered during drilling at 16 feet. Static groundwater level measured at 12 feet.			

APPENDIX B

Laboratory Testing
Grain Size Analysis

APPENDIX B

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			13.4	22.0		35.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	70.5		
#16	49.4		
#20	44.9		
#30	40.6		
#40	35.1		
#50	28.9		
#70	22.5		

* (no specification provided)

Soil Description

Very dark grayish brown well-graded SAND with silt and gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 2.4194 D_{50}= 1.2333
D_{30}= 0.3196 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SW-SM AASHTO=

Remarks

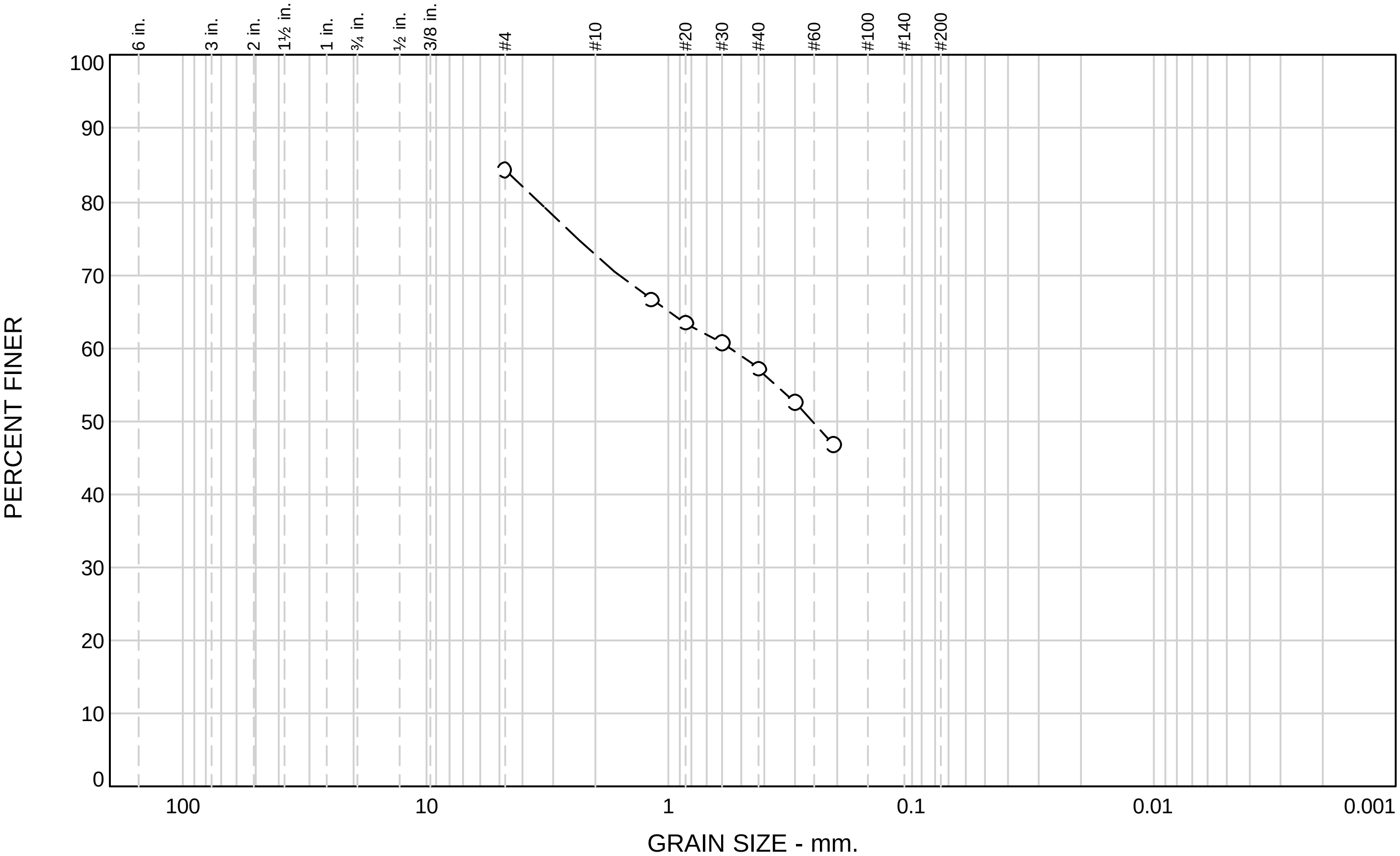
90.0% retained on #200 sieve

Sample No.: 115 to 125 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			11.6	15.6		57.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	84.4		
#16	66.6		
#20	63.5		
#30	60.6		
#40	57.2		
#50	52.6		
#70	46.8		

* (no specification provided)

Soil Description

Very dark grayish brown silty SAND with gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.5583 D_{50}= 0.2542
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

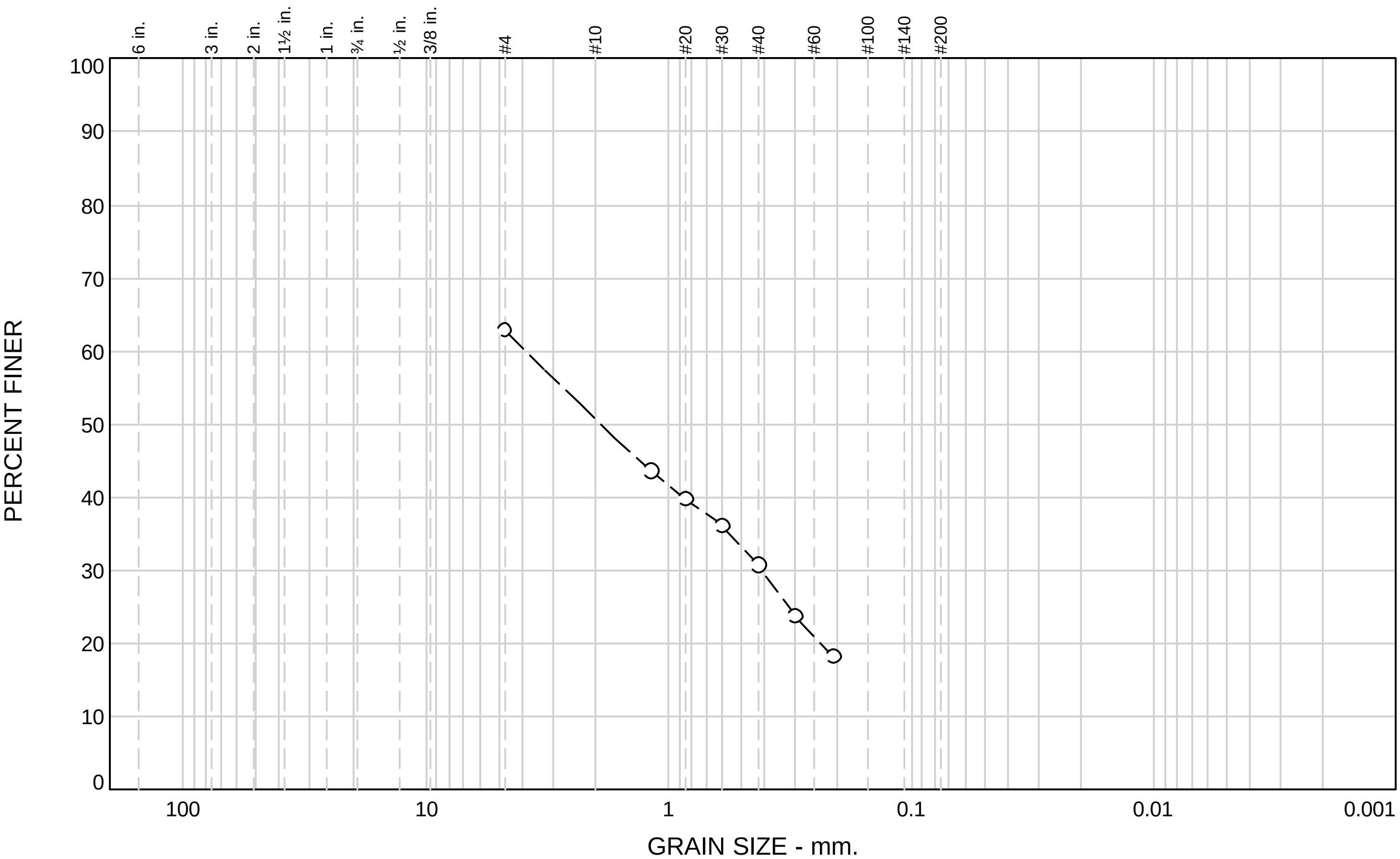
71.3% retained on #200 sieve

Sample No.: 135 to 145 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			12.3	19.9		30.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	63.0		
#16	43.7		
#20	39.8		
#30	36.2		
#40	30.8		
#50	23.9		
#70	18.3		

* (no specification provided)

Soil Description

Very dark grayish brown silty well-graded SAND with gravel. (pumice fragments)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 3.8715 D_{50}= 1.9063
D_{30}= 0.4084 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SW-SM AASHTO=

Remarks

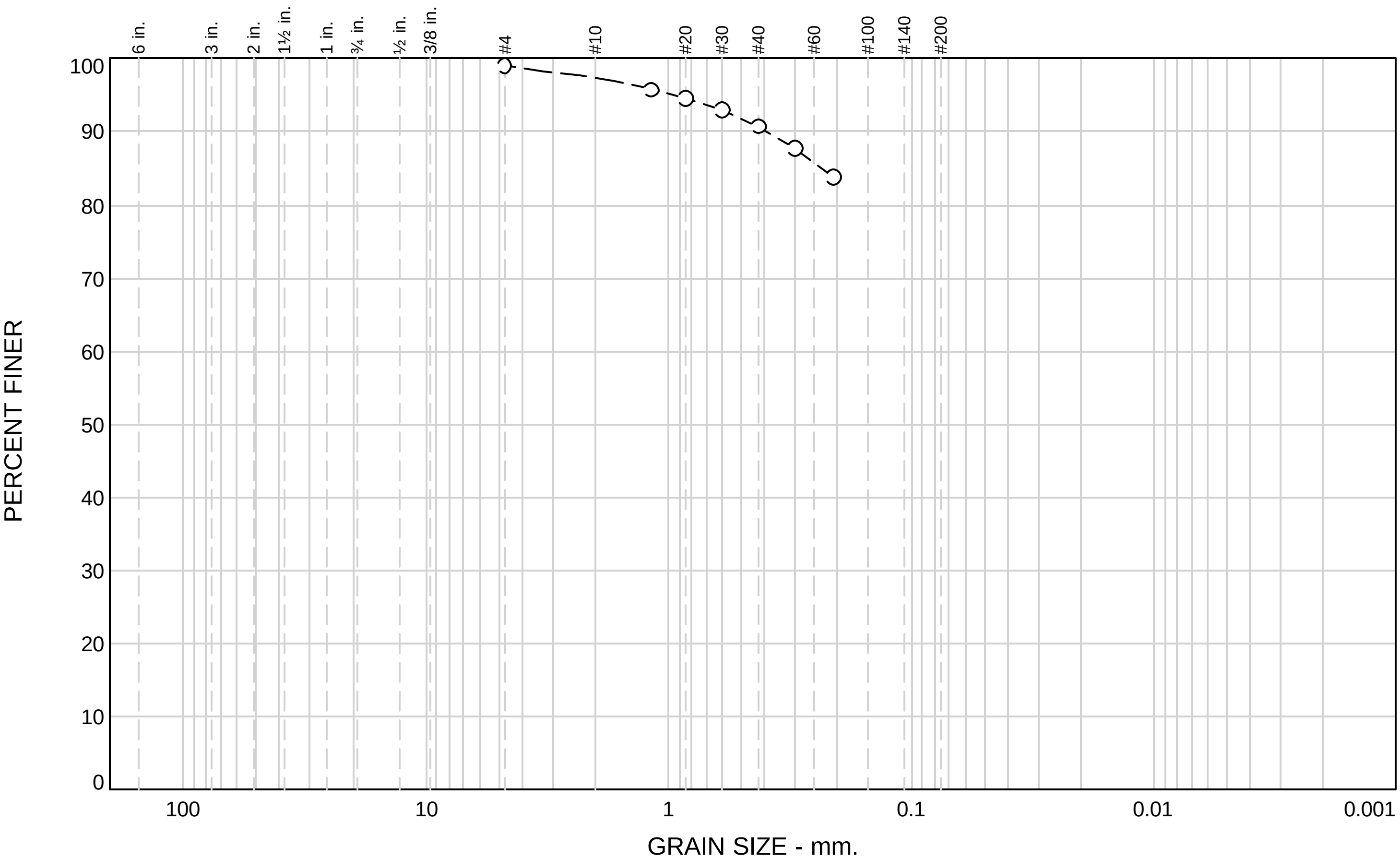
88.9 % retained on #200 sieve

Sample No.: 175 to 185 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			1.6	6.5		90.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	98.9		
#16	95.8		
#20	94.5		
#30	92.9		
#40	90.8		
#50	87.8		
#70	83.9		

* (no specification provided)

Soil Description

Very dark grayish brown sandy CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.2317 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

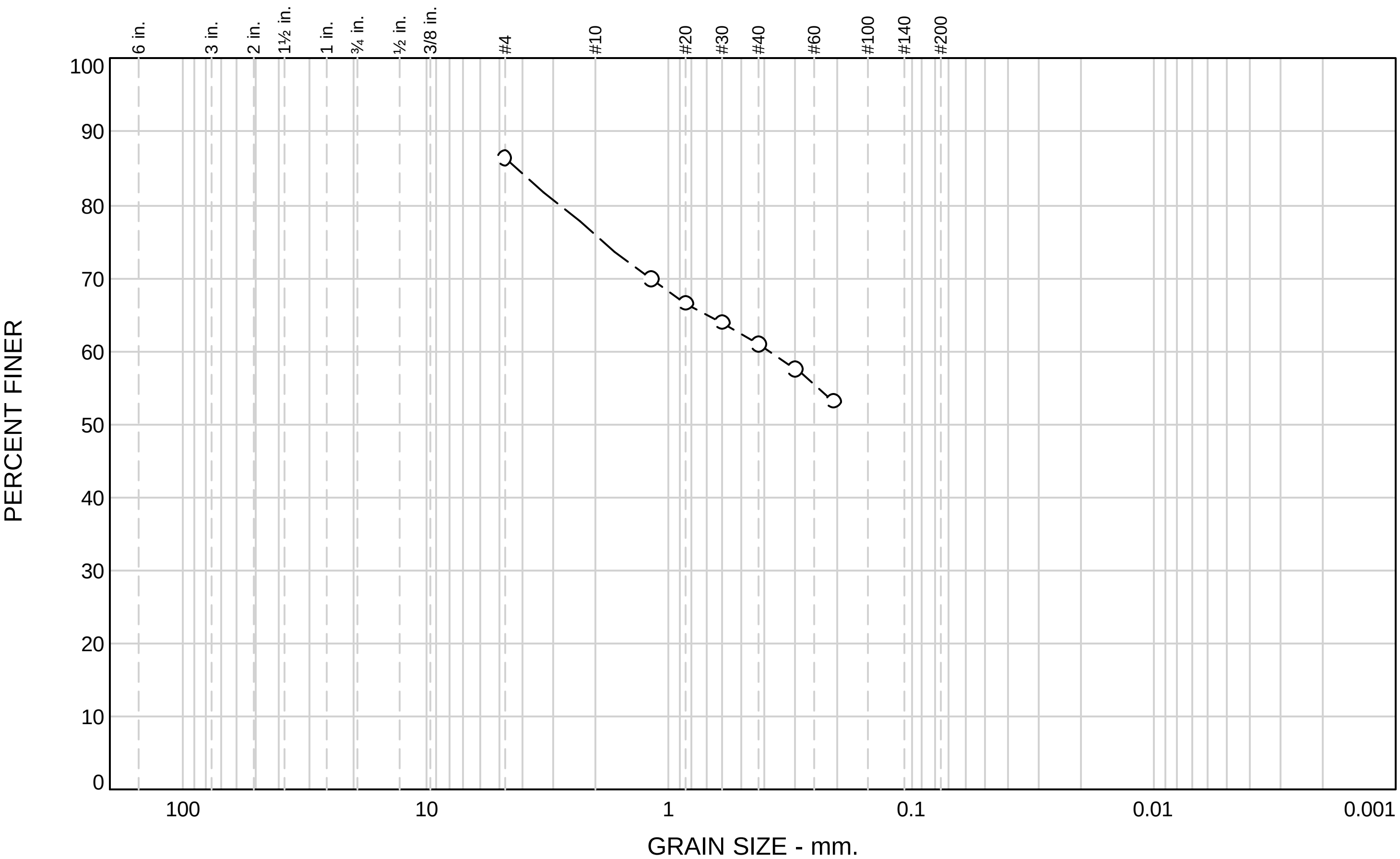
37.0% retained on #200 sieve

Sample No.: 205 to 215 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			10.6	14.8		61.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	86.4		
#16	69.9		
#20	66.6		
#30	64.0		
#40	61.0		
#50	57.6		
#70	53.2		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

$D_{85}=$ 4.2330 $D_{60}=$ 0.3801 $D_{50}=$
$D_{30}=$ $D_{15}=$ $D_{10}=$
$C_u=$ $C_c=$

Classification

USCS= SC AASHTO=

Remarks

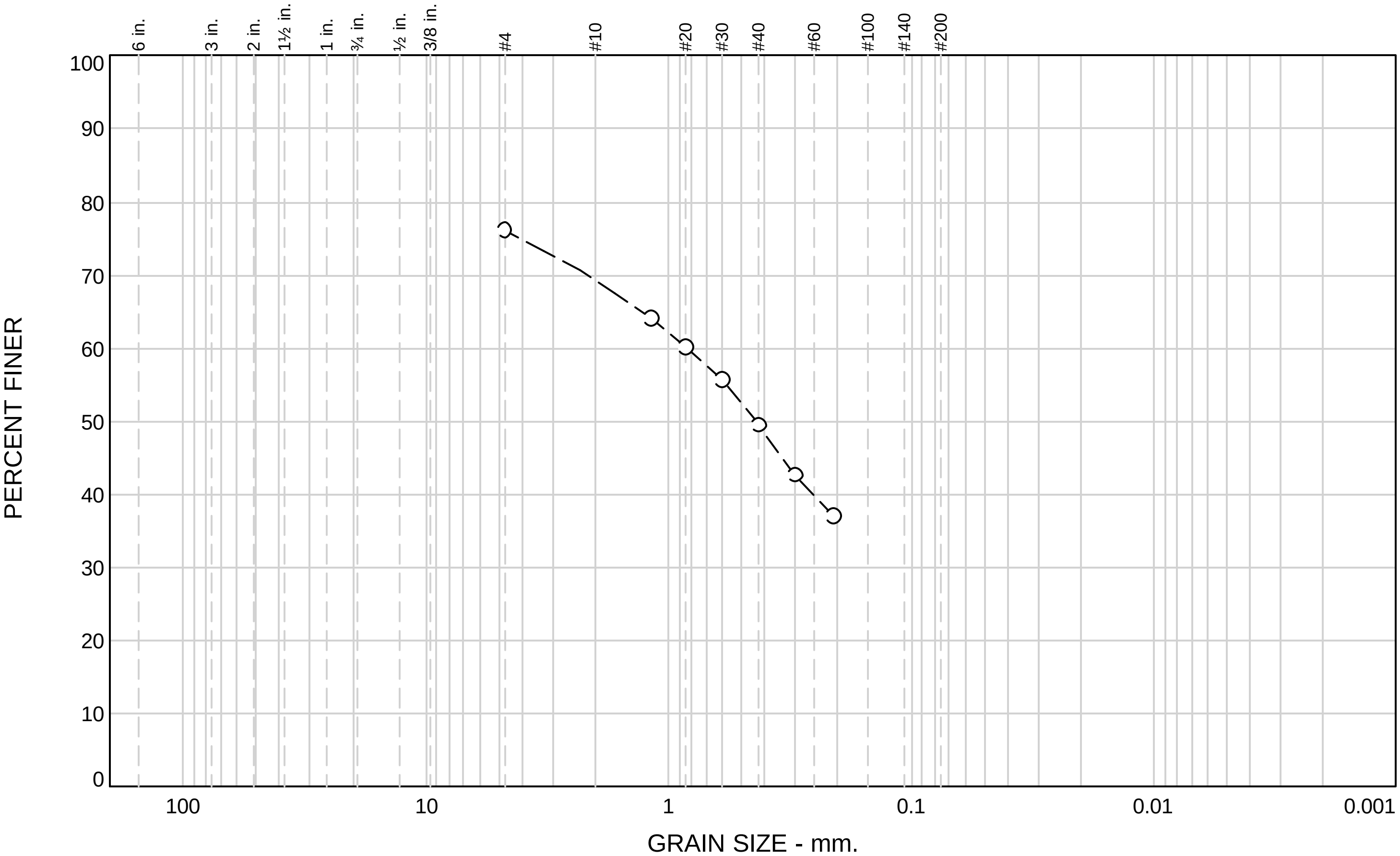
65.3% retained on #200 sieve

Sample No.: 215 to 225 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			6.8	19.8	49.6		

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	76.2		
#16	64.1		
#20	60.2		
#30	55.7		
#40	49.6		
#50	42.7		
#70	37.1		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND with gravel and clay pockets.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.8331 D_{50}= 0.4338
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

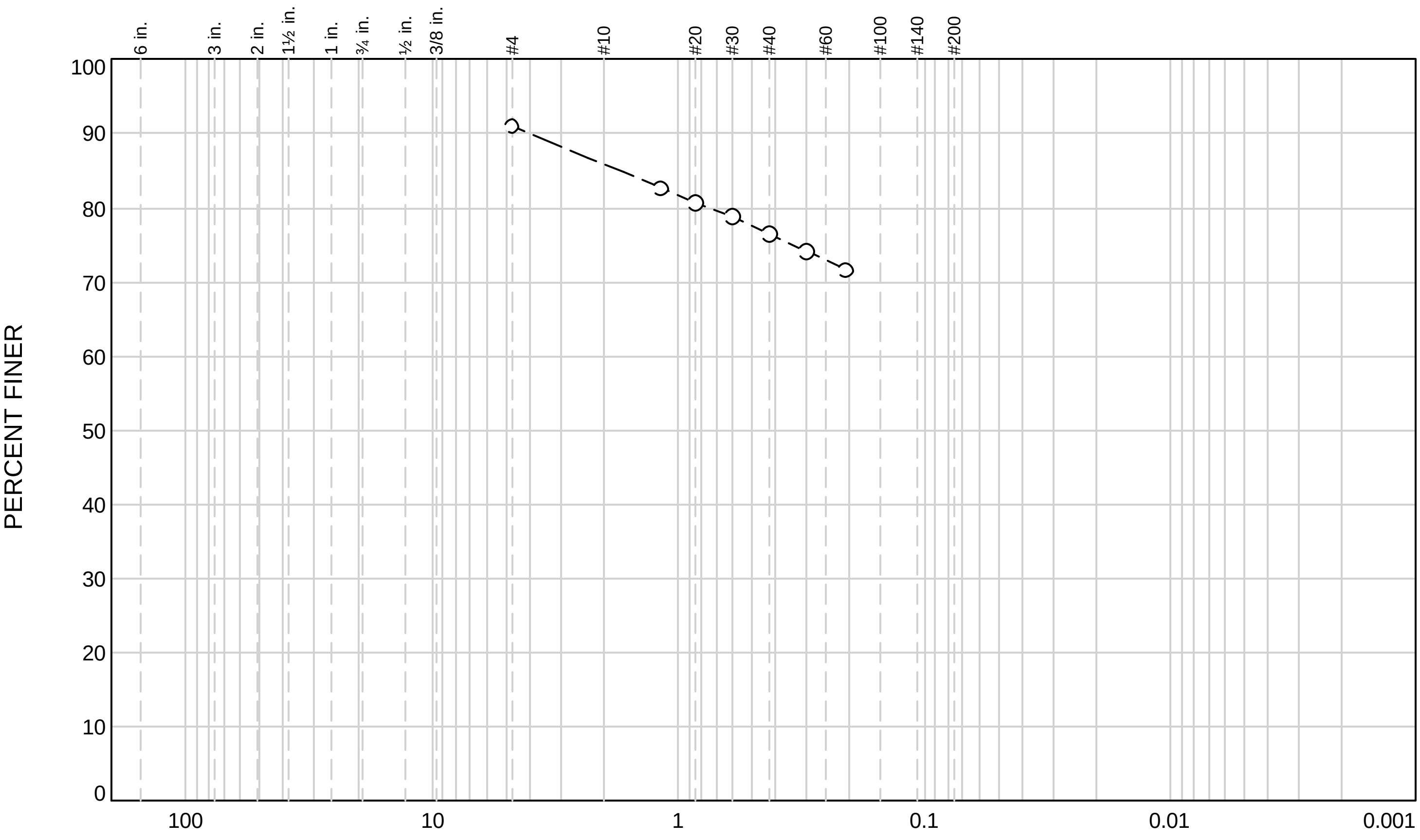
74.1% retained on #200 sieve

Sample No.: 265 to 275 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			5.1	9.5		76.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	91.0		
#16	82.7		
#20	80.7		
#30	78.8		
#40	76.4		
#50	74.1		
#70	71.6		

* (no specification provided)

Soil Description

Dark grayish brown sandy silty CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.7283 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

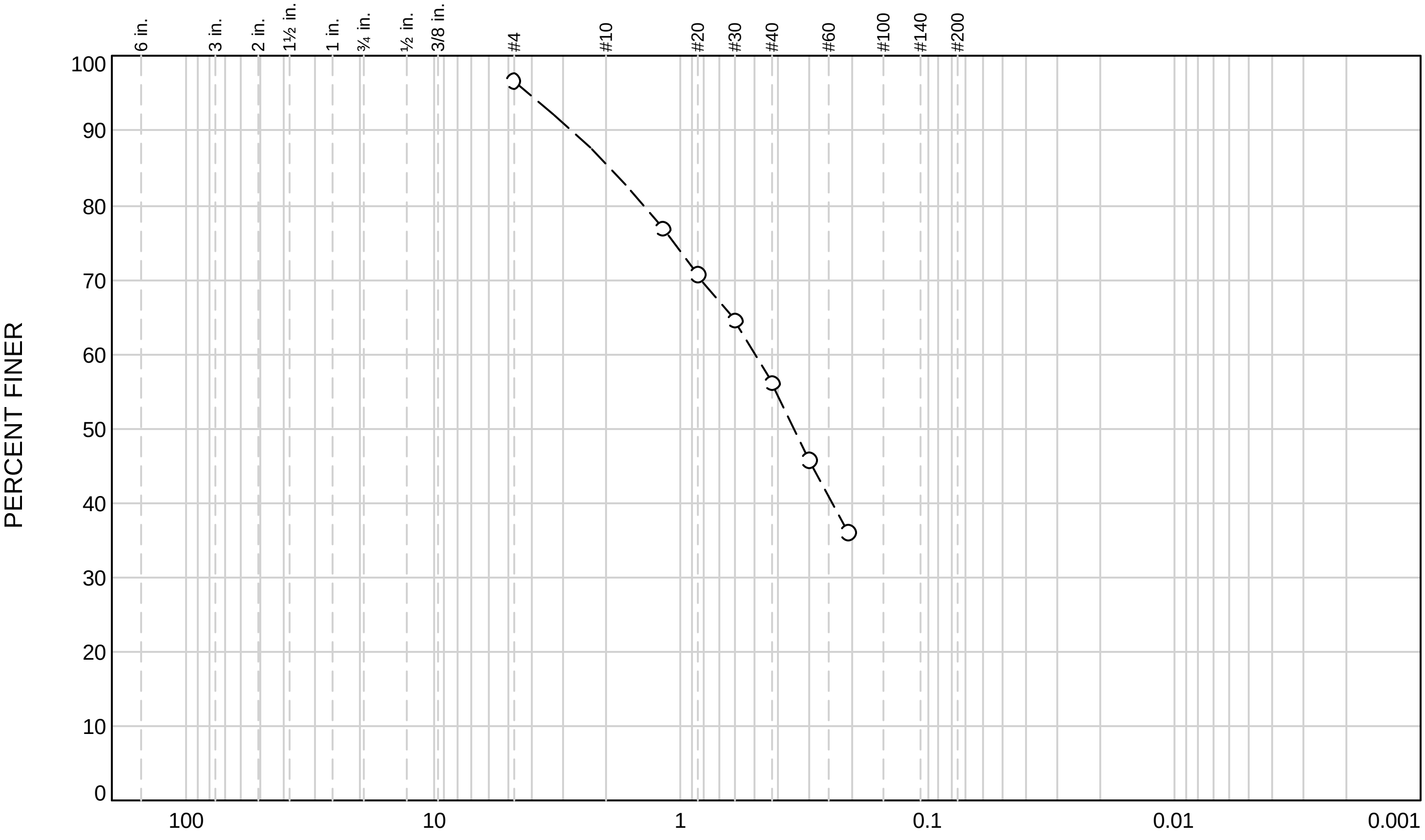
38.5% retained on #200 sieve

Sample No.: 275 to 285 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			11.1	29.4		56.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	96.7		
#16	76.9		
#20	70.6		
#30	64.6		
#40	56.2		
#50	45.7		
#70	36.1		

* (no specification provided)

Soil Description

Very dark grayish brown silty SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.9165 D_{60}= 0.4902 D_{50}= 0.3461
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

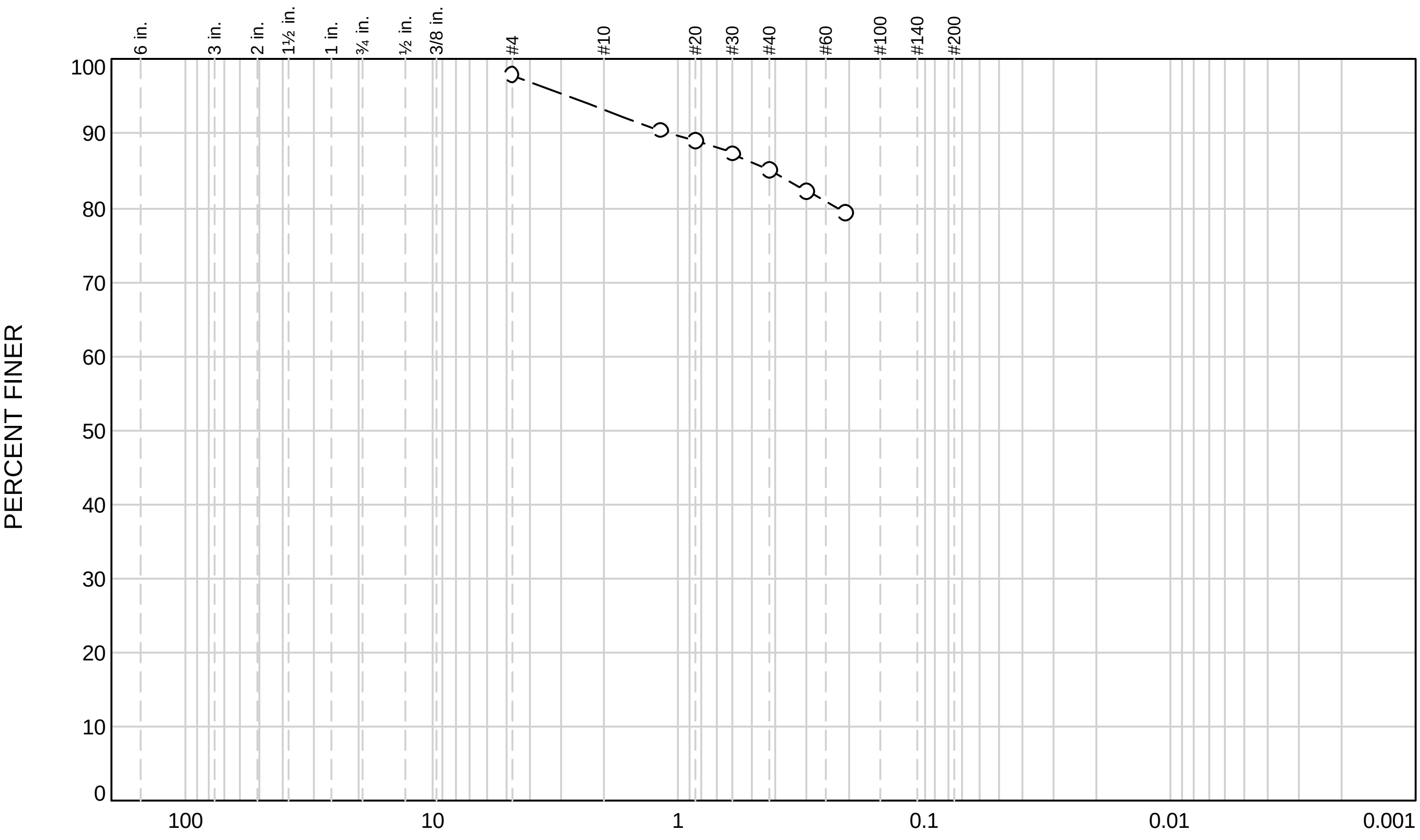
82.7% retained on #200 sieve

Sample No.: 295 to 305 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			4.8	8.0		85.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	97.9		
#16	90.5		
#20	89.0		
#30	87.4		
#40	85.1		
#50	82.3		
#70	79.3		

* (no specification provided)

Soil Description

Dark grayish brown sandy silty CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.4198 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

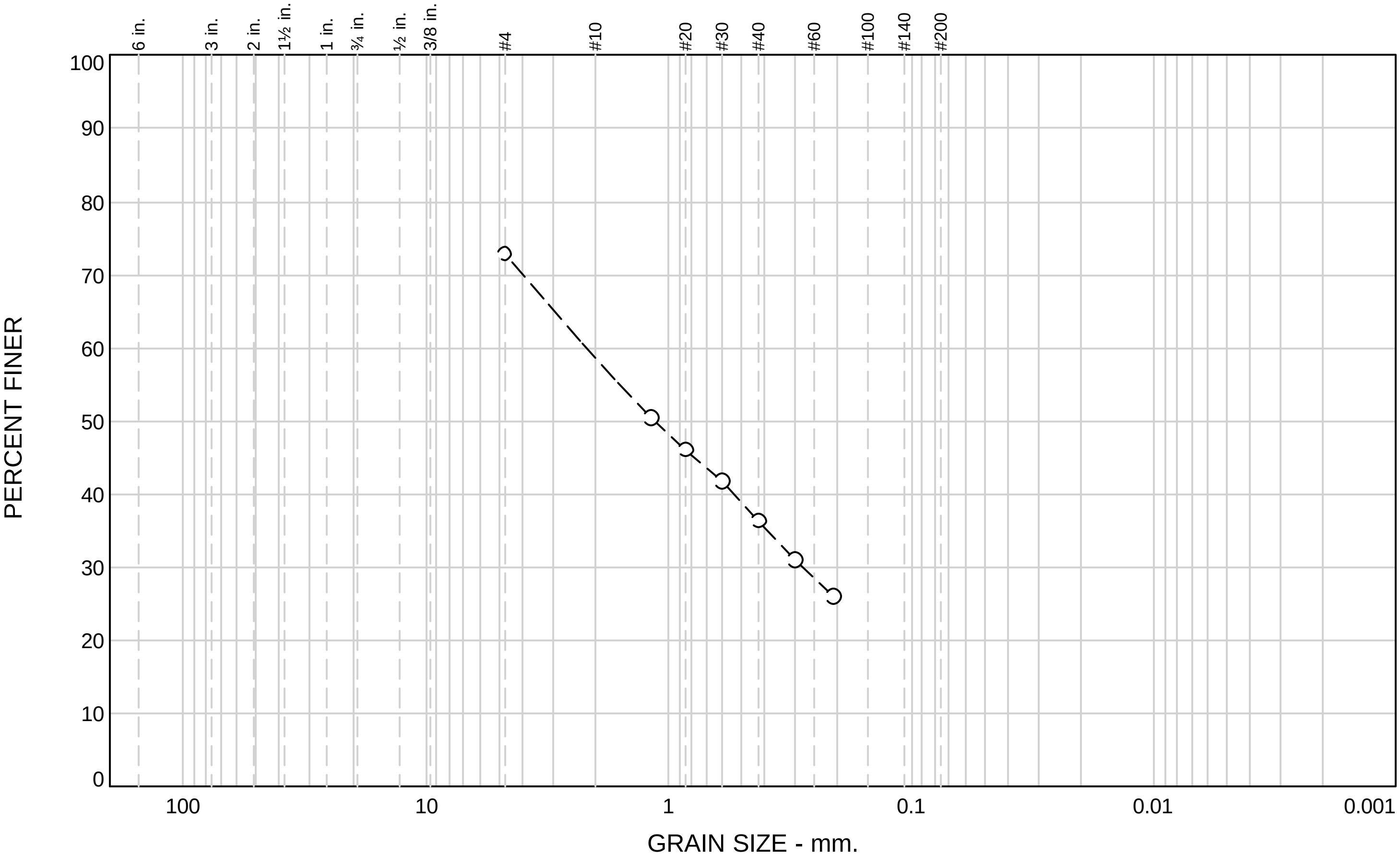
30.4% retained on #200 sieve

Sample No.: 365 to 375 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			14.4	22.1		36.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	72.9		
#16	50.6		
#20	46.2		
#30	41.8		
#40	36.4		
#50	31.0		
#70	26.0		

* (no specification provided)

Soil Description

Dark grayish brown silty, clayey SAND with gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 2.1896 D_{50}= 1.1337
D_{30}= 0.2797 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC-SM AASHTO=

Remarks

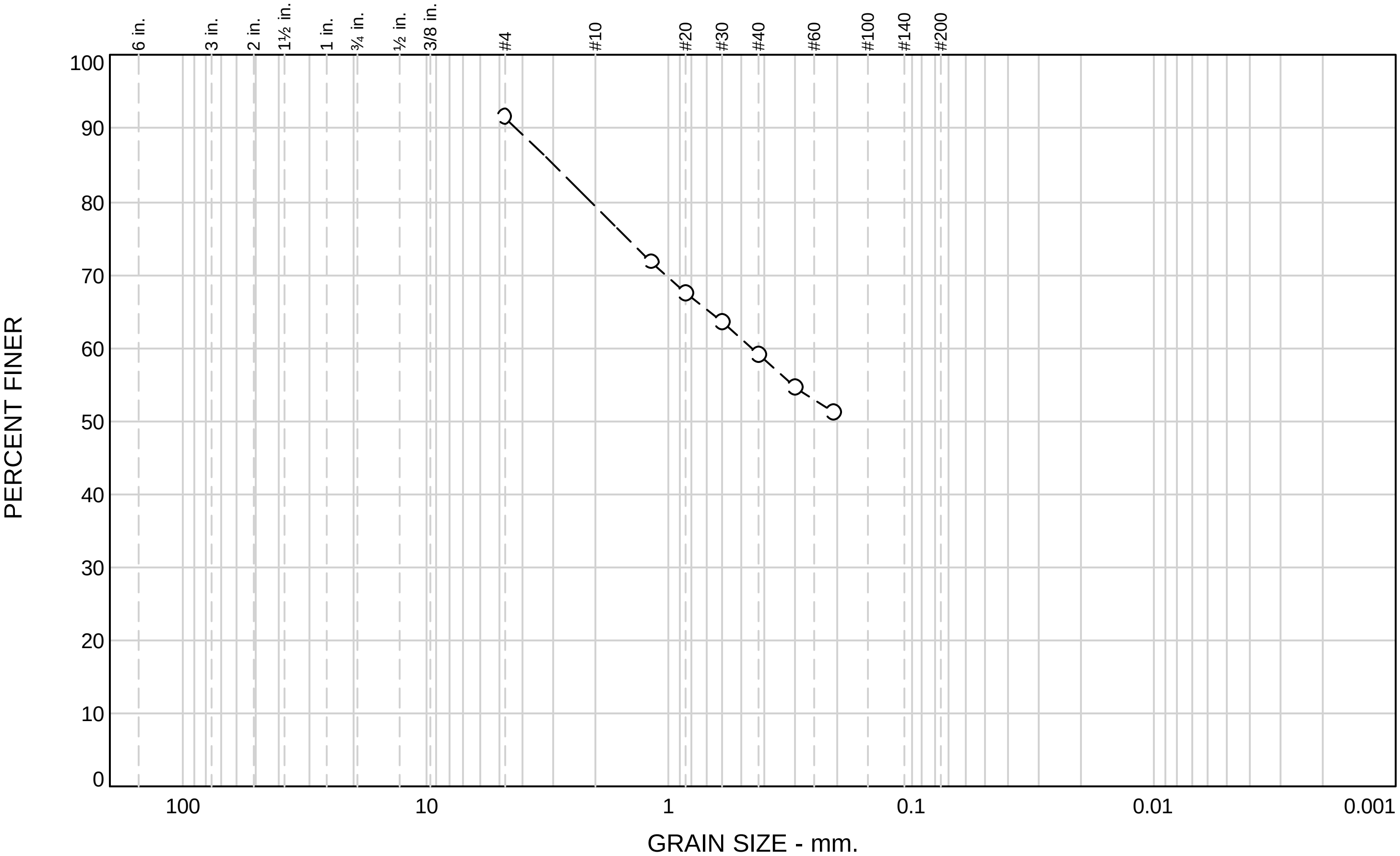
83.3% retained on #200 sieve

Sample No.: 385 to 395 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
			12.4	20.1		59.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	91.7		
#16	71.9		
#20	67.5		
#30	63.6		
#40	59.2		
#50	54.7		
#70	51.3		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 2.9845 D_{60}= 0.4501 D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

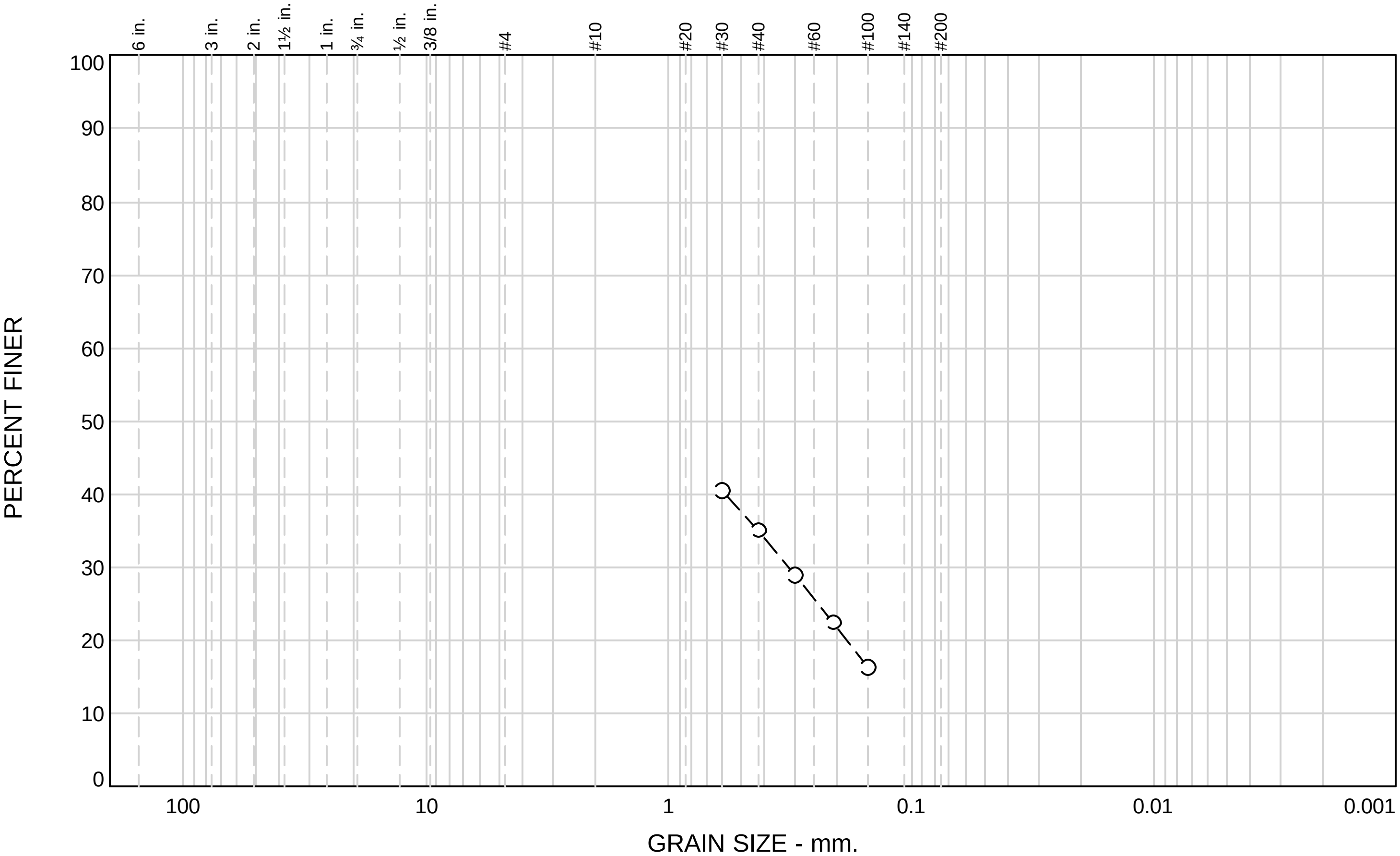
59.6% retained on #200 sieve

Sample No.: 465 to 475 **Source of Sample:** **Date:** 08/26/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						35.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	40.6		
#40	35.1		
#50	28.9		
#70	22.5		
#100	16.4		

* (no specification provided)

Soil Description

Very dark grayish brown well-graded SAND with silt and gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= 0.3188 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SW-SM AASHTO=

Remarks

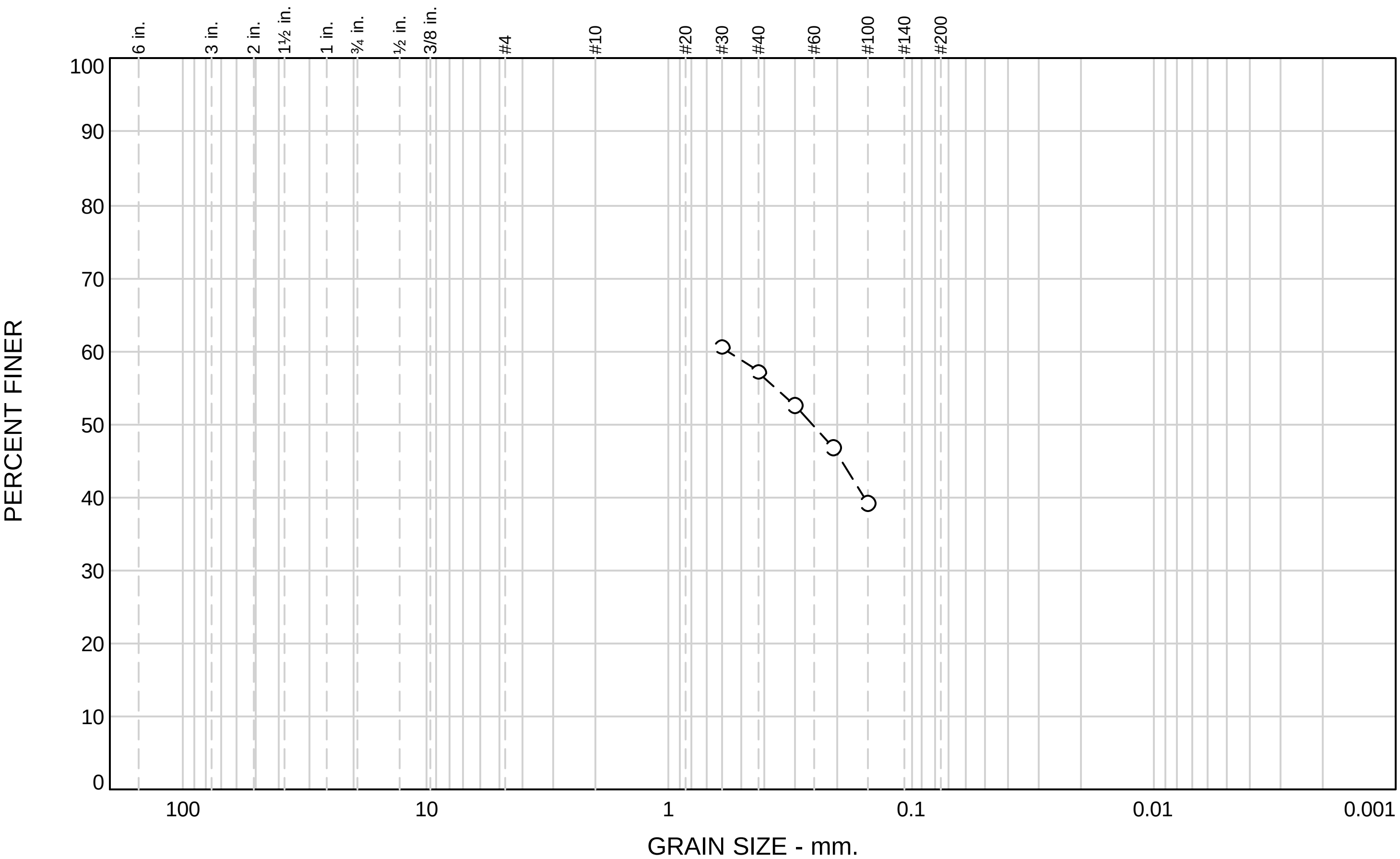
29.5% retained on #4 sieve; 90.0% retained on #200 sieve

Sample No.: 115 to 125 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						57.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	60.6		
#40	57.2		
#50	52.6		
#70	46.8		
#100	39.2		

* (no specification provided)

Soil Description

Very dark grayish brown silty SAND with gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.5615 D_{50}= 0.2521
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

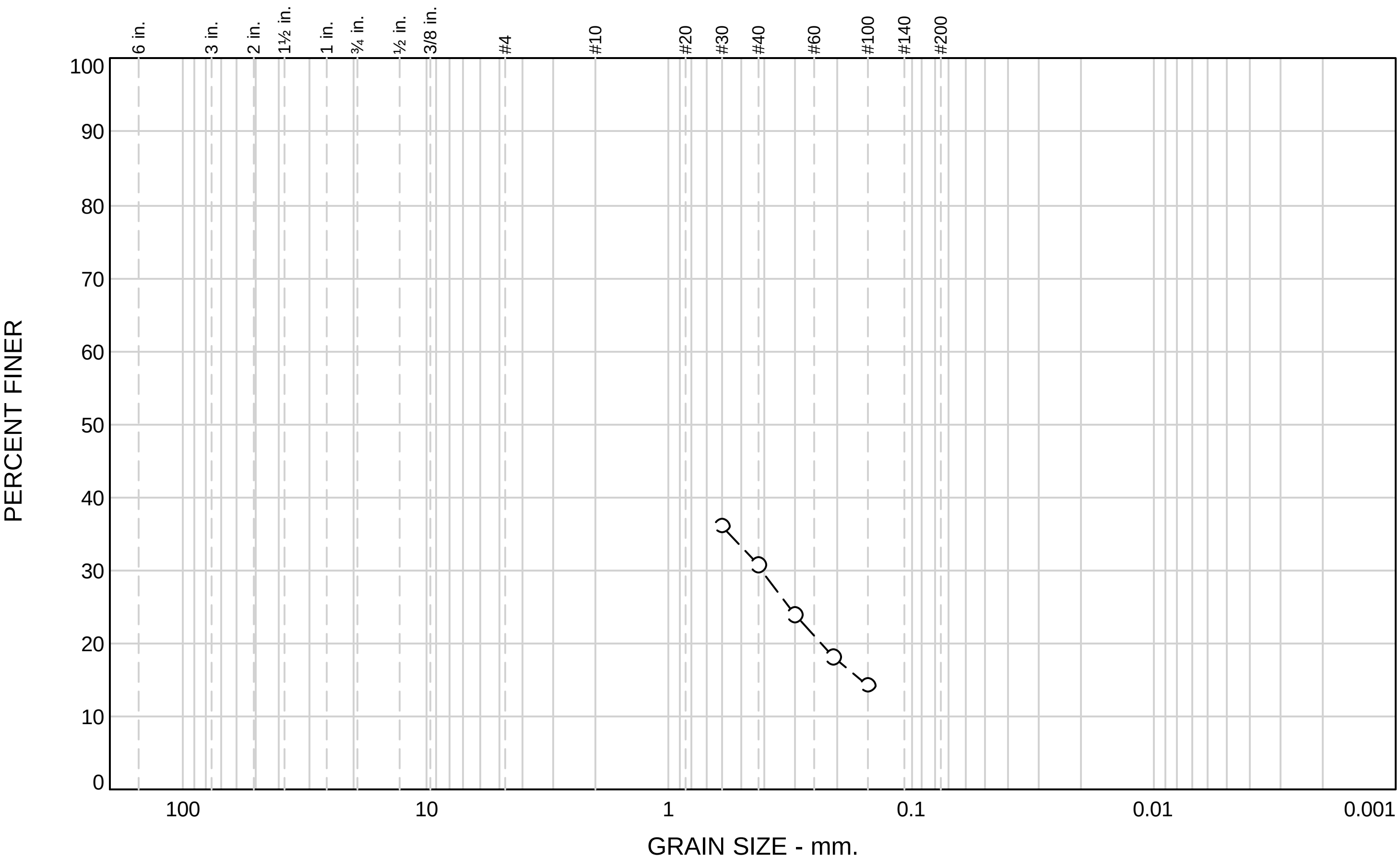
15.6% retained on #4 sieve; 71.3% retained on #200 sieve

Sample No.: 135 to 145 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						30.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	36.2		
#40	30.8		
#50	23.9		
#70	18.3		
#100	14.4		

* (no specification provided)

Soil Description

Very dark grayish brown silty well-graded SAND with gravel. (pumice fragments)

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= 0.4073 D_{15}= 0.1588 D_{10}=
C_u= C_c=

Classification

USCS= SW-SM AASHTO=

Remarks

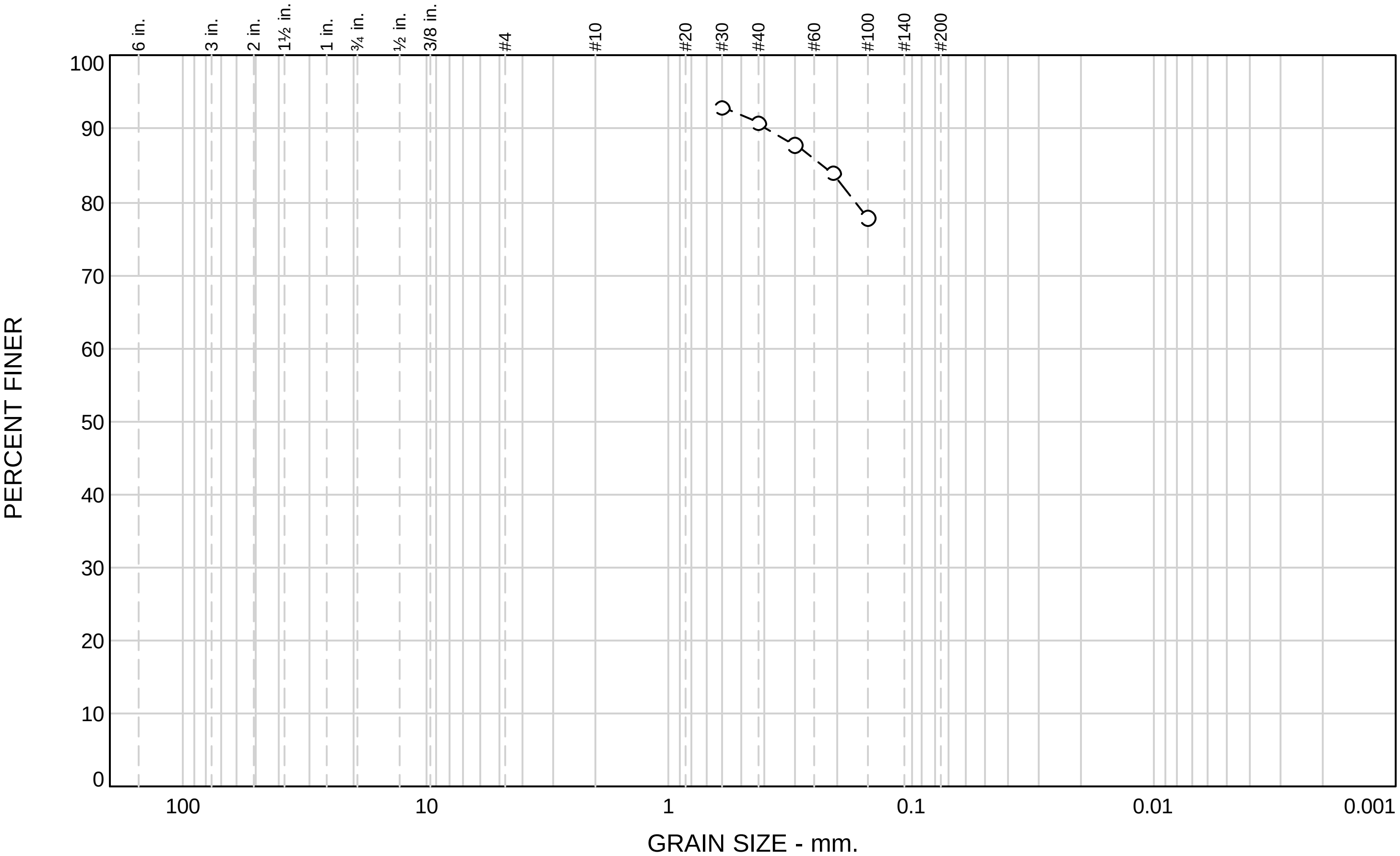
37.0% retained on #4 sieve; 88.9% retained on #200 sieve

Sample No.: 175 to 185 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						90.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	92.9		
#40	90.8		
#50	87.8		
#70	83.9		
#100	77.8		

* (no specification provided)

Soil Description

Very dark grayish brown sandy CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.2279 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

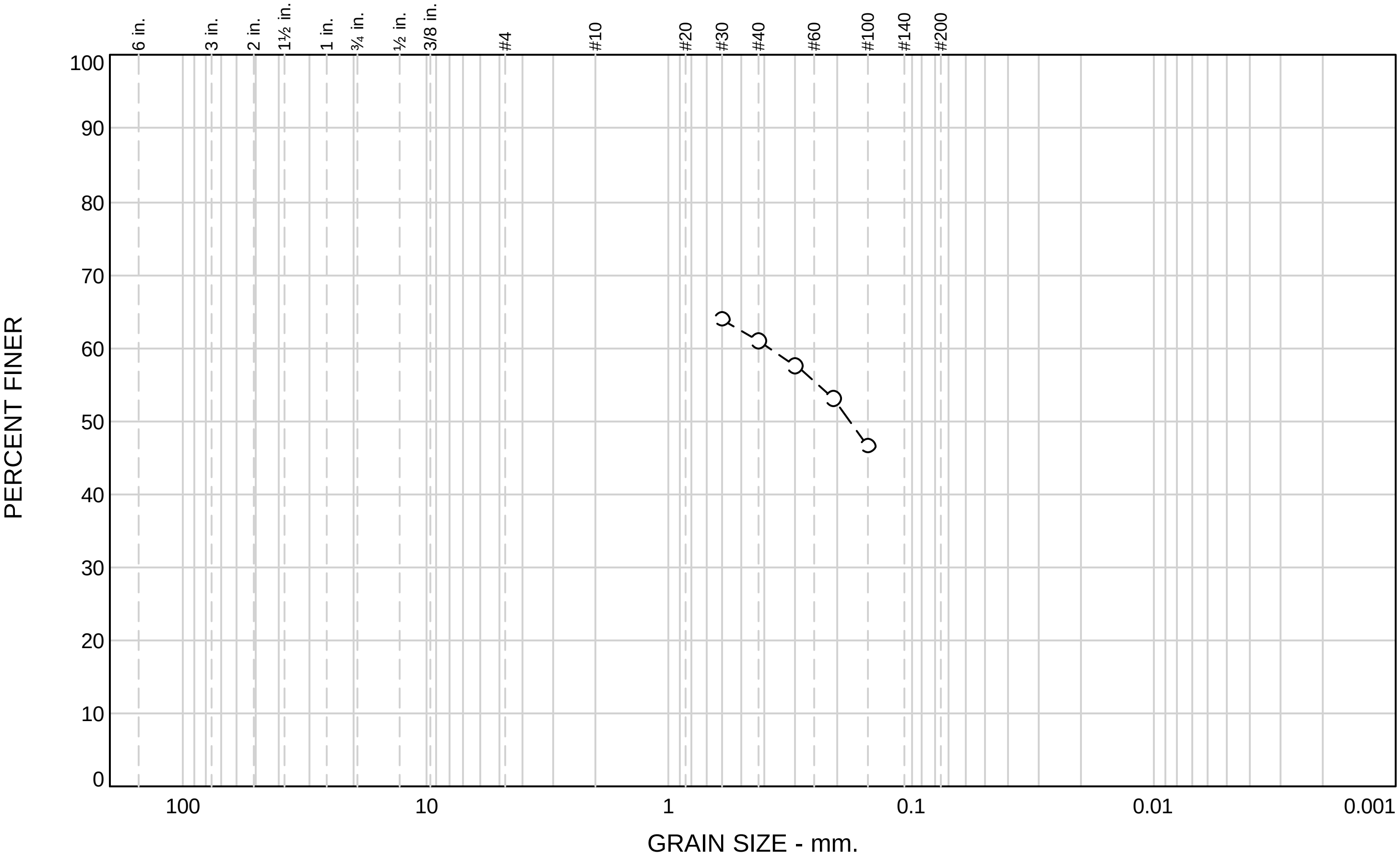
1.1% retained on #4 sieve; 37.0% retained on #200 sieve

Sample No.: 205 to 215 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						61.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	64.0		
#40	61.0		
#50	57.6		
#70	53.2		
#100	46.7		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.3820 D_{50}= 0.1762
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

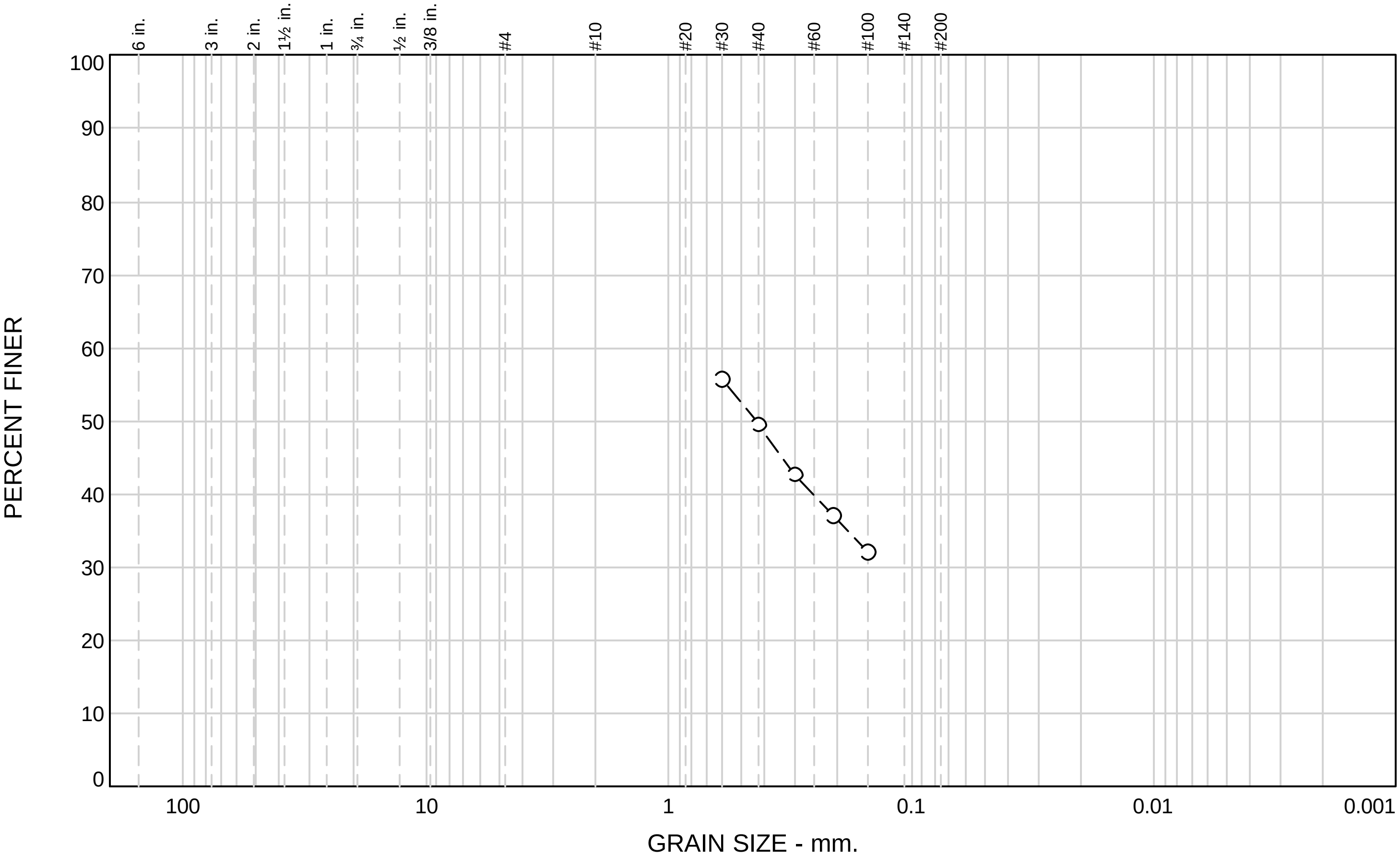
13.6% retained on #4 sieve; 65.3% retained on #200 sieve

Sample No.: 215 to 225 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						49.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	55.7		
#40	49.6		
#50	42.7		
#70	37.1		
#100	32.2		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND with gravel and clay pockets.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}= 0.4340
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

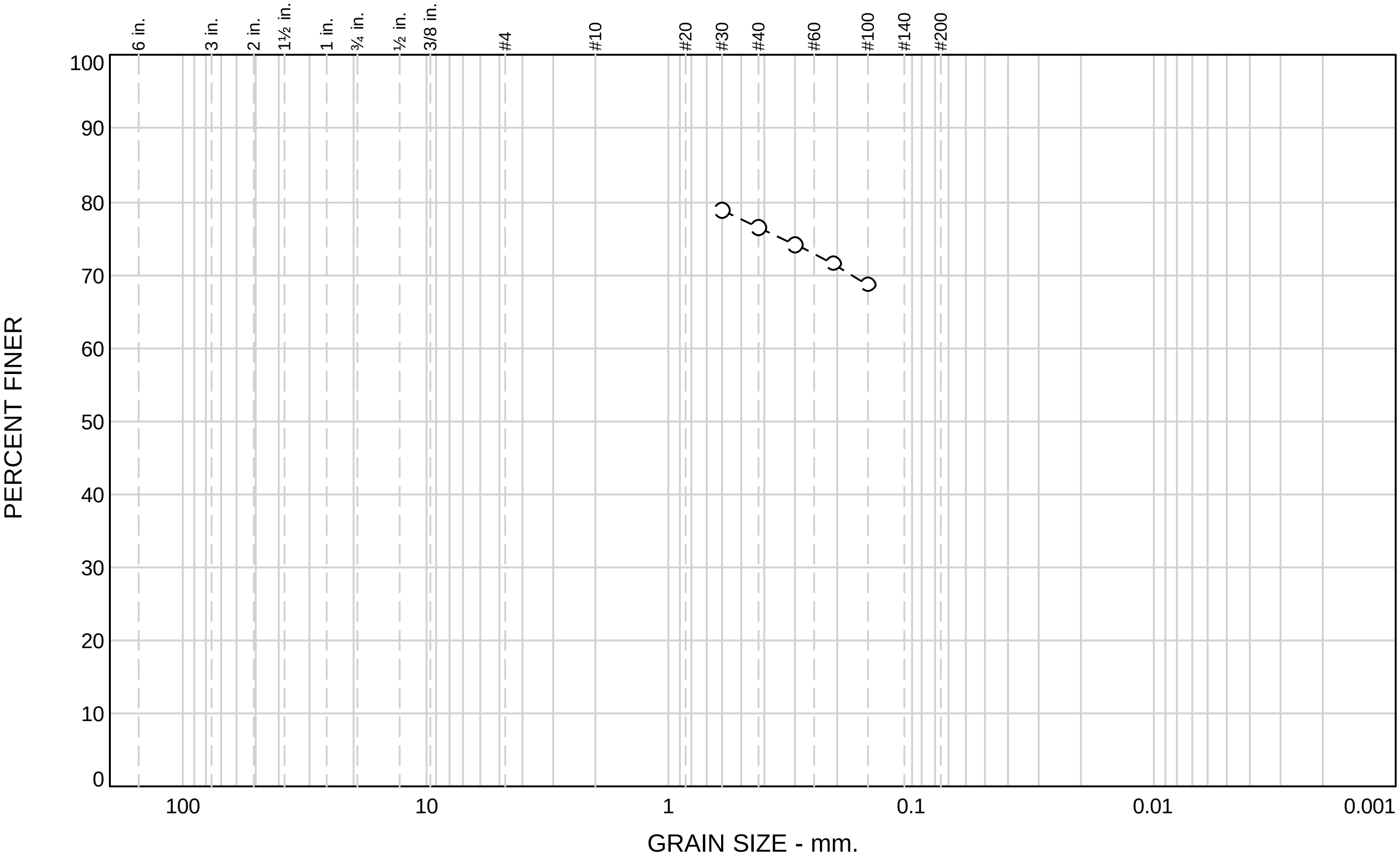
23.8% retained on #4 sieve; 74.1% retained on #200 sieve

Sample No.: 265 to 275 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						76.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	78.8		
#40	76.4		
#50	74.1		
#70	71.6		
#100	68.7		

* (no specification provided)

Soil Description

Dark grayish brown sandy silty CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

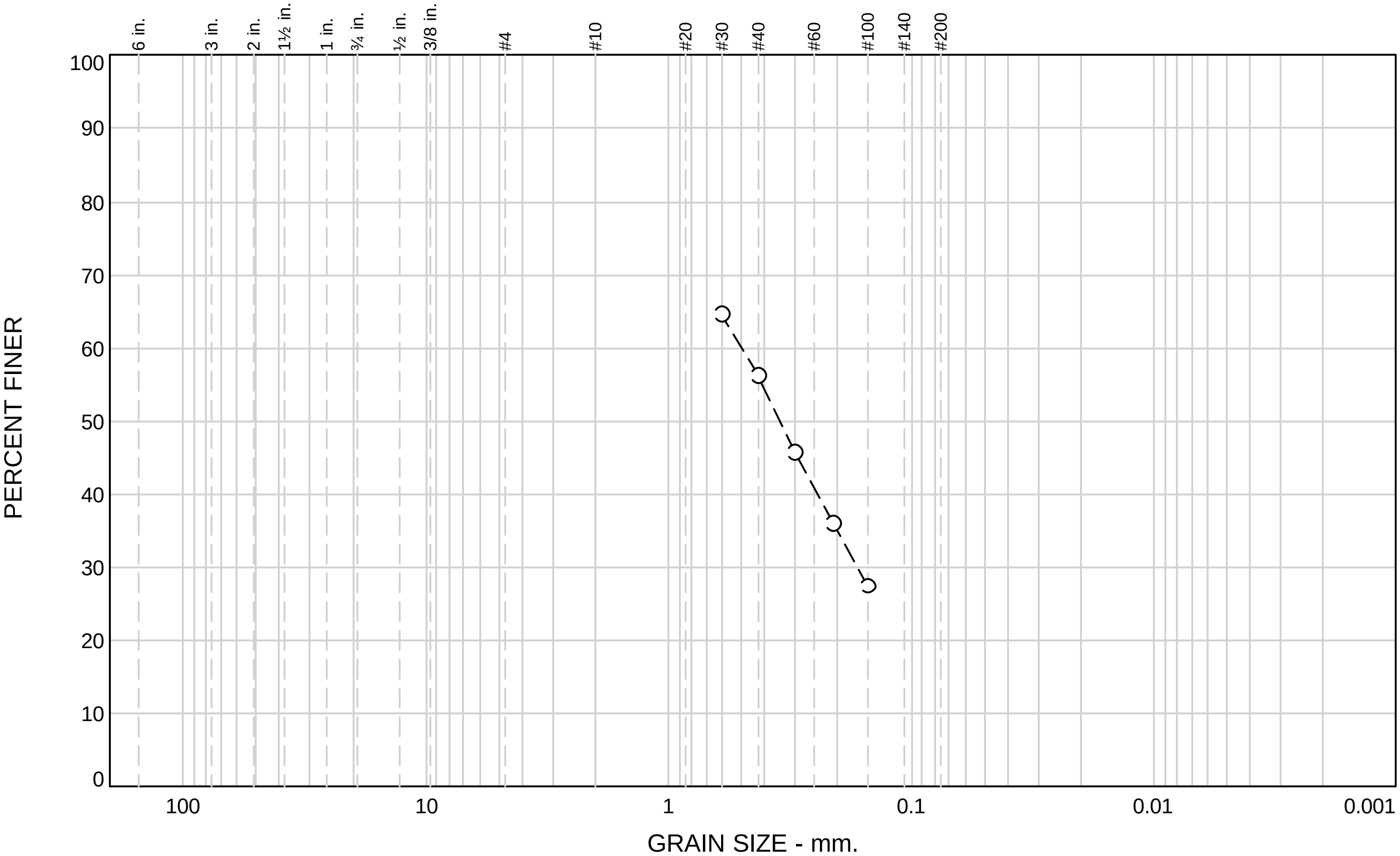
9.0% retained on #4 sieve; 38.5% retained on #200 sieve

Sample No.: 275 to 285 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						56.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	64.6		
#40	56.2		
#50	45.7		
#70	36.1		
#100	27.5		

* (no specification provided)

Soil Description

Very dark grayish brown silty SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.4921 D_{50}= 0.3456
D_{30}= 0.1654 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

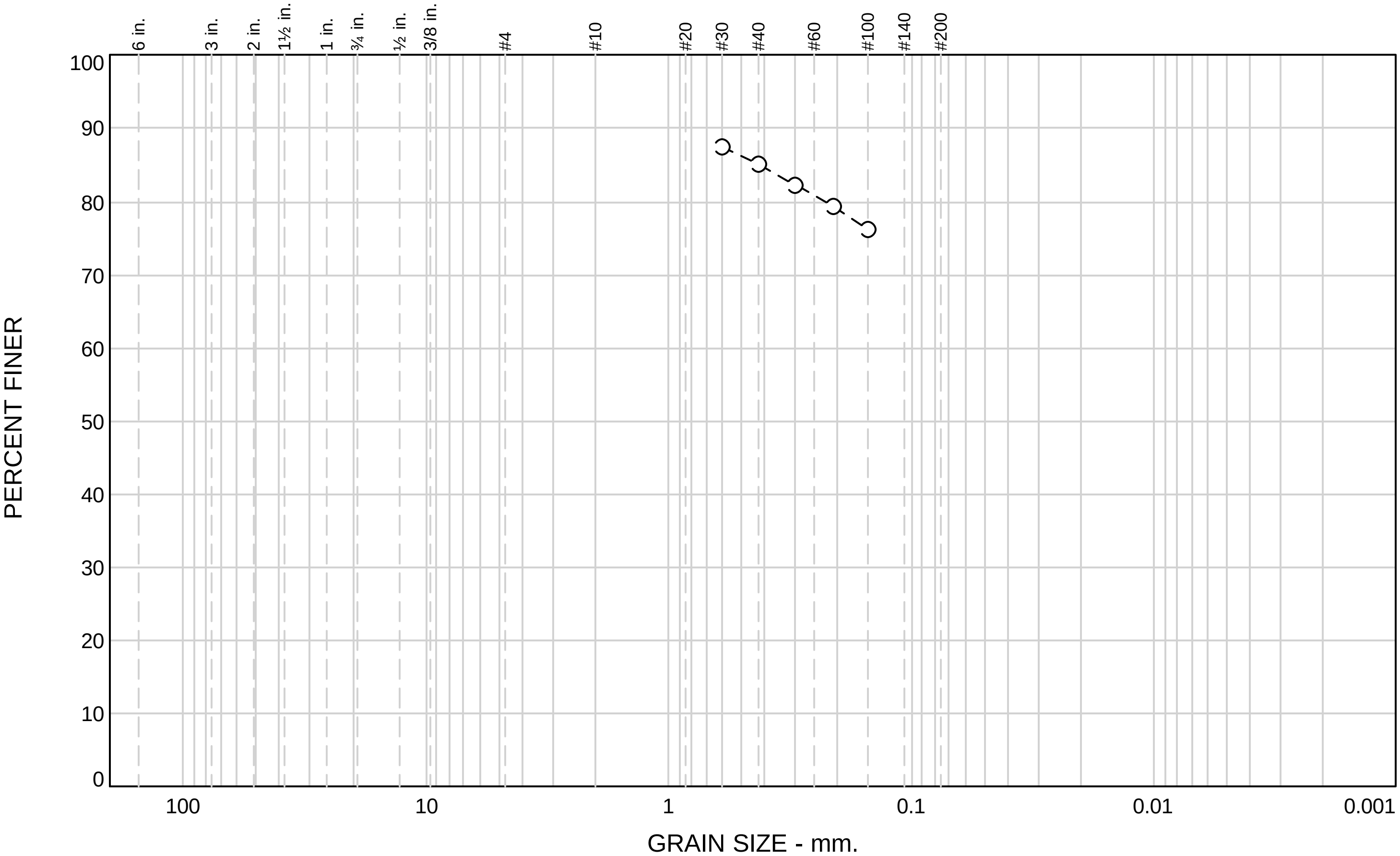
3.3% retained on #4 sieve; 82.7% retained on #200 sieve

Sample No.: 295 to 305 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						85.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	87.4		
#40	85.1		
#50	82.3		
#70	79.3		
#100	76.2		

* (no specification provided)

Soil Description

Dark grayish brown sandy silty CLAY.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.4187 D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

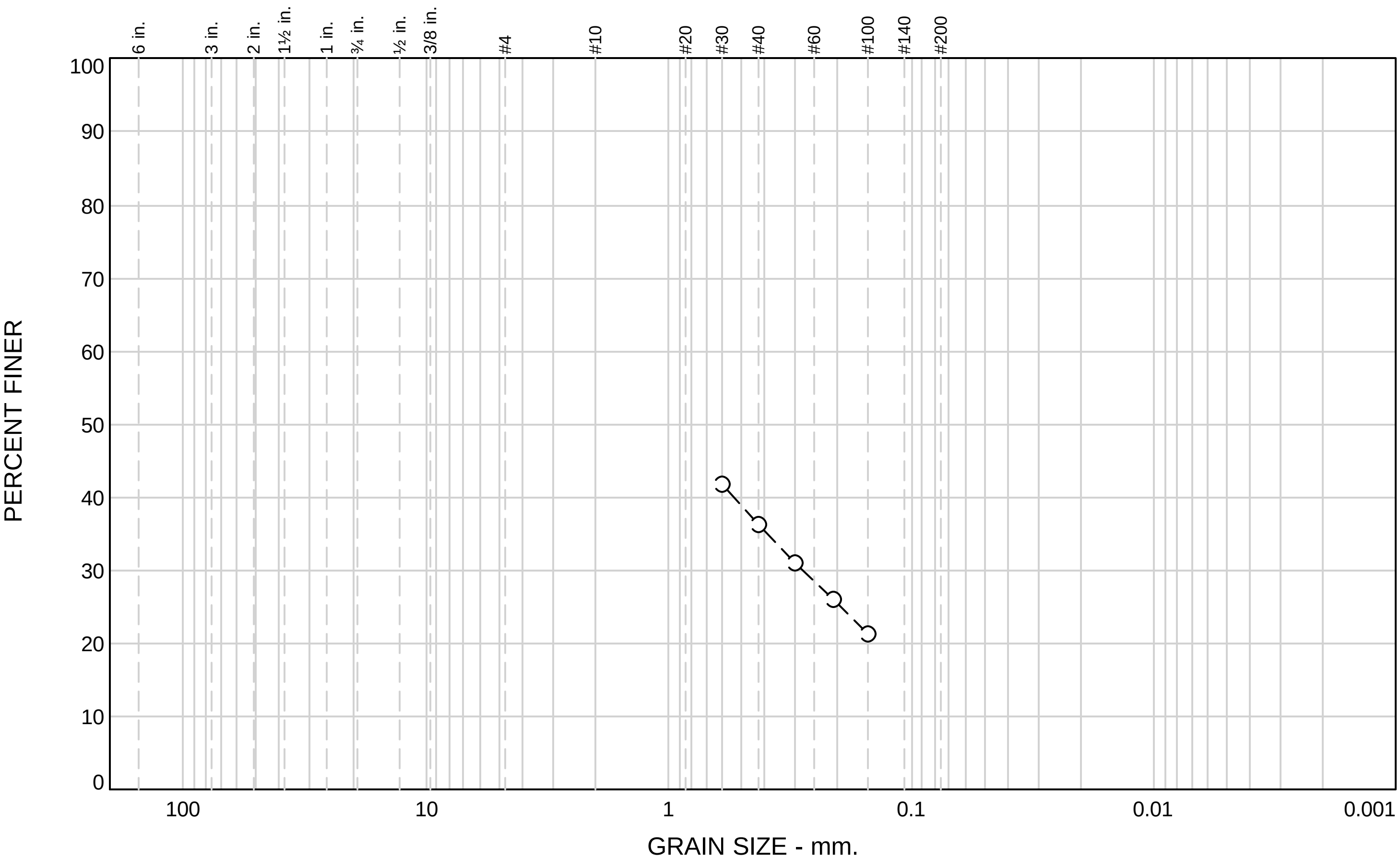
2.1% retained on #4 sieve; 30.4% retained on #200 sieve

Sample No.: 365 to 375 **Source of Sample:** **Date:** 08/24/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						36.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	41.8		
#40	36.4		
#50	31.0		
#70	26.0		
#100	21.4		

* (no specification provided)

Soil Description

Dark grayish brown silty, clayey SAND with gravel.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= 0.2800 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC-SM AASHTO=

Remarks

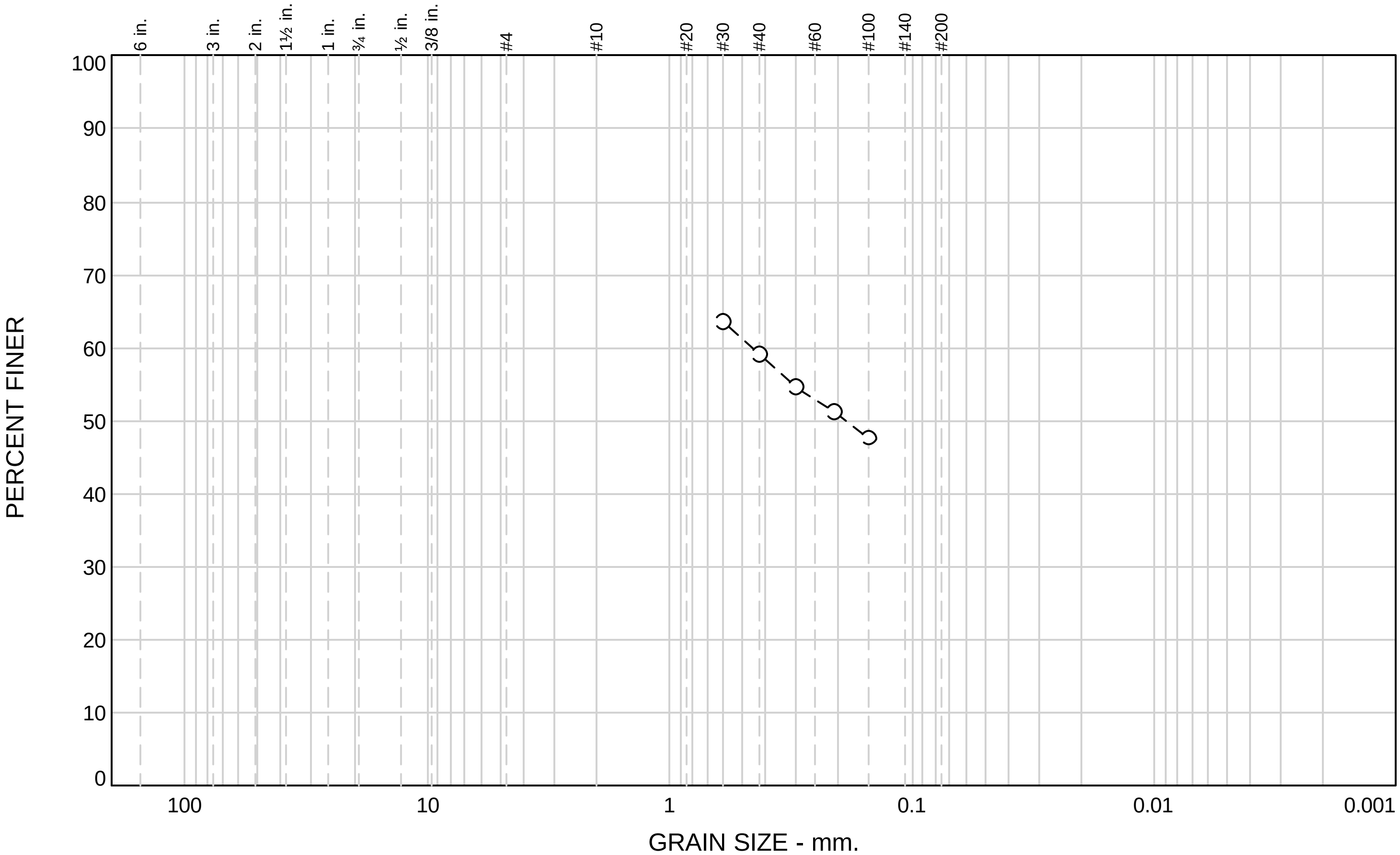
27.1% retained on #4 sieve; 83.3% retained on #200 sieve

Sample No.: 385 to 395 **Source of Sample:** **Date:** 08/21/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
					59.2		

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#30	63.6		
#40	59.2		
#50	54.7		
#70	51.3		
#100	47.7		

* (no specification provided)

Soil Description

Dark grayish brown clayey SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= 0.4515 D_{50}= 0.1848
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

9.3% retained on #4 sieve; 59.6% retained on #200 sieve

Sample No.: 465 to 475 **Source of Sample:** **Date:** 08/26/09
Location: **Elev./Depth:**

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Sutter Medical Center, Well 1 - Santa Rosa, CA
Project No: 6486.200.503

APPENDIX C

Pump Test Analysis

A
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P
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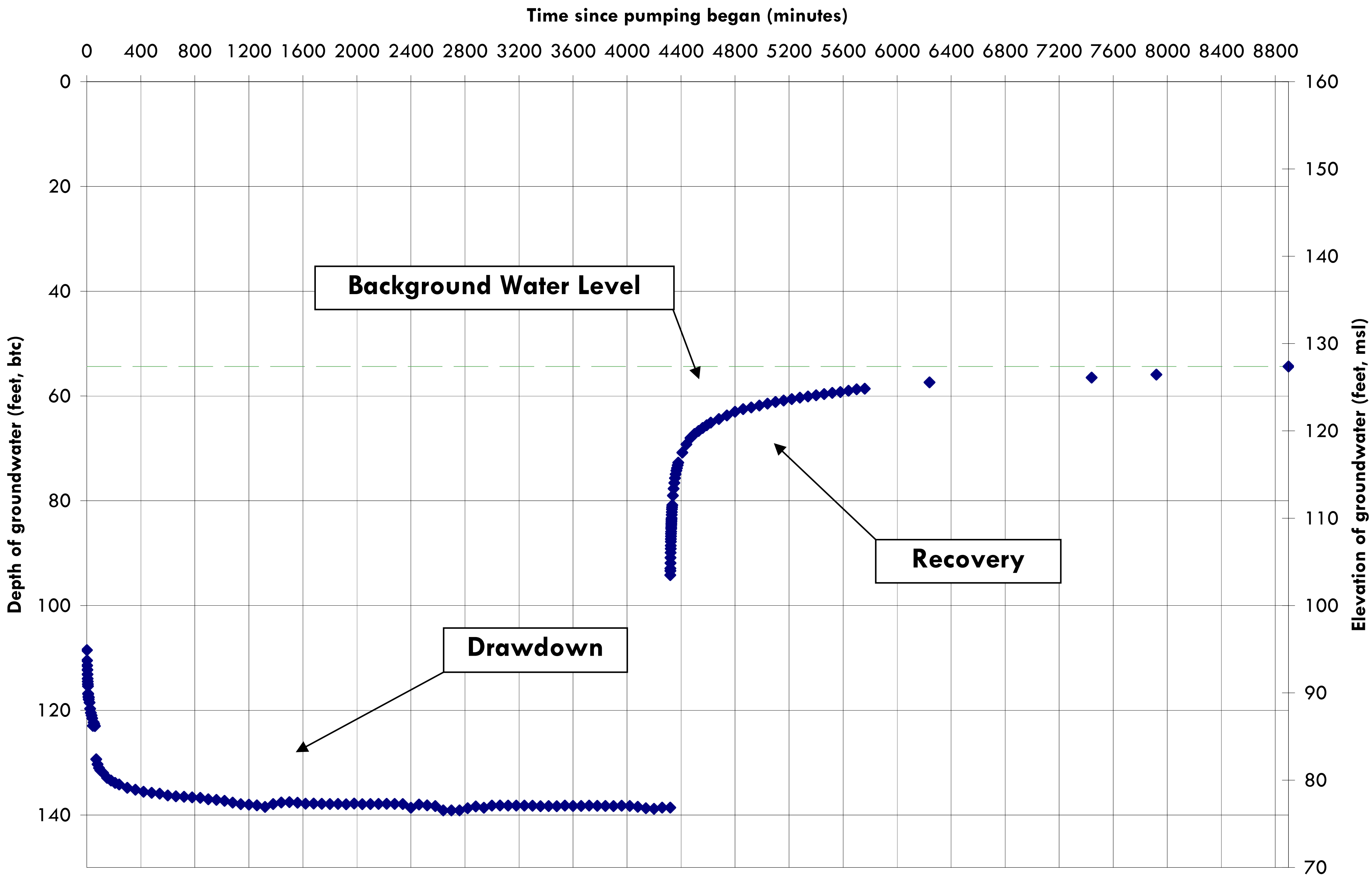
X

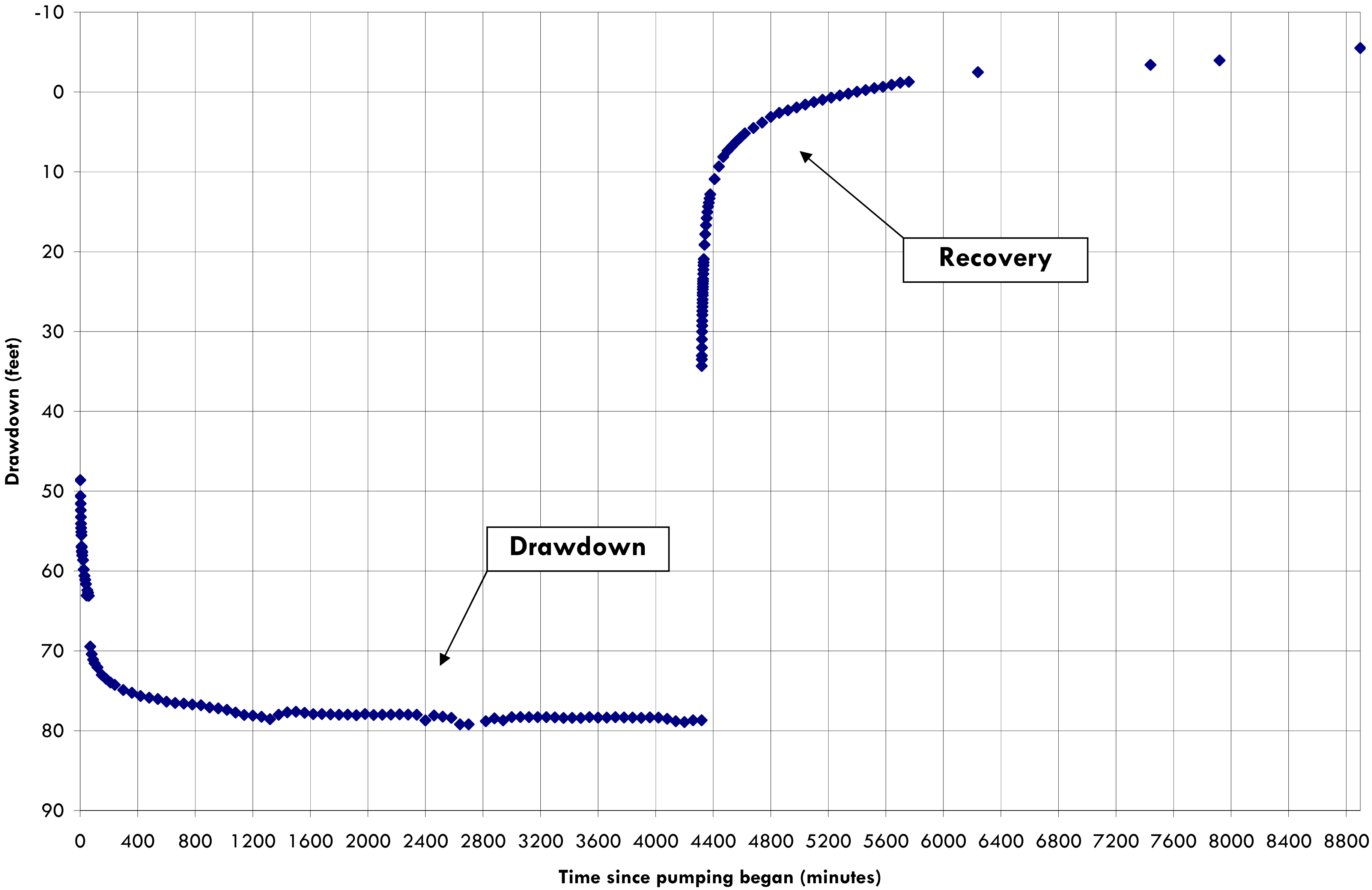
C

Figure B-1: Depth of Groundwater during W-SMC Pump Test @ 153gpm



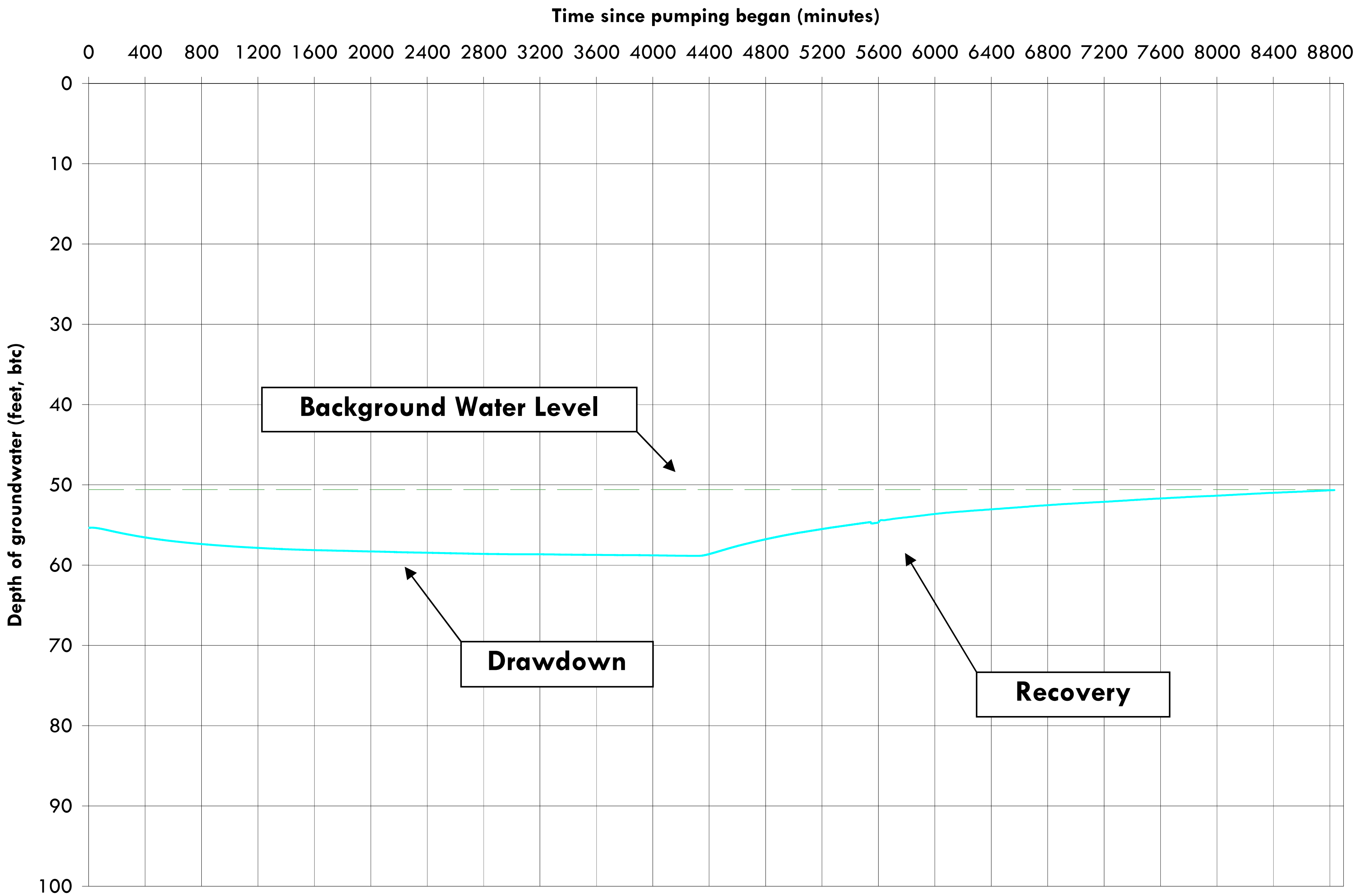
6486.200.503
October 2009

Figure B-2: Drawdown during W-SMC Pump Test @ 153gpm



6486.200.503
October 2009

Figure B-3: Depth of Groundwater at W-WFC during W-SMC Pump Test @ 153gpm



6486.200.503
October 2009

Figure B-4: Drawdown at W-WFC during W-SMC Pump Test @ 153gpm

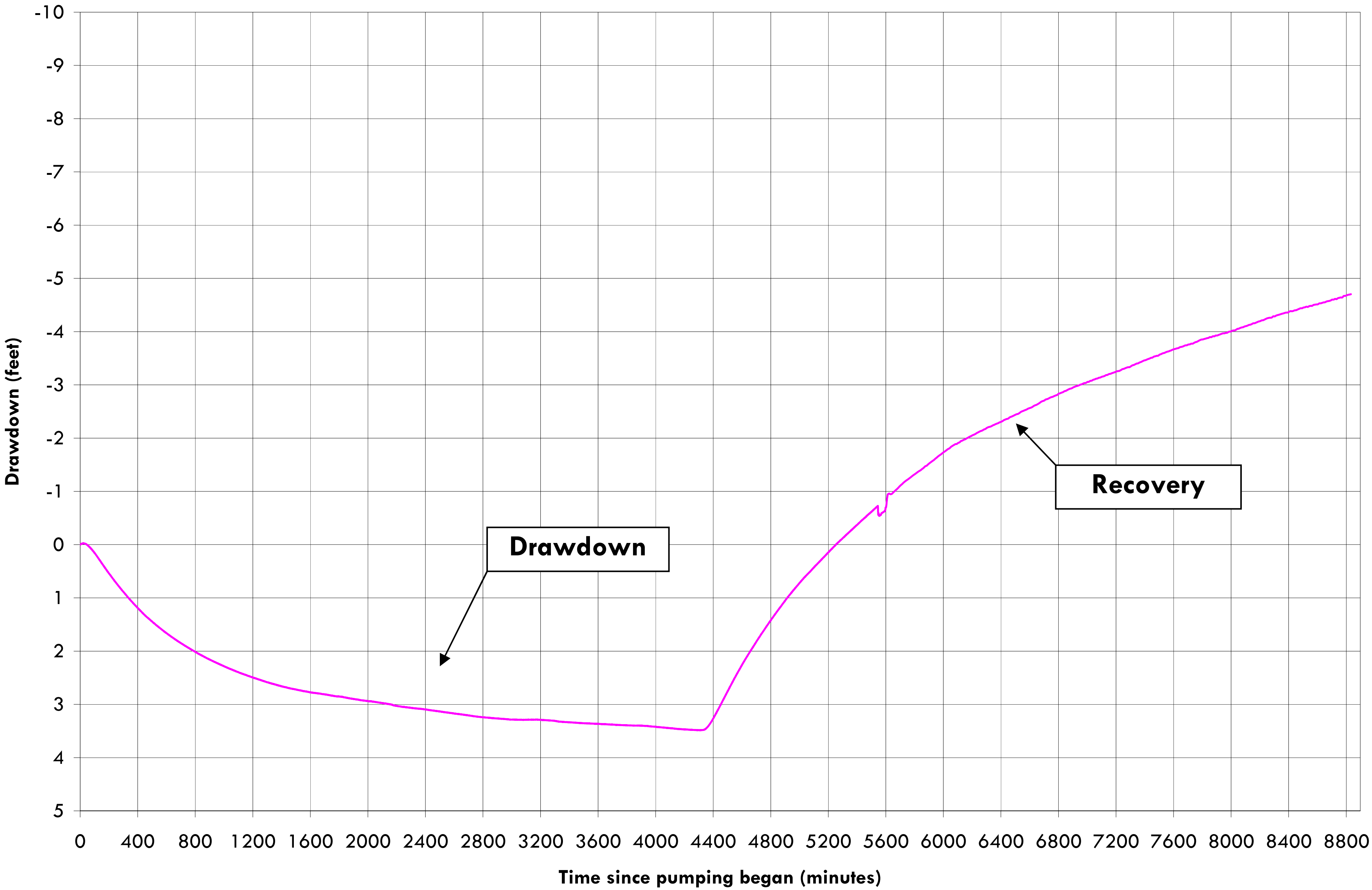
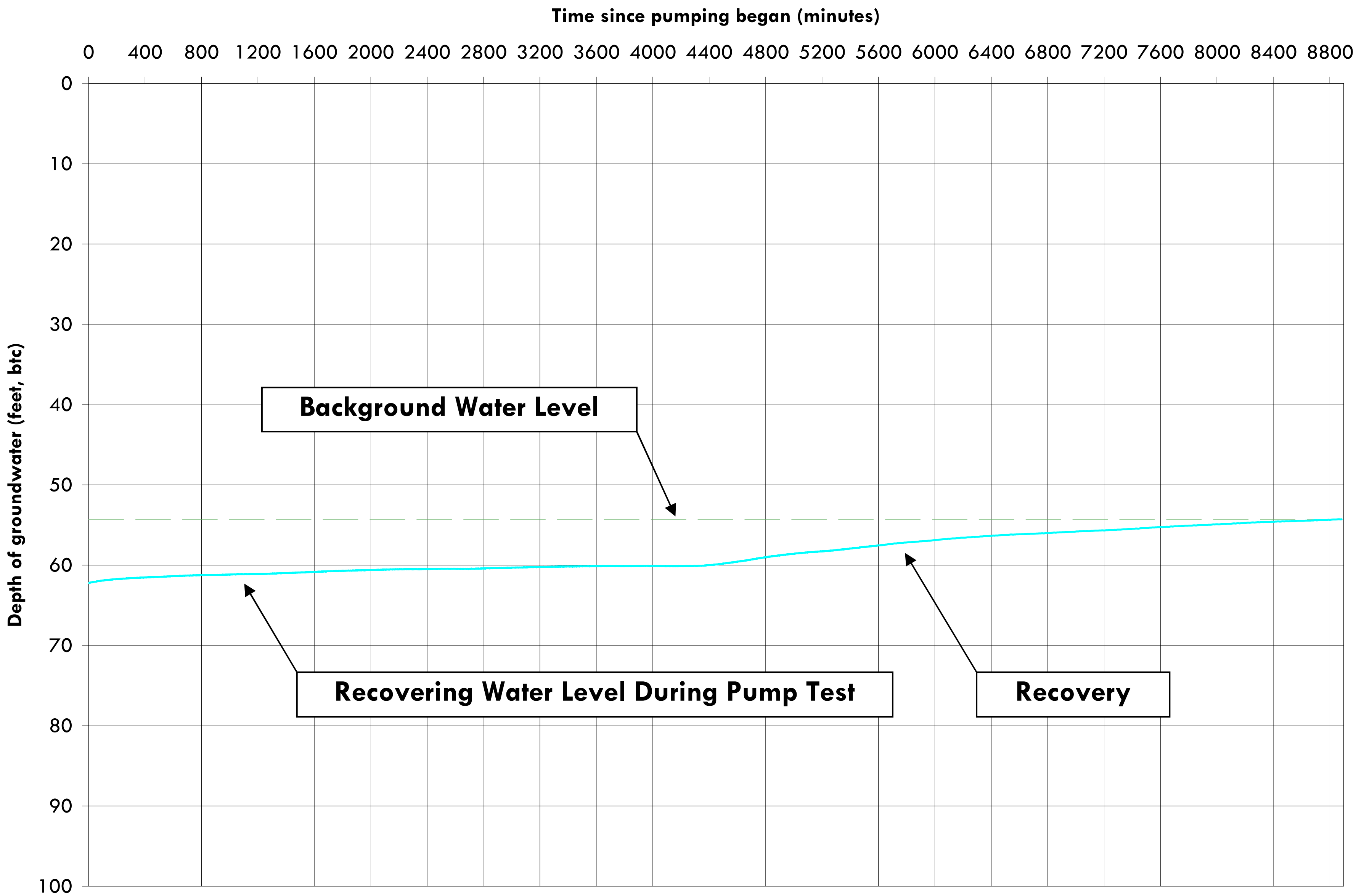
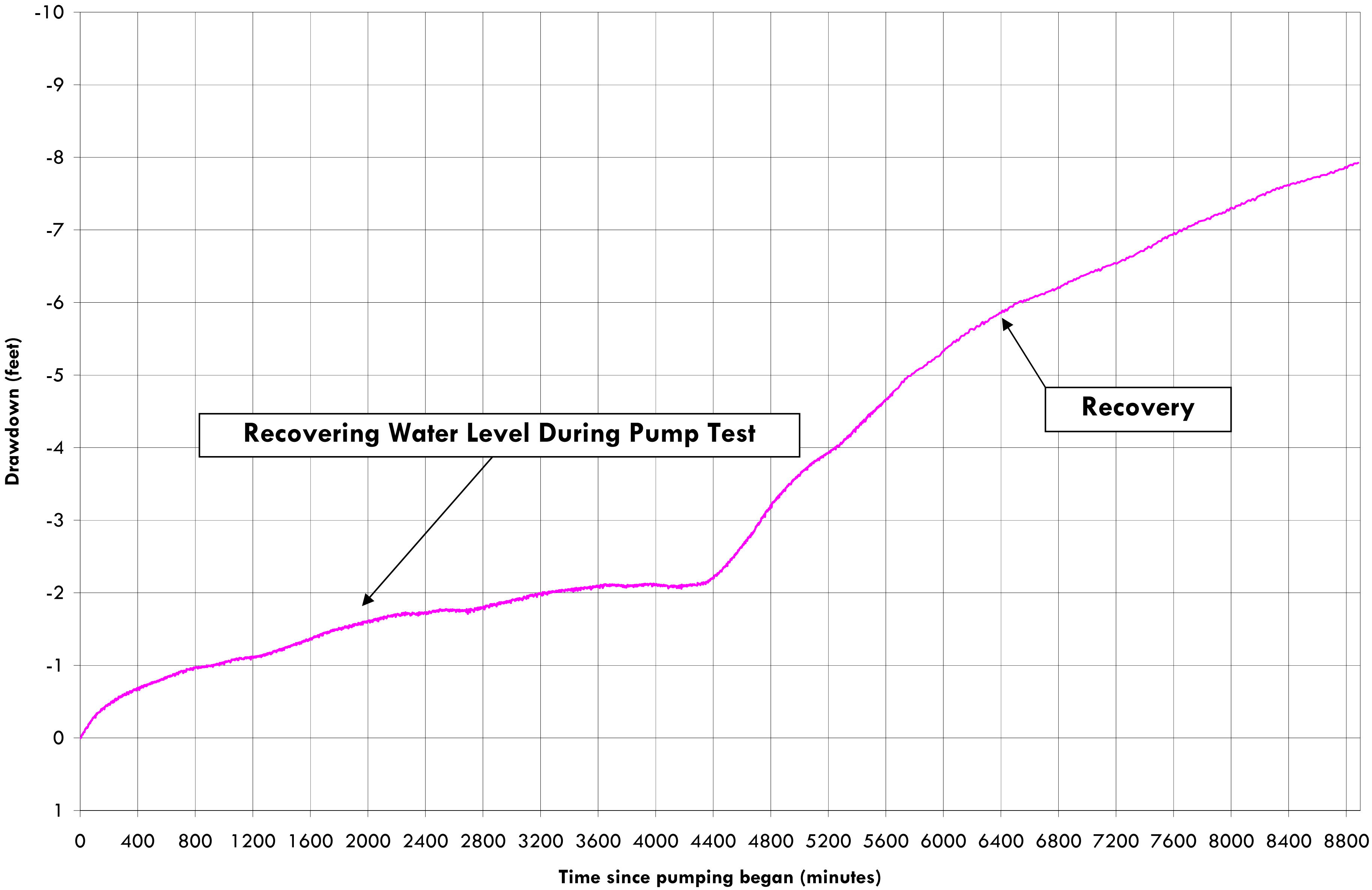


Figure B-5: Depth of Groundwater at W-VI during W-SMC Pump Test @ 153gpm

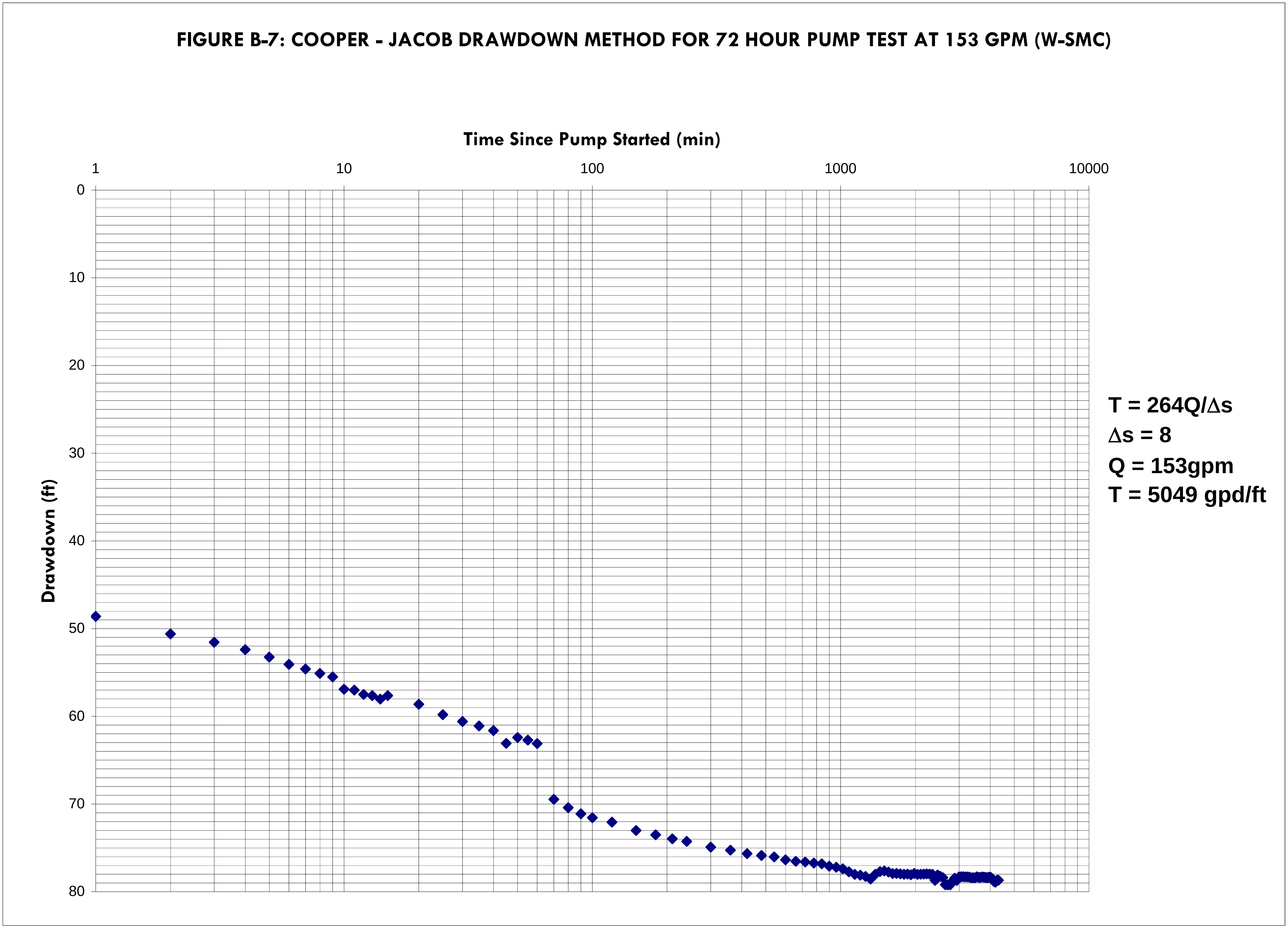


6486.200.503
October 2009

Figure B-6: Drawdown at W-VI during W-SMC Pump Test @ 153gpm



6486.200.503
October 2009



6486.200.503
October 2009

W-SMC :: 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	59.89	feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	W-SMC		Totalizer readings. observations, odors, clarity, notes.
		Depth to Groundwater	Drawdown (feet)	
1	10/9/2009 10:11	108.5	48.61	
2	10/9/2009 10:12	110.5	50.61	
3	10/9/2009 10:13	111.45	51.56	
4	10/9/2009 10:14	112.28	52.39	
5	10/9/2009 10:15	113.14	53.25	clear, no odors; Sand Test: 0 ppm
6	10/9/2009 10:16	113.96	54.07	
7	10/9/2009 10:17	114.5	54.61	
8	10/9/2009 10:18	115	55.11	
9	10/9/2009 10:19	115.4	55.51	
10	10/9/2009 10:20	116.8	56.91	clear, no odors; Sand Test: 0 ppm
11	10/9/2009 10:21	116.9	57.01	
12	10/9/2009 10:22	117.4	57.51	
13	10/9/2009 10:23	117.53	57.64	
14	10/9/2009 10:24	117.93	58.04	
15	10/9/2009 10:25	117.53	57.64	clear, no odors; Sand Test: 0 ppm
20	10/9/2009 10:30	118.52	58.63	
25	10/9/2009 10:35	119.7	59.81	clear, no odors; Sand Test: 0 ppm
30	10/9/2009 10:40	120.48	60.59	
35	10/9/2009 10:45	120.98	61.09	clear, no odors; Sand Test: 0 ppm
40	10/9/2009 10:50	121.52	61.63	
45	10/9/2009 10:55	122.97	63.08	
50	10/9/2009 11:00	122.3	62.41	
55	10/9/2009 11:05	122.6	62.71	
60	10/9/2009 11:10	123	63.11	clear, no odors; Sand Test: 0 ppm; totalizer - 271738
70	10/9/2009 11:20	129.35	69.46	
80	10/9/2009 11:30	130.3	70.41	
90	10/9/2009 11:40	131	71.11	clear, no odors; Sand Test: 0 ppm
100	10/9/2009 11:50	131.45	71.56	
120	10/9/2009 12:10	131.95	72.06	271748
150	10/9/2009 12:40	132.9	73.01	
180	10/9/2009 13:10	133.4	73.51	271757
210	10/9/2009 13:40	133.85	73.96	
240	10/9/2009 14:10	134.15	74.26	271767
300	10/9/2009 15:10	134.8	74.91	271776
360	10/9/2009 16:10	135.15	75.26	271786
420	10/9/2009 17:10	135.55	75.66	
480	10/9/2009 18:10	135.76	75.87	271804
540	10/9/2009 19:10	135.92	76.03	271813
600	10/9/2009 20:10	136.25	76.36	271823
660	10/9/2009 21:10	136.42	76.53	271832
720	10/9/2009 22:10	136.5	76.61	271840
780	10/9/2009 23:10	136.62	76.73	271850
840	10/10/2009 0:10	136.71	76.82	271861
900	10/10/2009 1:10	136.98	77.09	271870
960	10/10/2009 2:10	137.1	77.21	271878
1020	10/10/2009 3:10	137.27	77.38	271888
1080	10/10/2009 4:10	137.62	77.73	271897
1140	10/10/2009 5:10	137.92	78.03	271906
1200	10/10/2009 6:10	138	78.11	271914
1260	10/10/2009 7:10	138.15	78.26	271924
1320	10/10/2009 8:10	138.45	78.56	271933
1380	10/10/2009 9:10	137.9	78.01	271942
1440	10/10/2009 10:10	137.6	77.71	271952
1500	10/10/2009 11:10	137.52	77.63	271960

W-SMC :: 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 59.89 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	W-SMC		Totalizer readings. observations, odors, clarity, notes.
		Depth to Groundwater	Drawdown (feet)	
1560	10/10/2009 12:10	137.65	77.76	271969
1620	10/10/2009 13:10	137.82	77.93	
1680	10/10/2009 14:10	137.8	77.91	271988
1740	10/10/2009 15:10	137.85	77.96	271997
1800	10/10/2009 16:10	137.9	78.01	272006
1860	10/10/2009 17:10	137.88	77.99	272016
1920	10/10/2009 18:10	137.95	78.06	272026
1980	10/10/2009 19:10	137.8	77.91	272034
2040	10/10/2009 20:10	137.92	78.03	272043
2100	10/10/2009 21:10	137.89	78	272053
2160	10/10/2009 22:10	137.88	77.99	272062
2220	10/10/2009 23:10	137.85	77.96	272073
2280	10/11/2009 0:10	137.88	77.99	272082
2340	10/11/2009 1:10	137.9	78.01	272090
2400	10/11/2009 2:10	138.6	78.71	272099
2460	10/11/2009 3:10	137.98	78.09	272109
2520	10/11/2009 4:10	138.14	78.25	272117
2580	10/11/2009 5:10	138.28	78.39	272127
2640	10/11/2009 6:10	139.1	79.21	272135
2700	10/11/2009 7:10	139.1	79.21	272144
2760	10/11/2009 8:10	139.11	79.22	272153
2820	10/11/2009 9:10	138.7	78.81	272162
2880	10/11/2009 10:10	138.35	78.46	272171
2940	10/11/2009 11:10	138.6	78.71	272182
3000	10/11/2009 12:10	138.2	78.31	272190
3060	10/11/2009 13:10	138.18	78.29	272199
3120	10/11/2009 14:10	138.19	78.3	272209
3180	10/11/2009 15:10	138.2	78.31	272217
3240	10/11/2009 16:10	138.2	78.31	272227
3300	10/11/2009 17:10	138.22	78.33	272235
3360	10/11/2009 18:10	138.3	78.41	272244
3420	10/11/2009 19:10	138.28	78.39	272254
3480	10/11/2009 20:10	138.3	78.41	272260
3540	10/11/2009 21:10	138.19	78.3	272273
3600	10/11/2009 22:10	138.26	78.37	272281
3660	10/11/2009 23:10	138.25	78.36	272292
3720	10/12/2009 0:10	138.2	78.31	272301
3780	10/12/2009 1:10	138.24	78.35	272310
3840	10/12/2009 2:10	138.26	78.37	272319
3900	10/12/2009 3:10	138.29	78.4	272328
3960	10/12/2009 4:10	138.22	78.33	272337
4020	10/12/2009 5:10	138.25	78.36	272346
4080	10/12/2009 6:10	138.41	78.52	272354
4140	10/12/2009 7:10	138.7	78.81	272364
4200	10/12/2009 8:10	138.81	78.92	272373
4260	10/12/2009 9:10	138.58	78.69	272382 - - Sand Test 0 ppm
4320	10/12/2009 10:10	138.58	78.69	272391 - Collected Water Quality Sample for Analyses at
4320.5	10/12/2009 10:10:30	94.2	39.82	Recovery
4321	10/12/2009 10:11:00	93.38	39	
4321.5	10/12/2009 10:11:30	92.91	38.53	
4322	10/12/2009 10:12:00	91.9	37.52	
4322.5	10/12/2009 10:12:30	90.87	36.49	
4323	10/12/2009 10:13:00	89.91	35.53	
4323.5	10/12/2009 10:13:30	89.15	34.77	

W-SMC :: 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	59.89	feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	W-SMC		Totalizer readings. observations, odors, clarity, notes.
		Depth to Groundwater	Drawdown (feet)	
4324	10/12/2009 10:14:00	88.56	34.18	
4324.5	10/12/2009 10:14:30	87.82	33.44	
4325	10/12/2009 10:15:00	87.32	32.94	
4325.5	10/12/2009 10:15:30	86.78	32.4	
4326	10/12/2009 10:16:00	86.31	31.93	
4326.5	10/12/2009 10:16:30	85.89	31.51	
4327	10/12/2009 10:17:00	85.36	30.98	
4327.5	10/12/2009 10:17:30	85.03	30.65	
4328	10/12/2009 10:18:00	84.62	30.24	
4328.5	10/12/2009 10:18:30	84.28	29.9	
4329	10/12/2009 10:19:00	83.91	29.53	
4329.5	10/12/2009 10:19:30	83.59	29.21	
4330	10/12/2009 10:20:00	83.31	28.93	
4331	10/12/2009 10:21:00	82.68	28.3	
4332	10/12/2009 10:22:00	82.15	27.77	
4333	10/12/2009 10:23:00	81.61	27.23	
4334	10/12/2009 10:24:00	81.23	26.85	
4335	10/12/2009 10:25:00	80.83	26.45	
4340	10/12/2009 10:30:00	79.02	24.64	
4345	10/12/2009 10:35:00	77.7	23.32	
4350	10/12/2009 10:40:00	76.59	22.21	
4355	10/12/2009 10:45:00	75.69	21.31	
4360	10/12/2009 10:50:00	74.93	20.55	
4365	10/12/2009 10:55:00	74.25	19.87	
4370	10/12/2009 11:00:00	73.77	19.39	
4375	10/12/2009 11:05:00	73.22	18.84	
4380	10/12/2009 11:10:00	72.71	18.33	
4410	10/12/2009 11:40:00	70.8	16.42	
4440	10/12/2009 12:10:00	69.23	14.85	
4470	10/12/2009 12:40:00	68.02	13.64	
4500	10/12/2009 13:10:00	67.26	12.88	
4530	10/12/2009 13:40:00	66.68	12.3	
4560	10/12/2009 14:10:00	66.11	11.73	
4590	10/12/2009 14:40:00	65.58	11.2	
4620	10/12/2009 15:10:00	65.08	10.7	
4680	10/12/2009 16:10:00	64.39	10.01	
4740	10/12/2009 17:10:00	63.72	9.34	
4800	10/12/2009 18:10:00	63.01	8.63	
4860	10/12/2009 19:10:00	62.51	8.13	
4920	10/12/2009 20:10:00	62.19	7.81	
4980	10/12/2009 21:10:00	61.83	7.45	
5040	10/12/2009 22:10:00	61.47	7.09	
5100	10/12/2009 23:10:00	61.15	6.77	
5160	10/13/2009 0:10:00	60.87	6.49	
5220	10/13/2009 1:10:00	60.6	6.22	
5280	10/13/2009 2:10:00	60.33	5.95	
5340	10/13/2009 3:10:00	60.1	5.72	
5400	10/13/2009 4:10:00	59.86	5.48	
5460	10/13/2009 5:10:00	59.64	5.26	
5520	10/13/2009 6:10:00	59.4	5.02	
5580	10/13/2009 7:10:00	59.24	4.86	
5640	10/13/2009 8:10:00	58.99	4.61	
5700	10/13/2009 9:10:00	58.73	4.35	
5760	10/13/2009 10:10:00	58.61	4.23	

W-SMC :: 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	59.89 feet, below top of casing [btc] (approx. 14 inches above ground)

Elapsed Time (minutes)	Time	W-SMC		Totalizer readings. observations, odors, clarity, notes.
		Depth to Groundwater	Drawdown (feet)	
6240	10/13/2009 18:10:00	57.4	3.02	
7440	10/14/2009 14:10:00	56.49	2.11	
7920	10/14/2009 22:10:00	55.93	1.55	
8898	10/15/2009 14:28:00	54.38	0	

Water Sampling Notes
Water Sample at 10/12/09 10:05 AM (END); clear, no odor

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
0	10/9/09 10:10	55.36	0.00
1	10/9/09 10:11	55.36	0.00
2	10/9/09 10:12	55.36	0.00
3	10/9/09 10:13	55.36	0.00
4	10/9/09 10:14	55.35	-0.01
5	10/9/09 10:15	55.35	-0.01
6	10/9/09 10:16	55.35	-0.01
7	10/9/09 10:17	55.35	-0.01
8	10/9/09 10:18	55.35	-0.01
9	10/9/09 10:19	55.35	-0.01
10	10/9/09 10:20	55.34	-0.02
11	10/9/09 10:21	55.34	-0.02
12	10/9/09 10:22	55.34	-0.02
13	10/9/09 10:23	55.34	-0.02
14	10/9/09 10:24	55.34	-0.02
15	10/9/09 10:25	55.34	-0.02
16	10/9/09 10:26	55.34	-0.02
17	10/9/09 10:27	55.34	-0.02
18	10/9/09 10:28	55.34	-0.02
19	10/9/09 10:29	55.34	-0.02
20	10/9/09 10:30	55.34	-0.02
21	10/9/09 10:31	55.34	-0.02
22	10/9/09 10:32	55.33	-0.03
23	10/9/09 10:33	55.33	-0.03
24	10/9/09 10:34	55.34	-0.02
25	10/9/09 10:35	55.34	-0.02
26	10/9/09 10:36	55.34	-0.02
27	10/9/09 10:37	55.34	-0.02
28	10/9/09 10:38	55.34	-0.02
29	10/9/09 10:39	55.34	-0.02
30	10/9/09 10:40	55.34	-0.02
31	10/9/09 10:41	55.34	-0.02
32	10/9/09 10:42	55.34	-0.02
33	10/9/09 10:43	55.34	-0.02
34	10/9/09 10:44	55.34	-0.02
35	10/9/09 10:45	55.34	-0.02
36	10/9/09 10:46	55.34	-0.02
37	10/9/09 10:47	55.34	-0.02
38	10/9/09 10:48	55.35	-0.01
39	10/9/09 10:49	55.35	-0.01
40	10/9/09 10:50	55.35	-0.01
41	10/9/09 10:51	55.35	-0.01
42	10/9/09 10:52	55.35	-0.01
43	10/9/09 10:53	55.35	-0.01
44	10/9/09 10:54	55.35	-0.01
45	10/9/09 10:55	55.36	0.00
46	10/9/09 10:56	55.36	0.00
47	10/9/09 10:57	55.36	0.00
48	10/9/09 10:58	55.36	0.00
49	10/9/09 10:59	55.37	0.01
50	10/9/09 11:00	55.37	0.01
51	10/9/09 11:01	55.37	0.01
52	10/9/09 11:02	55.37	0.01

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
53	10/9/09 11:03	55.37	0.01
54	10/9/09 11:04	55.38	0.02
55	10/9/09 11:05	55.38	0.02
56	10/9/09 11:06	55.38	0.02
57	10/9/09 11:07	55.38	0.02
58	10/9/09 11:08	55.39	0.03
59	10/9/09 11:09	55.39	0.03
60	10/9/09 11:10	55.39	0.03
61	10/9/09 11:11	55.40	0.04
62	10/9/09 11:12	55.40	0.04
63	10/9/09 11:13	55.40	0.04
64	10/9/09 11:14	55.40	0.04
65	10/9/09 11:15	55.40	0.04
66	10/9/09 11:16	55.41	0.05
67	10/9/09 11:17	55.41	0.05
68	10/9/09 11:18	55.41	0.05
69	10/9/09 11:19	55.41	0.05
70	10/9/09 11:20	55.42	0.06
71	10/9/09 11:21	55.42	0.06
72	10/9/09 11:22	55.42	0.06
73	10/9/09 11:23	55.43	0.07
74	10/9/09 11:24	55.43	0.07
75	10/9/09 11:25	55.43	0.07
76	10/9/09 11:26	55.44	0.08
77	10/9/09 11:27	55.44	0.08
78	10/9/09 11:28	55.44	0.08
79	10/9/09 11:29	55.45	0.09
80	10/9/09 11:30	55.45	0.09
81	10/9/09 11:31	55.45	0.09
82	10/9/09 11:32	55.45	0.09
83	10/9/09 11:33	55.46	0.10
84	10/9/09 11:34	55.46	0.10
85	10/9/09 11:35	55.47	0.11
86	10/9/09 11:36	55.47	0.11
87	10/9/09 11:37	55.47	0.11
88	10/9/09 11:38	55.47	0.11
89	10/9/09 11:39	55.48	0.12
92	10/9/09 11:42	55.49	0.13
93	10/9/09 11:43	55.49	0.13
94	10/9/09 11:44	55.49	0.13
95	10/9/09 11:45	55.50	0.14
96	10/9/09 11:46	55.50	0.14
97	10/9/09 11:47	55.50	0.14
98	10/9/09 11:48	55.51	0.15
99	10/9/09 11:49	55.51	0.15
100	10/9/09 11:50	55.52	0.16
101	10/9/09 11:51	55.52	0.16
102	10/9/09 11:52	55.52	0.16
103	10/9/09 11:53	55.53	0.17
104	10/9/09 11:54	55.53	0.17
105	10/9/09 11:55	55.53	0.17
106	10/9/09 11:56	55.54	0.18
107	10/9/09 11:57	55.54	0.18

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
108	10/9/09 11:58	55.54	0.18
109	10/9/09 11:59	55.55	0.19
110	10/9/09 12:00	55.55	0.19
111	10/9/09 12:01	55.56	0.20
112	10/9/09 12:02	55.56	0.20
113	10/9/09 12:03	55.56	0.20
114	10/9/09 12:04	55.57	0.21
115	10/9/09 12:05	55.57	0.21
116	10/9/09 12:06	55.57	0.21
117	10/9/09 12:07	55.58	0.22
118	10/9/09 12:08	55.58	0.22
119	10/9/09 12:09	55.59	0.23
120	10/9/09 12:10	55.59	0.23
121	10/9/09 12:11	55.59	0.23
122	10/9/09 12:12	55.60	0.24
123	10/9/09 12:13	55.60	0.24
124	10/9/09 12:14	55.61	0.25
125	10/9/09 12:15	55.61	0.25
126	10/9/09 12:16	55.61	0.25
127	10/9/09 12:17	55.62	0.26
128	10/9/09 12:18	55.62	0.26
129	10/9/09 12:19	55.63	0.27
130	10/9/09 12:20	55.63	0.27
131	10/9/09 12:21	55.63	0.27
132	10/9/09 12:22	55.64	0.28
133	10/9/09 12:23	55.64	0.28
134	10/9/09 12:24	55.64	0.28
135	10/9/09 12:25	55.65	0.29
136	10/9/09 12:26	55.65	0.29
137	10/9/09 12:27	55.66	0.30
138	10/9/09 12:28	55.66	0.30
139	10/9/09 12:29	55.66	0.30
140	10/9/09 12:30	55.67	0.31
141	10/9/09 12:31	55.67	0.31
142	10/9/09 12:32	55.68	0.32
143	10/9/09 12:33	55.68	0.32
144	10/9/09 12:34	55.68	0.32
145	10/9/09 12:35	55.69	0.33
146	10/9/09 12:36	55.69	0.33
147	10/9/09 12:37	55.70	0.34
148	10/9/09 12:38	55.70	0.34
149	10/9/09 12:39	55.70	0.34
150	10/9/09 12:40	55.71	0.35
151	10/9/09 12:41	55.71	0.35
152	10/9/09 12:42	55.72	0.36
153	10/9/09 12:43	55.72	0.36
154	10/9/09 12:44	55.72	0.36
155	10/9/09 12:45	55.73	0.37
156	10/9/09 12:46	55.73	0.37
157	10/9/09 12:47	55.73	0.37
158	10/9/09 12:48	55.74	0.38
159	10/9/09 12:49	55.74	0.38
160	10/9/09 12:50	55.75	0.39

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
161	10/9/09 12:51	55.75	0.39
162	10/9/09 12:52	55.75	0.39
163	10/9/09 12:53	55.76	0.40
164	10/9/09 12:54	55.76	0.40
165	10/9/09 12:55	55.77	0.41
166	10/9/09 12:56	55.77	0.41
167	10/9/09 12:57	55.77	0.41
168	10/9/09 12:58	55.78	0.42
169	10/9/09 12:59	55.78	0.42
170	10/9/09 13:00	55.78	0.42
171	10/9/09 13:01	55.79	0.43
172	10/9/09 13:02	55.79	0.43
173	10/9/09 13:03	55.80	0.44
174	10/9/09 13:04	55.80	0.44
175	10/9/09 13:05	55.80	0.44
176	10/9/09 13:06	55.81	0.45
177	10/9/09 13:07	55.81	0.45
178	10/9/09 13:08	55.82	0.46
179	10/9/09 13:09	55.82	0.46
180	10/9/09 13:10	55.82	0.46
181	10/9/09 13:11	55.83	0.47
182	10/9/09 13:12	55.83	0.47
183	10/9/09 13:13	55.84	0.48
184	10/9/09 13:14	55.84	0.48
185	10/9/09 13:15	55.84	0.48
186	10/9/09 13:16	55.85	0.49
187	10/9/09 13:17	55.85	0.49
188	10/9/09 13:18	55.86	0.50
189	10/9/09 13:19	55.86	0.50
190	10/9/09 13:20	55.86	0.50
191	10/9/09 13:21	55.87	0.51
192	10/9/09 13:22	55.87	0.51
193	10/9/09 13:23	55.87	0.51
194	10/9/09 13:24	55.88	0.52
195	10/9/09 13:25	55.88	0.52
196	10/9/09 13:26	55.88	0.52
197	10/9/09 13:27	55.89	0.53
198	10/9/09 13:28	55.89	0.53
199	10/9/09 13:29	55.89	0.53
200	10/9/09 13:30	55.90	0.54
201	10/9/09 13:31	55.90	0.54
202	10/9/09 13:32	55.91	0.55
203	10/9/09 13:33	55.91	0.55
204	10/9/09 13:34	55.91	0.55
205	10/9/09 13:35	55.92	0.56
206	10/9/09 13:36	55.92	0.56
207	10/9/09 13:37	55.92	0.56
208	10/9/09 13:38	55.93	0.57
209	10/9/09 13:39	55.93	0.57
210	10/9/09 13:40	55.93	0.57
211	10/9/09 13:41	55.94	0.58
212	10/9/09 13:42	55.94	0.58
213	10/9/09 13:43	55.95	0.59

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
214	10/9/09 13:44	55.95	0.59
215	10/9/09 13:45	55.95	0.59
216	10/9/09 13:46	55.96	0.60
217	10/9/09 13:47	55.96	0.60
218	10/9/09 13:48	55.97	0.61
219	10/9/09 13:49	55.97	0.61
220	10/9/09 13:50	55.97	0.61
221	10/9/09 13:51	55.97	0.61
222	10/9/09 13:52	55.98	0.62
223	10/9/09 13:53	55.98	0.62
224	10/9/09 13:54	55.99	0.63
225	10/9/09 13:55	55.99	0.63
226	10/9/09 13:56	55.99	0.63
227	10/9/09 13:57	56.00	0.64
228	10/9/09 13:58	56.00	0.64
229	10/9/09 13:59	56.00	0.64
230	10/9/09 14:00	56.01	0.65
231	10/9/09 14:01	56.01	0.65
232	10/9/09 14:02	56.02	0.66
233	10/9/09 14:03	56.02	0.66
234	10/9/09 14:04	56.02	0.66
235	10/9/09 14:05	56.03	0.67
236	10/9/09 14:06	56.03	0.67
237	10/9/09 14:07	56.03	0.67
238	10/9/09 14:08	56.04	0.68
239	10/9/09 14:09	56.04	0.68
240	10/9/09 14:10	56.04	0.68
241	10/9/09 14:11	56.05	0.69
242	10/9/09 14:12	56.05	0.69
243	10/9/09 14:13	56.06	0.70
244	10/9/09 14:14	56.06	0.70
245	10/9/09 14:15	56.06	0.70
246	10/9/09 14:16	56.06	0.70
247	10/9/09 14:17	56.07	0.71
248	10/9/09 14:18	56.07	0.71
249	10/9/09 14:19	56.07	0.71
250	10/9/09 14:20	56.08	0.72
251	10/9/09 14:21	56.08	0.72
252	10/9/09 14:22	56.08	0.72
253	10/9/09 14:23	56.09	0.73
254	10/9/09 14:24	56.09	0.73
255	10/9/09 14:25	56.10	0.74
256	10/9/09 14:26	56.10	0.74
257	10/9/09 14:27	56.10	0.74
258	10/9/09 14:28	56.11	0.75
259	10/9/09 14:29	56.11	0.75
260	10/9/09 14:30	56.11	0.75
261	10/9/09 14:31	56.11	0.75
262	10/9/09 14:32	56.12	0.76
264	10/9/09 14:34	56.13	0.77
265	10/9/09 14:35	56.13	0.77
266	10/9/09 14:36	56.13	0.77
267	10/9/09 14:37	56.14	0.78

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
268	10/9/09 14:38	56.14	0.78
269	10/9/09 14:39	56.14	0.78
270	10/9/09 14:40	56.15	0.79
271	10/9/09 14:41	56.15	0.79
272	10/9/09 14:42	56.15	0.79
273	10/9/09 14:43	56.16	0.80
274	10/9/09 14:44	56.16	0.80
275	10/9/09 14:45	56.16	0.80
276	10/9/09 14:46	56.17	0.81
277	10/9/09 14:47	56.17	0.81
278	10/9/09 14:48	56.17	0.81
279	10/9/09 14:49	56.18	0.82
280	10/9/09 14:50	56.18	0.82
281	10/9/09 14:51	56.18	0.82
282	10/9/09 14:52	56.19	0.83
283	10/9/09 14:53	56.19	0.83
284	10/9/09 14:54	56.19	0.83
285	10/9/09 14:55	56.20	0.84
286	10/9/09 14:56	56.20	0.84
287	10/9/09 14:57	56.20	0.84
288	10/9/09 14:58	56.21	0.85
289	10/9/09 14:59	56.21	0.85
290	10/9/09 15:00	56.21	0.85
291	10/9/09 15:01	56.22	0.86
292	10/9/09 15:02	56.22	0.86
293	10/9/09 15:03	56.22	0.86
294	10/9/09 15:04	56.23	0.87
295	10/9/09 15:05	56.23	0.87
296	10/9/09 15:06	56.23	0.87
297	10/9/09 15:07	56.24	0.88
298	10/9/09 15:08	56.24	0.88
299	10/9/09 15:09	56.24	0.88
300	10/9/09 15:10	56.24	0.88
301	10/9/09 15:11	56.25	0.89
302	10/9/09 15:12	56.25	0.89
303	10/9/09 15:13	56.26	0.90
304	10/9/09 15:14	56.26	0.90
305	10/9/09 15:15	56.26	0.90
306	10/9/09 15:16	56.26	0.90
307	10/9/09 15:17	56.27	0.91
308	10/9/09 15:18	56.27	0.91
309	10/9/09 15:19	56.27	0.91
310	10/9/09 15:20	56.28	0.92
311	10/9/09 15:21	56.28	0.92
312	10/9/09 15:22	56.29	0.93
313	10/9/09 15:23	56.29	0.93
314	10/9/09 15:24	56.29	0.93
315	10/9/09 15:25	56.29	0.93
316	10/9/09 15:26	56.30	0.94
317	10/9/09 15:27	56.30	0.94
318	10/9/09 15:28	56.30	0.94
319	10/9/09 15:29	56.31	0.95
320	10/9/09 15:30	56.31	0.95

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:		2009-10-09 10:10 AM
End Pumping:		2009-10-12 10:10 AM
Initial Volume:		271729 x1000 gal
Final Volume:		272391 x1000 gal
Water Level at Start of Pump Test:		55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
321	10/9/09 15:31	56.31	0.95
322	10/9/09 15:32	56.31	0.95
323	10/9/09 15:33	56.32	0.96
324	10/9/09 15:34	56.32	0.96
325	10/9/09 15:35	56.33	0.97
326	10/9/09 15:36	56.33	0.97
327	10/9/09 15:37	56.33	0.97
328	10/9/09 15:38	56.33	0.97
329	10/9/09 15:39	56.34	0.98
330	10/9/09 15:40	56.34	0.98
331	10/9/09 15:41	56.35	0.99
332	10/9/09 15:42	56.35	0.99
333	10/9/09 15:43	56.35	0.99
334	10/9/09 15:44	56.35	0.99
335	10/9/09 15:45	56.36	1.00
336	10/9/09 15:46	56.36	1.00
337	10/9/09 15:47	56.36	1.00
338	10/9/09 15:48	56.37	1.01
339	10/9/09 15:49	56.37	1.01
340	10/9/09 15:50	56.37	1.01
341	10/9/09 15:51	56.38	1.02
342	10/9/09 15:52	56.38	1.02
343	10/9/09 15:53	56.38	1.02
344	10/9/09 15:54	56.39	1.03
345	10/9/09 15:55	56.39	1.03
346	10/9/09 15:56	56.39	1.03
347	10/9/09 15:57	56.39	1.03
348	10/9/09 15:58	56.40	1.04
349	10/9/09 15:59	56.40	1.04
350	10/9/09 16:00	56.40	1.04
351	10/9/09 16:01	56.41	1.05
352	10/9/09 16:02	56.41	1.05
353	10/9/09 16:03	56.41	1.05
354	10/9/09 16:04	56.42	1.06
355	10/9/09 16:05	56.42	1.06
356	10/9/09 16:06	56.42	1.06
357	10/9/09 16:07	56.42	1.06
358	10/9/09 16:08	56.43	1.07
359	10/9/09 16:09	56.43	1.07
360	10/9/09 16:10	56.43	1.07
361	10/9/09 16:11	56.44	1.08
362	10/9/09 16:12	56.44	1.08
363	10/9/09 16:13	56.44	1.08
364	10/9/09 16:14	56.44	1.08
365	10/9/09 16:15	56.45	1.09
366	10/9/09 16:16	56.45	1.09
367	10/9/09 16:17	56.45	1.09
368	10/9/09 16:18	56.46	1.10
369	10/9/09 16:19	56.46	1.10
370	10/9/09 16:20	56.47	1.11
371	10/9/09 16:21	56.47	1.11
372	10/9/09 16:22	56.47	1.11
373	10/9/09 16:23	56.47	1.11

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
374	10/9/09 16:24	56.47	1.11
375	10/9/09 16:25	56.48	1.12
376	10/9/09 16:26	56.48	1.12
377	10/9/09 16:27	56.48	1.12
378	10/9/09 16:28	56.49	1.13
379	10/9/09 16:29	56.49	1.13
380	10/9/09 16:30	56.49	1.13
381	10/9/09 16:31	56.50	1.14
382	10/9/09 16:32	56.50	1.14
383	10/9/09 16:33	56.50	1.14
384	10/9/09 16:34	56.50	1.14
385	10/9/09 16:35	56.51	1.15
386	10/9/09 16:36	56.51	1.15
387	10/9/09 16:37	56.51	1.15
388	10/9/09 16:38	56.51	1.15
389	10/9/09 16:39	56.52	1.16
390	10/9/09 16:40	56.52	1.16
391	10/9/09 16:41	56.52	1.16
392	10/9/09 16:42	56.53	1.17
393	10/9/09 16:43	56.53	1.17
394	10/9/09 16:44	56.53	1.17
395	10/9/09 16:45	56.53	1.17
396	10/9/09 16:46	56.54	1.18
397	10/9/09 16:47	56.54	1.18
398	10/9/09 16:48	56.54	1.18
399	10/9/09 16:49	56.55	1.19
400	10/9/09 16:50	56.55	1.19
401	10/9/09 16:51	56.55	1.19
402	10/9/09 16:52	56.55	1.19
403	10/9/09 16:53	56.56	1.20
404	10/9/09 16:54	56.56	1.20
405	10/9/09 16:55	56.56	1.20
406	10/9/09 16:56	56.57	1.21
407	10/9/09 16:57	56.57	1.21
408	10/9/09 16:58	56.57	1.21
409	10/9/09 16:59	56.57	1.21
410	10/9/09 17:00	56.58	1.22
411	10/9/09 17:01	56.58	1.22
412	10/9/09 17:02	56.58	1.22
413	10/9/09 17:03	56.59	1.23
414	10/9/09 17:04	56.59	1.23
415	10/9/09 17:05	56.59	1.23
416	10/9/09 17:06	56.59	1.23
417	10/9/09 17:07	56.60	1.24
418	10/9/09 17:08	56.60	1.24
419	10/9/09 17:09	56.60	1.24
420	10/9/09 17:10	56.60	1.24
421	10/9/09 17:11	56.61	1.25
422	10/9/09 17:12	56.61	1.25
423	10/9/09 17:13	56.61	1.25
424	10/9/09 17:14	56.61	1.25
425	10/9/09 17:15	56.62	1.26
426	10/9/09 17:16	56.62	1.26

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
427	10/9/09 17:17	56.62	1.26
428	10/9/09 17:18	56.63	1.27
429	10/9/09 17:19	56.63	1.27
430	10/9/09 17:20	56.63	1.27
431	10/9/09 17:21	56.64	1.28
432	10/9/09 17:22	56.64	1.28
433	10/9/09 17:23	56.64	1.28
434	10/9/09 17:24	56.64	1.28
435	10/9/09 17:25	56.65	1.29
436	10/9/09 17:26	56.65	1.29
437	10/9/09 17:27	56.65	1.29
438	10/9/09 17:28	56.65	1.29
439	10/9/09 17:29	56.66	1.30
440	10/9/09 17:30	56.66	1.30
441	10/9/09 17:31	56.66	1.30
442	10/9/09 17:32	56.67	1.31
443	10/9/09 17:33	56.67	1.31
444	10/9/09 17:34	56.67	1.31
445	10/9/09 17:35	56.67	1.31
446	10/9/09 17:36	56.68	1.32
447	10/9/09 17:37	56.68	1.32
448	10/9/09 17:38	56.68	1.32
449	10/9/09 17:39	56.68	1.32
450	10/9/09 17:40	56.69	1.33
451	10/9/09 17:41	56.69	1.33
452	10/9/09 17:42	56.69	1.33
453	10/9/09 17:43	56.69	1.33
454	10/9/09 17:44	56.70	1.34
455	10/9/09 17:45	56.70	1.34
456	10/9/09 17:46	56.70	1.34
457	10/9/09 17:47	56.70	1.34
458	10/9/09 17:48	56.71	1.35
464	10/9/09 17:54	56.72	1.36
465	10/9/09 17:55	56.72	1.36
466	10/9/09 17:56	56.72	1.36
467	10/9/09 17:57	56.73	1.37
468	10/9/09 17:58	56.73	1.37
469	10/9/09 17:59	56.73	1.37
470	10/9/09 18:00	56.73	1.37
471	10/9/09 18:01	56.74	1.38
472	10/9/09 18:02	56.74	1.38
473	10/9/09 18:03	56.74	1.38
474	10/9/09 18:04	56.75	1.39
475	10/9/09 18:05	56.74	1.38
476	10/9/09 18:06	56.75	1.39
477	10/9/09 18:07	56.75	1.39
478	10/9/09 18:08	56.75	1.39
479	10/9/09 18:09	56.76	1.40
480	10/9/09 18:10	56.76	1.40
481	10/9/09 18:11	56.76	1.40
482	10/9/09 18:12	56.76	1.40
483	10/9/09 18:13	56.76	1.40
484	10/9/09 18:14	56.77	1.41

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
485	10/9/09 18:15	56.77	1.41
486	10/9/09 18:16	56.77	1.41
487	10/9/09 18:17	56.77	1.41
488	10/9/09 18:18	56.78	1.42
489	10/9/09 18:19	56.78	1.42
490	10/9/09 18:20	56.78	1.42
491	10/9/09 18:21	56.78	1.42
492	10/9/09 18:22	56.79	1.43
493	10/9/09 18:23	56.79	1.43
494	10/9/09 18:24	56.79	1.43
495	10/9/09 18:25	56.79	1.43
496	10/9/09 18:26	56.80	1.44
497	10/9/09 18:27	56.80	1.44
498	10/9/09 18:28	56.80	1.44
499	10/9/09 18:29	56.80	1.44
500	10/9/09 18:30	56.80	1.44
501	10/9/09 18:31	56.81	1.45
502	10/9/09 18:32	56.81	1.45
503	10/9/09 18:33	56.81	1.45
504	10/9/09 18:34	56.82	1.46
505	10/9/09 18:35	56.82	1.46
506	10/9/09 18:36	56.82	1.46
507	10/9/09 18:37	56.82	1.46
508	10/9/09 18:38	56.82	1.46
509	10/9/09 18:39	56.83	1.47
510	10/9/09 18:40	56.83	1.47
511	10/9/09 18:41	56.83	1.47
512	10/9/09 18:42	56.83	1.47
513	10/9/09 18:43	56.84	1.48
514	10/9/09 18:44	56.84	1.48
515	10/9/09 18:45	56.84	1.48
516	10/9/09 18:46	56.84	1.48
517	10/9/09 18:47	56.84	1.48
518	10/9/09 18:48	56.84	1.48
519	10/9/09 18:49	56.85	1.49
520	10/9/09 18:50	56.85	1.49
521	10/9/09 18:51	56.85	1.49
522	10/9/09 18:52	56.86	1.50
523	10/9/09 18:53	56.86	1.50
524	10/9/09 18:54	56.86	1.50
525	10/9/09 18:55	56.86	1.50
526	10/9/09 18:56	56.86	1.50
527	10/9/09 18:57	56.87	1.51
528	10/9/09 18:58	56.87	1.51
529	10/9/09 18:59	56.87	1.51
530	10/9/09 19:00	56.87	1.51
531	10/9/09 19:01	56.88	1.52
532	10/9/09 19:02	56.88	1.52
533	10/9/09 19:03	56.88	1.52
534	10/9/09 19:04	56.88	1.52
535	10/9/09 19:05	56.89	1.53
536	10/9/09 19:06	56.89	1.53
537	10/9/09 19:07	56.89	1.53

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
538	10/9/09 19:08	56.89	1.53
539	10/9/09 19:09	56.89	1.53
540	10/9/09 19:10	56.90	1.54
541	10/9/09 19:11	56.90	1.54
542	10/9/09 19:12	56.90	1.54
543	10/9/09 19:13	56.90	1.54
544	10/9/09 19:14	56.90	1.54
545	10/9/09 19:15	56.91	1.55
546	10/9/09 19:16	56.91	1.55
547	10/9/09 19:17	56.91	1.55
548	10/9/09 19:18	56.91	1.55
549	10/9/09 19:19	56.92	1.56
550	10/9/09 19:20	56.92	1.56
551	10/9/09 19:21	56.92	1.56
552	10/9/09 19:22	56.92	1.56
553	10/9/09 19:23	56.92	1.56
554	10/9/09 19:24	56.93	1.57
555	10/9/09 19:25	56.93	1.57
556	10/9/09 19:26	56.93	1.57
557	10/9/09 19:27	56.93	1.57
558	10/9/09 19:28	56.93	1.57
559	10/9/09 19:29	56.94	1.58
560	10/9/09 19:30	56.94	1.58
561	10/9/09 19:31	56.94	1.58
562	10/9/09 19:32	56.94	1.58
563	10/9/09 19:33	56.94	1.58
564	10/9/09 19:34	56.95	1.59
565	10/9/09 19:35	56.95	1.59
566	10/9/09 19:36	56.95	1.59
567	10/9/09 19:37	56.96	1.60
568	10/9/09 19:38	56.96	1.60
569	10/9/09 19:39	56.96	1.60
570	10/9/09 19:40	56.96	1.60
571	10/9/09 19:41	56.96	1.60
572	10/9/09 19:42	56.96	1.60
573	10/9/09 19:43	56.97	1.61
574	10/9/09 19:44	56.97	1.61
575	10/9/09 19:45	56.97	1.61
576	10/9/09 19:46	56.97	1.61
577	10/9/09 19:47	56.98	1.62
578	10/9/09 19:48	56.98	1.62
579	10/9/09 19:49	56.98	1.62
580	10/9/09 19:50	56.98	1.62
581	10/9/09 19:51	56.98	1.62
582	10/9/09 19:52	56.99	1.63
583	10/9/09 19:53	56.99	1.63
584	10/9/09 19:54	56.99	1.63
585	10/9/09 19:55	56.99	1.63
586	10/9/09 19:56	57.00	1.64
587	10/9/09 19:57	57.00	1.64
588	10/9/09 19:58	57.00	1.64
589	10/9/09 19:59	57.00	1.64
590	10/9/09 20:00	57.00	1.64

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
591	10/9/09 20:01	57.00	1.64
592	10/9/09 20:02	57.01	1.65
593	10/9/09 20:03	57.01	1.65
594	10/9/09 20:04	57.01	1.65
595	10/9/09 20:05	57.01	1.65
596	10/9/09 20:06	57.02	1.66
597	10/9/09 20:07	57.02	1.66
598	10/9/09 20:08	57.02	1.66
599	10/9/09 20:09	57.02	1.66
600	10/9/09 20:10	57.02	1.66
601	10/9/09 20:11	57.02	1.66
602	10/9/09 20:12	57.03	1.67
603	10/9/09 20:13	57.03	1.67
604	10/9/09 20:14	57.03	1.67
605	10/9/09 20:15	57.03	1.67
606	10/9/09 20:16	57.03	1.67
607	10/9/09 20:17	57.04	1.68
608	10/9/09 20:18	57.04	1.68
609	10/9/09 20:19	57.04	1.68
610	10/9/09 20:20	57.04	1.68
611	10/9/09 20:21	57.04	1.68
612	10/9/09 20:22	57.05	1.69
613	10/9/09 20:23	57.05	1.69
614	10/9/09 20:24	57.05	1.69
615	10/9/09 20:25	57.05	1.69
616	10/9/09 20:26	57.05	1.69
617	10/9/09 20:27	57.06	1.70
618	10/9/09 20:28	57.06	1.70
619	10/9/09 20:29	57.06	1.70
620	10/9/09 20:30	57.06	1.70
621	10/9/09 20:31	57.06	1.70
622	10/9/09 20:32	57.07	1.71
623	10/9/09 20:33	57.07	1.71
624	10/9/09 20:34	57.07	1.71
625	10/9/09 20:35	57.07	1.71
626	10/9/09 20:36	57.07	1.71
627	10/9/09 20:37	57.07	1.71
628	10/9/09 20:38	57.08	1.72
629	10/9/09 20:39	57.08	1.72
630	10/9/09 20:40	57.08	1.72
631	10/9/09 20:41	57.08	1.72
632	10/9/09 20:42	57.09	1.73
633	10/9/09 20:43	57.09	1.73
634	10/9/09 20:44	57.09	1.73
635	10/9/09 20:45	57.09	1.73
636	10/9/09 20:46	57.09	1.73
637	10/9/09 20:47	57.10	1.74
638	10/9/09 20:48	57.10	1.74
639	10/9/09 20:49	57.10	1.74
640	10/9/09 20:50	57.10	1.74
641	10/9/09 20:51	57.10	1.74
642	10/9/09 20:52	57.10	1.74
643	10/9/09 20:53	57.11	1.75

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
644	10/9/09 20:54	57.11	1.75
645	10/9/09 20:55	57.11	1.75
646	10/9/09 20:56	57.11	1.75
647	10/9/09 20:57	57.11	1.75
648	10/9/09 20:58	57.12	1.76
649	10/9/09 20:59	57.12	1.76
650	10/9/09 21:00	57.12	1.76
651	10/9/09 21:01	57.12	1.76
652	10/9/09 21:02	57.12	1.76
653	10/9/09 21:03	57.12	1.76
654	10/9/09 21:04	57.13	1.77
655	10/9/09 21:05	57.13	1.77
656	10/9/09 21:06	57.13	1.77
657	10/9/09 21:07	57.13	1.77
658	10/9/09 21:08	57.13	1.77
659	10/9/09 21:09	57.14	1.78
660	10/9/09 21:10	57.14	1.78
661	10/9/09 21:11	57.14	1.78
662	10/9/09 21:12	57.14	1.78
663	10/9/09 21:13	57.14	1.78
664	10/9/09 21:14	57.15	1.79
665	10/9/09 21:15	57.15	1.79
666	10/9/09 21:16	57.15	1.79
667	10/9/09 21:17	57.15	1.79
668	10/9/09 21:18	57.15	1.79
669	10/9/09 21:19	57.15	1.79
670	10/9/09 21:20	57.16	1.80
671	10/9/09 21:21	57.16	1.80
672	10/9/09 21:22	57.16	1.80
673	10/9/09 21:23	57.16	1.80
674	10/9/09 21:24	57.16	1.80
675	10/9/09 21:25	57.16	1.80
676	10/9/09 21:26	57.17	1.81
677	10/9/09 21:27	57.17	1.81
678	10/9/09 21:28	57.17	1.81
679	10/9/09 21:29	57.17	1.81
680	10/9/09 21:30	57.18	1.82
681	10/9/09 21:31	57.18	1.82
682	10/9/09 21:32	57.18	1.82
683	10/9/09 21:33	57.18	1.82
684	10/9/09 21:34	57.18	1.82
685	10/9/09 21:35	57.18	1.82
686	10/9/09 21:36	57.19	1.83
687	10/9/09 21:37	57.19	1.83
688	10/9/09 21:38	57.19	1.83
689	10/9/09 21:39	57.19	1.83
690	10/9/09 21:40	57.19	1.83
691	10/9/09 21:41	57.19	1.83
692	10/9/09 21:42	57.19	1.83
693	10/9/09 21:43	57.20	1.84
694	10/9/09 21:44	57.20	1.84
695	10/9/09 21:45	57.20	1.84
696	10/9/09 21:46	57.20	1.84

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
697	10/9/09 21:47	57.20	1.84
698	10/9/09 21:48	57.21	1.85
699	10/9/09 21:49	57.21	1.85
700	10/9/09 21:50	57.21	1.85
701	10/9/09 21:51	57.21	1.85
702	10/9/09 21:52	57.21	1.85
703	10/9/09 21:53	57.21	1.85
704	10/9/09 21:54	57.22	1.86
705	10/9/09 21:55	57.22	1.86
706	10/9/09 21:56	57.22	1.86
707	10/9/09 21:57	57.22	1.86
708	10/9/09 21:58	57.22	1.86
709	10/9/09 21:59	57.23	1.87
710	10/9/09 22:00	57.23	1.87
711	10/9/09 22:01	57.23	1.87
712	10/9/09 22:02	57.23	1.87
713	10/9/09 22:03	57.23	1.87
714	10/9/09 22:04	57.23	1.87
715	10/9/09 22:05	57.24	1.88
716	10/9/09 22:06	57.24	1.88
717	10/9/09 22:07	57.24	1.88
718	10/9/09 22:08	57.24	1.88
719	10/9/09 22:09	57.24	1.88
720	10/9/09 22:10	57.24	1.88
721	10/9/09 22:11	57.25	1.89
722	10/9/09 22:12	57.25	1.89
723	10/9/09 22:13	57.25	1.89
724	10/9/09 22:14	57.25	1.89
725	10/9/09 22:15	57.25	1.89
726	10/9/09 22:16	57.25	1.89
727	10/9/09 22:17	57.26	1.90
728	10/9/09 22:18	57.26	1.90
729	10/9/09 22:19	57.26	1.90
730	10/9/09 22:20	57.26	1.90
731	10/9/09 22:21	57.26	1.90
732	10/9/09 22:22	57.26	1.90
733	10/9/09 22:23	57.27	1.91
734	10/9/09 22:24	57.27	1.91
735	10/9/09 22:25	57.27	1.91
736	10/9/09 22:26	57.27	1.91
737	10/9/09 22:27	57.27	1.91
738	10/9/09 22:28	57.27	1.91
739	10/9/09 22:29	57.28	1.92
740	10/9/09 22:30	57.28	1.92
741	10/9/09 22:31	57.28	1.92
742	10/9/09 22:32	57.28	1.92
743	10/9/09 22:33	57.28	1.92
744	10/9/09 22:34	57.28	1.92
745	10/9/09 22:35	57.29	1.93
746	10/9/09 22:36	57.29	1.93
747	10/9/09 22:37	57.29	1.93
748	10/9/09 22:38	57.29	1.93
749	10/9/09 22:39	57.29	1.93

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
750	10/9/09 22:40	57.29	1.93
751	10/9/09 22:41	57.29	1.93
752	10/9/09 22:42	57.30	1.94
753	10/9/09 22:43	57.30	1.94
754	10/9/09 22:44	57.30	1.94
755	10/9/09 22:45	57.30	1.94
756	10/9/09 22:46	57.30	1.94
757	10/9/09 22:47	57.30	1.94
758	10/9/09 22:48	57.31	1.95
759	10/9/09 22:49	57.31	1.95
760	10/9/09 22:50	57.31	1.95
761	10/9/09 22:51	57.31	1.95
762	10/9/09 22:52	57.31	1.95
763	10/9/09 22:53	57.31	1.95
764	10/9/09 22:54	57.32	1.96
765	10/9/09 22:55	57.32	1.96
766	10/9/09 22:56	57.32	1.96
767	10/9/09 22:57	57.32	1.96
768	10/9/09 22:58	57.32	1.96
769	10/9/09 22:59	57.32	1.96
770	10/9/09 23:00	57.33	1.97
771	10/9/09 23:01	57.33	1.97
772	10/9/09 23:02	57.33	1.97
773	10/9/09 23:03	57.33	1.97
774	10/9/09 23:04	57.33	1.97
775	10/9/09 23:05	57.33	1.97
776	10/9/09 23:06	57.33	1.97
777	10/9/09 23:07	57.34	1.98
778	10/9/09 23:08	57.34	1.98
779	10/9/09 23:09	57.34	1.98
780	10/9/09 23:10	57.34	1.98
781	10/9/09 23:11	57.34	1.98
782	10/9/09 23:12	57.35	1.99
783	10/9/09 23:13	57.35	1.99
784	10/9/09 23:14	57.35	1.99
785	10/9/09 23:15	57.35	1.99
786	10/9/09 23:16	57.35	1.99
787	10/9/09 23:17	57.35	1.99
788	10/9/09 23:18	57.35	1.99
789	10/9/09 23:19	57.36	2.00
790	10/9/09 23:20	57.36	2.00
791	10/9/09 23:21	57.36	2.00
792	10/9/09 23:22	57.36	2.00
793	10/9/09 23:23	57.36	2.00
794	10/9/09 23:24	57.36	2.00
795	10/9/09 23:25	57.36	2.00
796	10/9/09 23:26	57.37	2.01
797	10/9/09 23:27	57.37	2.01
798	10/9/09 23:28	57.37	2.01
799	10/9/09 23:29	57.37	2.01
800	10/9/09 23:30	57.37	2.01
801	10/9/09 23:31	57.38	2.02
802	10/9/09 23:32	57.38	2.02

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
803	10/9/09 23:33	57.38	2.02
804	10/9/09 23:34	57.38	2.02
805	10/9/09 23:35	57.38	2.02
806	10/9/09 23:36	57.38	2.02
807	10/9/09 23:37	57.39	2.03
808	10/9/09 23:38	57.39	2.03
809	10/9/09 23:39	57.39	2.03
810	10/9/09 23:40	57.39	2.03
811	10/9/09 23:41	57.39	2.03
812	10/9/09 23:42	57.39	2.03
813	10/9/09 23:43	57.39	2.03
814	10/9/09 23:44	57.40	2.04
815	10/9/09 23:45	57.40	2.04
816	10/9/09 23:46	57.40	2.04
817	10/9/09 23:47	57.40	2.04
818	10/9/09 23:48	57.40	2.04
819	10/9/09 23:49	57.41	2.05
820	10/9/09 23:50	57.41	2.05
821	10/9/09 23:51	57.41	2.05
822	10/9/09 23:52	57.41	2.05
823	10/9/09 23:53	57.41	2.05
824	10/9/09 23:54	57.41	2.05
825	10/9/09 23:55	57.41	2.05
826	10/9/09 23:56	57.41	2.05
827	10/9/09 23:57	57.41	2.05
828	10/9/09 23:58	57.42	2.06
829	10/9/09 23:59	57.42	2.06
830	10/10/09 0:00	57.42	2.06
831	10/10/09 0:01	57.42	2.06
832	10/10/09 0:02	57.42	2.06
833	10/10/09 0:03	57.42	2.06
834	10/10/09 0:04	57.43	2.07
835	10/10/09 0:05	57.43	2.07
836	10/10/09 0:06	57.43	2.07
837	10/10/09 0:07	57.43	2.07
838	10/10/09 0:08	57.43	2.07
839	10/10/09 0:09	57.43	2.07
840	10/10/09 0:10	57.44	2.08
841	10/10/09 0:11	57.44	2.08
842	10/10/09 0:12	57.44	2.08
843	10/10/09 0:13	57.44	2.08
844	10/10/09 0:14	57.44	2.08
845	10/10/09 0:15	57.44	2.08
846	10/10/09 0:16	57.44	2.08
847	10/10/09 0:17	57.44	2.08
848	10/10/09 0:18	57.45	2.09
849	10/10/09 0:19	57.45	2.09
850	10/10/09 0:20	57.45	2.09
851	10/10/09 0:21	57.45	2.09
852	10/10/09 0:22	57.45	2.09
853	10/10/09 0:23	57.45	2.09
854	10/10/09 0:24	57.45	2.09
855	10/10/09 0:25	57.45	2.09

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
856	10/10/09 0:26	57.46	2.10
857	10/10/09 0:27	57.46	2.10
858	10/10/09 0:28	57.46	2.10
859	10/10/09 0:29	57.46	2.10
860	10/10/09 0:30	57.46	2.10
861	10/10/09 0:31	57.46	2.10
862	10/10/09 0:32	57.47	2.11
863	10/10/09 0:33	57.47	2.11
864	10/10/09 0:34	57.47	2.11
865	10/10/09 0:35	57.47	2.11
866	10/10/09 0:36	57.47	2.11
867	10/10/09 0:37	57.47	2.11
868	10/10/09 0:38	57.48	2.12
869	10/10/09 0:39	57.48	2.12
870	10/10/09 0:40	57.48	2.12
871	10/10/09 0:41	57.48	2.12
872	10/10/09 0:42	57.48	2.12
873	10/10/09 0:43	57.48	2.12
874	10/10/09 0:44	57.48	2.12
875	10/10/09 0:45	57.48	2.12
876	10/10/09 0:46	57.48	2.12
877	10/10/09 0:47	57.49	2.13
878	10/10/09 0:48	57.49	2.13
879	10/10/09 0:49	57.49	2.13
880	10/10/09 0:50	57.49	2.13
881	10/10/09 0:51	57.49	2.13
882	10/10/09 0:52	57.50	2.14
883	10/10/09 0:53	57.50	2.14
884	10/10/09 0:54	57.50	2.14
885	10/10/09 0:55	57.50	2.14
886	10/10/09 0:56	57.50	2.14
887	10/10/09 0:57	57.50	2.14
888	10/10/09 0:58	57.50	2.14
889	10/10/09 0:59	57.50	2.14
890	10/10/09 1:00	57.50	2.14
891	10/10/09 1:01	57.51	2.15
892	10/10/09 1:02	57.51	2.15
893	10/10/09 1:03	57.51	2.15
894	10/10/09 1:04	57.51	2.15
895	10/10/09 1:05	57.51	2.15
896	10/10/09 1:06	57.51	2.15
897	10/10/09 1:07	57.51	2.15
898	10/10/09 1:08	57.52	2.16
899	10/10/09 1:09	57.52	2.16
900	10/10/09 1:10	57.52	2.16
901	10/10/09 1:11	57.52	2.16
902	10/10/09 1:12	57.52	2.16
903	10/10/09 1:13	57.52	2.16
904	10/10/09 1:14	57.52	2.16
905	10/10/09 1:15	57.52	2.16
906	10/10/09 1:16	57.53	2.17
907	10/10/09 1:17	57.53	2.17
908	10/10/09 1:18	57.53	2.17

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
909	10/10/09 1:19	57.53	2.17
910	10/10/09 1:20	57.53	2.17
911	10/10/09 1:21	57.53	2.17
912	10/10/09 1:22	57.53	2.17
913	10/10/09 1:23	57.54	2.18
914	10/10/09 1:24	57.54	2.18
915	10/10/09 1:25	57.54	2.18
916	10/10/09 1:26	57.54	2.18
917	10/10/09 1:27	57.54	2.18
918	10/10/09 1:28	57.54	2.18
919	10/10/09 1:29	57.54	2.18
920	10/10/09 1:30	57.54	2.18
921	10/10/09 1:31	57.54	2.18
922	10/10/09 1:32	57.55	2.19
923	10/10/09 1:33	57.55	2.19
924	10/10/09 1:34	57.55	2.19
925	10/10/09 1:35	57.55	2.19
926	10/10/09 1:36	57.55	2.19
927	10/10/09 1:37	57.55	2.19
928	10/10/09 1:38	57.55	2.19
929	10/10/09 1:39	57.55	2.19
930	10/10/09 1:40	57.56	2.20
931	10/10/09 1:41	57.56	2.20
932	10/10/09 1:42	57.56	2.20
933	10/10/09 1:43	57.56	2.20
934	10/10/09 1:44	57.56	2.20
935	10/10/09 1:45	57.56	2.20
936	10/10/09 1:46	57.56	2.20
937	10/10/09 1:47	57.57	2.21
938	10/10/09 1:48	57.57	2.21
939	10/10/09 1:49	57.57	2.21
940	10/10/09 1:50	57.57	2.21
941	10/10/09 1:51	57.57	2.21
942	10/10/09 1:52	57.57	2.21
943	10/10/09 1:53	57.57	2.21
944	10/10/09 1:54	57.57	2.21
945	10/10/09 1:55	57.58	2.22
946	10/10/09 1:56	57.58	2.22
947	10/10/09 1:57	57.58	2.22
948	10/10/09 1:58	57.58	2.22
949	10/10/09 1:59	57.58	2.22
950	10/10/09 2:00	57.58	2.22
951	10/10/09 2:01	57.58	2.22
952	10/10/09 2:02	57.59	2.23
953	10/10/09 2:03	57.59	2.23
954	10/10/09 2:04	57.59	2.23
955	10/10/09 2:05	57.59	2.23
956	10/10/09 2:06	57.59	2.23
957	10/10/09 2:07	57.59	2.23
958	10/10/09 2:08	57.59	2.23
959	10/10/09 2:09	57.60	2.24
960	10/10/09 2:10	57.59	2.23
961	10/10/09 2:11	57.60	2.24

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
962	10/10/09 2:12	57.60	2.24
963	10/10/09 2:13	57.60	2.24
964	10/10/09 2:14	57.60	2.24
965	10/10/09 2:15	57.60	2.24
966	10/10/09 2:16	57.60	2.24
967	10/10/09 2:17	57.60	2.24
968	10/10/09 2:18	57.60	2.24
969	10/10/09 2:19	57.61	2.25
970	10/10/09 2:20	57.61	2.25
971	10/10/09 2:21	57.61	2.25
972	10/10/09 2:22	57.61	2.25
973	10/10/09 2:23	57.61	2.25
974	10/10/09 2:24	57.61	2.25
975	10/10/09 2:25	57.61	2.25
976	10/10/09 2:26	57.61	2.25
977	10/10/09 2:27	57.62	2.26
978	10/10/09 2:28	57.62	2.26
979	10/10/09 2:29	57.62	2.26
980	10/10/09 2:30	57.62	2.26
981	10/10/09 2:31	57.62	2.26
982	10/10/09 2:32	57.62	2.26
983	10/10/09 2:33	57.62	2.26
984	10/10/09 2:34	57.62	2.26
985	10/10/09 2:35	57.63	2.27
986	10/10/09 2:36	57.63	2.27
987	10/10/09 2:37	57.63	2.27
988	10/10/09 2:38	57.63	2.27
989	10/10/09 2:39	57.63	2.27
990	10/10/09 2:40	57.63	2.27
991	10/10/09 2:41	57.63	2.27
992	10/10/09 2:42	57.63	2.27
993	10/10/09 2:43	57.64	2.28
994	10/10/09 2:44	57.64	2.28
995	10/10/09 2:45	57.64	2.28
996	10/10/09 2:46	57.64	2.28
997	10/10/09 2:47	57.64	2.28
998	10/10/09 2:48	57.64	2.28
999	10/10/09 2:49	57.64	2.28
1000	10/10/09 2:50	57.64	2.28
1001	10/10/09 2:51	57.64	2.28
1002	10/10/09 2:52	57.65	2.29
1003	10/10/09 2:53	57.65	2.29
1004	10/10/09 2:54	57.65	2.29
1005	10/10/09 2:55	57.65	2.29
1006	10/10/09 2:56	57.65	2.29
1007	10/10/09 2:57	57.65	2.29
1008	10/10/09 2:58	57.65	2.29
1009	10/10/09 2:59	57.65	2.29
1010	10/10/09 3:00	57.66	2.30
1011	10/10/09 3:01	57.66	2.30
1012	10/10/09 3:02	57.66	2.30
1013	10/10/09 3:03	57.66	2.30
1014	10/10/09 3:04	57.66	2.30

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
1015	10/10/09 3:05	57.66	2.30
1016	10/10/09 3:06	57.66	2.30
1017	10/10/09 3:07	57.67	2.31
1018	10/10/09 3:08	57.66	2.30
1019	10/10/09 3:09	57.67	2.31
1020	10/10/09 3:10	57.67	2.31
1021	10/10/09 3:11	57.67	2.31
1022	10/10/09 3:12	57.67	2.31
1023	10/10/09 3:13	57.67	2.31
1024	10/10/09 3:14	57.67	2.31
1025	10/10/09 3:15	57.67	2.31
1026	10/10/09 3:16	57.68	2.32
1027	10/10/09 3:17	57.68	2.32
1028	10/10/09 3:18	57.68	2.32
1029	10/10/09 3:19	57.68	2.32
1030	10/10/09 3:20	57.68	2.32
1031	10/10/09 3:21	57.68	2.32
1032	10/10/09 3:22	57.68	2.32
1033	10/10/09 3:23	57.68	2.32
1034	10/10/09 3:24	57.68	2.32
1035	10/10/09 3:25	57.69	2.33
1036	10/10/09 3:26	57.69	2.33
1037	10/10/09 3:27	57.69	2.33
1038	10/10/09 3:28	57.69	2.33
1039	10/10/09 3:29	57.69	2.33
1040	10/10/09 3:30	57.69	2.33
1041	10/10/09 3:31	57.69	2.33
1042	10/10/09 3:32	57.69	2.33
1043	10/10/09 3:33	57.70	2.34
1044	10/10/09 3:34	57.69	2.33
1045	10/10/09 3:35	57.70	2.34
1046	10/10/09 3:36	57.70	2.34
1047	10/10/09 3:37	57.70	2.34
1048	10/10/09 3:38	57.70	2.34
1049	10/10/09 3:39	57.70	2.34
1050	10/10/09 3:40	57.70	2.34
1051	10/10/09 3:41	57.70	2.34
1052	10/10/09 3:42	57.71	2.35
1053	10/10/09 3:43	57.71	2.35
1054	10/10/09 3:44	57.71	2.35
1055	10/10/09 3:45	57.71	2.35
1056	10/10/09 3:46	57.71	2.35
1057	10/10/09 3:47	57.71	2.35
1058	10/10/09 3:48	57.71	2.35
1059	10/10/09 3:49	57.71	2.35
1060	10/10/09 3:50	57.71	2.35
1061	10/10/09 3:51	57.72	2.36
1062	10/10/09 3:52	57.71	2.35
1063	10/10/09 3:53	57.72	2.36
1064	10/10/09 3:54	57.72	2.36
1065	10/10/09 3:55	57.72	2.36
1066	10/10/09 3:56	57.72	2.36
1067	10/10/09 3:57	57.72	2.36

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well Approximately 740 feet

Start Pumping: 2009-10-09 10:10 AM

End Pumping: 2009-10-12 10:10 AM

Initial Volume: 271729 x1000 gal

Final Volume: 272391 x1000 gal

Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1068	10/10/09 3:58	57.72	2.36
1069	10/10/09 3:59	57.72	2.36
1070	10/10/09 4:00	57.72	2.36
1071	10/10/09 4:01	57.73	2.37
1072	10/10/09 4:02	57.73	2.37
1073	10/10/09 4:03	57.73	2.37
1074	10/10/09 4:04	57.73	2.37
1075	10/10/09 4:05	57.73	2.37
1076	10/10/09 4:06	57.73	2.37
1077	10/10/09 4:07	57.73	2.37
1078	10/10/09 4:08	57.73	2.37
1079	10/10/09 4:09	57.73	2.37
1080	10/10/09 4:10	57.74	2.38
1081	10/10/09 4:11	57.74	2.38
1082	10/10/09 4:12	57.74	2.38
1083	10/10/09 4:13	57.74	2.38
1084	10/10/09 4:14	57.74	2.38
1085	10/10/09 4:15	57.74	2.38
1086	10/10/09 4:16	57.74	2.38
1087	10/10/09 4:17	57.74	2.38
1088	10/10/09 4:18	57.75	2.39
1089	10/10/09 4:19	57.75	2.39
1090	10/10/09 4:20	57.75	2.39
1091	10/10/09 4:21	57.75	2.39
1092	10/10/09 4:22	57.75	2.39
1093	10/10/09 4:23	57.75	2.39
1094	10/10/09 4:24	57.75	2.39
1095	10/10/09 4:25	57.75	2.39
1096	10/10/09 4:26	57.75	2.39
1097	10/10/09 4:27	57.75	2.39
1098	10/10/09 4:28	57.75	2.39
1099	10/10/09 4:29	57.75	2.39
1100	10/10/09 4:30	57.76	2.40
1101	10/10/09 4:31	57.76	2.40
1102	10/10/09 4:32	57.76	2.40
1103	10/10/09 4:33	57.76	2.40
1104	10/10/09 4:34	57.76	2.40
1105	10/10/09 4:35	57.76	2.40
1106	10/10/09 4:36	57.76	2.40
1107	10/10/09 4:37	57.76	2.40
1108	10/10/09 4:38	57.77	2.41
1109	10/10/09 4:39	57.77	2.41
1110	10/10/09 4:40	57.77	2.41
1111	10/10/09 4:41	57.77	2.41
1112	10/10/09 4:42	57.77	2.41
1113	10/10/09 4:43	57.77	2.41
1114	10/10/09 4:44	57.77	2.41
1115	10/10/09 4:45	57.77	2.41
1116	10/10/09 4:46	57.77	2.41
1117	10/10/09 4:47	57.77	2.41
1118	10/10/09 4:48	57.78	2.42
1119	10/10/09 4:49	57.78	2.42
1120	10/10/09 4:50	57.78	2.42

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1121	10/10/09 4:51	57.78	2.42
1122	10/10/09 4:52	57.78	2.42
1123	10/10/09 4:53	57.78	2.42
1124	10/10/09 4:54	57.78	2.42
1125	10/10/09 4:55	57.78	2.42
1126	10/10/09 4:56	57.78	2.42
1127	10/10/09 4:57	57.78	2.42
1128	10/10/09 4:58	57.79	2.43
1129	10/10/09 4:59	57.79	2.43
1130	10/10/09 5:00	57.79	2.43
1131	10/10/09 5:01	57.79	2.43
1132	10/10/09 5:02	57.79	2.43
1133	10/10/09 5:03	57.79	2.43
1134	10/10/09 5:04	57.79	2.43
1135	10/10/09 5:05	57.79	2.43
1136	10/10/09 5:06	57.79	2.43
1137	10/10/09 5:07	57.79	2.43
1138	10/10/09 5:08	57.80	2.44
1139	10/10/09 5:09	57.80	2.44
1140	10/10/09 5:10	57.80	2.44
1141	10/10/09 5:11	57.80	2.44
1142	10/10/09 5:12	57.80	2.44
1143	10/10/09 5:13	57.80	2.44
1144	10/10/09 5:14	57.80	2.44
1145	10/10/09 5:15	57.80	2.44
1146	10/10/09 5:16	57.80	2.44
1147	10/10/09 5:17	57.80	2.44
1148	10/10/09 5:18	57.81	2.45
1149	10/10/09 5:19	57.81	2.45
1150	10/10/09 5:20	57.81	2.45
1151	10/10/09 5:21	57.81	2.45
1152	10/10/09 5:22	57.81	2.45
1153	10/10/09 5:23	57.81	2.45
1154	10/10/09 5:24	57.81	2.45
1155	10/10/09 5:25	57.81	2.45
1156	10/10/09 5:26	57.81	2.45
1157	10/10/09 5:27	57.81	2.45
1158	10/10/09 5:28	57.82	2.46
1159	10/10/09 5:29	57.82	2.46
1160	10/10/09 5:30	57.82	2.46
1161	10/10/09 5:31	57.82	2.46
1162	10/10/09 5:32	57.82	2.46
1163	10/10/09 5:33	57.82	2.46
1164	10/10/09 5:34	57.82	2.46
1165	10/10/09 5:35	57.82	2.46
1166	10/10/09 5:36	57.82	2.46
1167	10/10/09 5:37	57.83	2.47
1168	10/10/09 5:38	57.82	2.46
1169	10/10/09 5:39	57.83	2.47
1170	10/10/09 5:40	57.83	2.47
1171	10/10/09 5:41	57.83	2.47
1172	10/10/09 5:42	57.83	2.47
1173	10/10/09 5:43	57.83	2.47

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
1174	10/10/09 5:44	57.83	2.47
1175	10/10/09 5:45	57.83	2.47
1176	10/10/09 5:46	57.83	2.47
1177	10/10/09 5:47	57.83	2.47
1178	10/10/09 5:48	57.83	2.47
1179	10/10/09 5:49	57.83	2.47
1180	10/10/09 5:50	57.84	2.48
1181	10/10/09 5:51	57.84	2.48
1182	10/10/09 5:52	57.84	2.48
1183	10/10/09 5:53	57.84	2.48
1184	10/10/09 5:54	57.84	2.48
1185	10/10/09 5:55	57.84	2.48
1186	10/10/09 5:56	57.84	2.48
1187	10/10/09 5:57	57.84	2.48
1188	10/10/09 5:58	57.84	2.48
1189	10/10/09 5:59	57.84	2.48
1190	10/10/09 6:00	57.84	2.48
1191	10/10/09 6:01	57.85	2.49
1192	10/10/09 6:02	57.85	2.49
1193	10/10/09 6:03	57.85	2.49
1194	10/10/09 6:04	57.85	2.49
1195	10/10/09 6:05	57.85	2.49
1196	10/10/09 6:06	57.85	2.49
1197	10/10/09 6:07	57.85	2.49
1198	10/10/09 6:08	57.85	2.49
1199	10/10/09 6:09	57.85	2.49
1200	10/10/09 6:10	57.85	2.49
1201	10/10/09 6:11	57.85	2.49
1202	10/10/09 6:12	57.86	2.50
1203	10/10/09 6:13	57.86	2.50
1204	10/10/09 6:14	57.86	2.50
1205	10/10/09 6:15	57.86	2.50
1206	10/10/09 6:16	57.86	2.50
1207	10/10/09 6:17	57.86	2.50
1208	10/10/09 6:18	57.86	2.50
1209	10/10/09 6:19	57.86	2.50
1210	10/10/09 6:20	57.86	2.50
1211	10/10/09 6:21	57.86	2.50
1212	10/10/09 6:22	57.87	2.51
1213	10/10/09 6:23	57.87	2.51
1214	10/10/09 6:24	57.87	2.51
1215	10/10/09 6:25	57.87	2.51
1216	10/10/09 6:26	57.87	2.51
1217	10/10/09 6:27	57.87	2.51
1218	10/10/09 6:28	57.87	2.51
1219	10/10/09 6:29	57.87	2.51
1220	10/10/09 6:30	57.87	2.51
1221	10/10/09 6:31	57.87	2.51
1222	10/10/09 6:32	57.87	2.51
1223	10/10/09 6:33	57.88	2.52
1224	10/10/09 6:34	57.88	2.52
1225	10/10/09 6:35	57.88	2.52
1226	10/10/09 6:36	57.88	2.52

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1227	10/10/09 6:37	57.88	2.52
1228	10/10/09 6:38	57.88	2.52
1229	10/10/09 6:39	57.88	2.52
1230	10/10/09 6:40	57.88	2.52
1231	10/10/09 6:41	57.88	2.52
1232	10/10/09 6:42	57.88	2.52
1233	10/10/09 6:43	57.88	2.52
1234	10/10/09 6:44	57.89	2.53
1235	10/10/09 6:45	57.89	2.53
1236	10/10/09 6:46	57.89	2.53
1237	10/10/09 6:47	57.89	2.53
1238	10/10/09 6:48	57.89	2.53
1239	10/10/09 6:49	57.89	2.53
1240	10/10/09 6:50	57.89	2.53
1241	10/10/09 6:51	57.89	2.53
1242	10/10/09 6:52	57.89	2.53
1243	10/10/09 6:53	57.89	2.53
1244	10/10/09 6:54	57.89	2.53
1245	10/10/09 6:55	57.89	2.53
1246	10/10/09 6:56	57.90	2.54
1247	10/10/09 6:57	57.90	2.54
1248	10/10/09 6:58	57.90	2.54
1249	10/10/09 6:59	57.90	2.54
1250	10/10/09 7:00	57.90	2.54
1251	10/10/09 7:01	57.90	2.54
1252	10/10/09 7:02	57.90	2.54
1253	10/10/09 7:03	57.90	2.54
1254	10/10/09 7:04	57.90	2.54
1255	10/10/09 7:05	57.90	2.54
1256	10/10/09 7:06	57.91	2.55
1257	10/10/09 7:07	57.91	2.55
1258	10/10/09 7:08	57.91	2.55
1259	10/10/09 7:09	57.91	2.55
1260	10/10/09 7:10	57.91	2.55
1261	10/10/09 7:11	57.91	2.55
1262	10/10/09 7:12	57.91	2.55
1263	10/10/09 7:13	57.91	2.55
1264	10/10/09 7:14	57.91	2.55
1265	10/10/09 7:15	57.91	2.55
1266	10/10/09 7:16	57.91	2.55
1267	10/10/09 7:17	57.92	2.56
1268	10/10/09 7:18	57.92	2.56
1269	10/10/09 7:19	57.92	2.56
1270	10/10/09 7:20	57.92	2.56
1271	10/10/09 7:21	57.92	2.56
1272	10/10/09 7:22	57.92	2.56
1273	10/10/09 7:23	57.92	2.56
1274	10/10/09 7:24	57.92	2.56
1275	10/10/09 7:25	57.92	2.56
1276	10/10/09 7:26	57.92	2.56
1277	10/10/09 7:27	57.93	2.57
1278	10/10/09 7:28	57.93	2.57
1279	10/10/09 7:29	57.93	2.57

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
1280	10/10/09 7:30	57.93	2.57
1281	10/10/09 7:31	57.93	2.57
1282	10/10/09 7:32	57.93	2.57
1283	10/10/09 7:33	57.93	2.57
1284	10/10/09 7:34	57.93	2.57
1285	10/10/09 7:35	57.93	2.57
1286	10/10/09 7:36	57.93	2.57
1287	10/10/09 7:37	57.93	2.57
1288	10/10/09 7:38	57.93	2.57
1289	10/10/09 7:39	57.93	2.57
1290	10/10/09 7:40	57.94	2.58
1291	10/10/09 7:41	57.94	2.58
1292	10/10/09 7:42	57.94	2.58
1293	10/10/09 7:43	57.94	2.58
1294	10/10/09 7:44	57.94	2.58
1295	10/10/09 7:45	57.94	2.58
1296	10/10/09 7:46	57.94	2.58
1297	10/10/09 7:47	57.94	2.58
1298	10/10/09 7:48	57.94	2.58
1299	10/10/09 7:49	57.94	2.58
1300	10/10/09 7:50	57.95	2.59
1301	10/10/09 7:51	57.95	2.59
1302	10/10/09 7:52	57.94	2.58
1303	10/10/09 7:53	57.95	2.59
1304	10/10/09 7:54	57.95	2.59
1305	10/10/09 7:55	57.95	2.59
1306	10/10/09 7:56	57.95	2.59
1307	10/10/09 7:57	57.95	2.59
1308	10/10/09 7:58	57.95	2.59
1309	10/10/09 7:59	57.95	2.59
1310	10/10/09 8:00	57.95	2.59
1311	10/10/09 8:01	57.95	2.59
1312	10/10/09 8:02	57.95	2.59
1313	10/10/09 8:03	57.95	2.59
1314	10/10/09 8:04	57.95	2.59
1315	10/10/09 8:05	57.96	2.60
1316	10/10/09 8:06	57.96	2.60
1317	10/10/09 8:07	57.96	2.60
1318	10/10/09 8:08	57.96	2.60
1319	10/10/09 8:09	57.96	2.60
1326	10/10/09 8:16	57.97	2.61
1327	10/10/09 8:17	57.96	2.60
1328	10/10/09 8:18	57.97	2.61
1329	10/10/09 8:19	57.97	2.61
1330	10/10/09 8:20	57.97	2.61
1331	10/10/09 8:21	57.97	2.61
1332	10/10/09 8:22	57.97	2.61
1333	10/10/09 8:23	57.97	2.61
1334	10/10/09 8:24	57.97	2.61
1335	10/10/09 8:25	57.97	2.61
1336	10/10/09 8:26	57.97	2.61
1337	10/10/09 8:27	57.97	2.61
1338	10/10/09 8:28	57.97	2.61

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1339	10/10/09 8:29	57.97	2.61
1340	10/10/09 8:30	57.97	2.61
1341	10/10/09 8:31	57.98	2.62
1342	10/10/09 8:32	57.98	2.62
1343	10/10/09 8:33	57.98	2.62
1344	10/10/09 8:34	57.98	2.62
1345	10/10/09 8:35	57.98	2.62
1346	10/10/09 8:36	57.98	2.62
1347	10/10/09 8:37	57.98	2.62
1348	10/10/09 8:38	57.98	2.62
1349	10/10/09 8:39	57.98	2.62
1350	10/10/09 8:40	57.98	2.62
1351	10/10/09 8:41	57.98	2.62
1352	10/10/09 8:42	57.98	2.62
1353	10/10/09 8:43	57.99	2.63
1354	10/10/09 8:44	57.99	2.63
1355	10/10/09 8:45	57.99	2.63
1356	10/10/09 8:46	57.99	2.63
1357	10/10/09 8:47	57.99	2.63
1358	10/10/09 8:48	57.99	2.63
1359	10/10/09 8:49	57.99	2.63
1360	10/10/09 8:50	57.99	2.63
1361	10/10/09 8:51	57.99	2.63
1362	10/10/09 8:52	57.99	2.63
1363	10/10/09 8:53	57.99	2.63
1364	10/10/09 8:54	57.99	2.63
1365	10/10/09 8:55	58.00	2.64
1366	10/10/09 8:56	58.00	2.64
1367	10/10/09 8:57	58.00	2.64
1368	10/10/09 8:58	58.00	2.64
1369	10/10/09 8:59	58.00	2.64
1370	10/10/09 9:00	58.00	2.64
1371	10/10/09 9:01	58.00	2.64
1372	10/10/09 9:02	58.00	2.64
1373	10/10/09 9:03	58.00	2.64
1374	10/10/09 9:04	58.00	2.64
1375	10/10/09 9:05	58.00	2.64
1376	10/10/09 9:06	58.00	2.64
1377	10/10/09 9:07	58.00	2.64
1378	10/10/09 9:08	58.00	2.64
1379	10/10/09 9:09	58.01	2.65
1380	10/10/09 9:10	58.00	2.64
1381	10/10/09 9:11	58.01	2.65
1382	10/10/09 9:12	58.01	2.65
1383	10/10/09 9:13	58.01	2.65
1384	10/10/09 9:14	58.01	2.65
1385	10/10/09 9:15	58.01	2.65
1386	10/10/09 9:16	58.01	2.65
1387	10/10/09 9:17	58.01	2.65
1388	10/10/09 9:18	58.01	2.65
1389	10/10/09 9:19	58.01	2.65
1390	10/10/09 9:20	58.01	2.65
1391	10/10/09 9:21	58.01	2.65

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1392	10/10/09 9:22	58.02	2.66
1393	10/10/09 9:23	58.01	2.65
1394	10/10/09 9:24	58.01	2.65
1395	10/10/09 9:25	58.02	2.66
1396	10/10/09 9:26	58.02	2.66
1397	10/10/09 9:27	58.02	2.66
1398	10/10/09 9:28	58.02	2.66
1399	10/10/09 9:29	58.02	2.66
1400	10/10/09 9:30	58.02	2.66
1401	10/10/09 9:31	58.02	2.66
1402	10/10/09 9:32	58.02	2.66
1403	10/10/09 9:33	58.02	2.66
1404	10/10/09 9:34	58.02	2.66
1405	10/10/09 9:35	58.02	2.66
1406	10/10/09 9:36	58.03	2.67
1407	10/10/09 9:37	58.02	2.66
1408	10/10/09 9:38	58.02	2.66
1409	10/10/09 9:39	58.03	2.67
1410	10/10/09 9:40	58.03	2.67
1411	10/10/09 9:41	58.03	2.67
1412	10/10/09 9:42	58.03	2.67
1413	10/10/09 9:43	58.03	2.67
1414	10/10/09 9:44	58.03	2.67
1415	10/10/09 9:45	58.03	2.67
1416	10/10/09 9:46	58.03	2.67
1417	10/10/09 9:47	58.03	2.67
1418	10/10/09 9:48	58.03	2.67
1419	10/10/09 9:49	58.03	2.67
1420	10/10/09 9:50	58.03	2.67
1421	10/10/09 9:51	58.04	2.68
1422	10/10/09 9:52	58.04	2.68
1423	10/10/09 9:53	58.04	2.68
1424	10/10/09 9:54	58.04	2.68
1425	10/10/09 9:55	58.04	2.68
1426	10/10/09 9:56	58.04	2.68
1427	10/10/09 9:57	58.04	2.68
1428	10/10/09 9:58	58.04	2.68
1429	10/10/09 9:59	58.04	2.68
1430	10/10/09 10:00	58.04	2.68
1431	10/10/09 10:01	58.04	2.68
1432	10/10/09 10:02	58.04	2.68
1433	10/10/09 10:03	58.04	2.68
1434	10/10/09 10:04	58.04	2.68
1435	10/10/09 10:05	58.04	2.68
1436	10/10/09 10:06	58.04	2.68
1437	10/10/09 10:07	58.04	2.68
1438	10/10/09 10:08	58.05	2.69
1439	10/10/09 10:09	58.05	2.69
1440	10/10/09 10:10	58.05	2.69
1441	10/10/09 10:11	58.05	2.69
1442	10/10/09 10:12	58.05	2.69
1443	10/10/09 10:13	58.05	2.69
1444	10/10/09 10:14	58.05	2.69

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1445	10/10/09 10:15	58.05	2.69
1446	10/10/09 10:16	58.05	2.69
1447	10/10/09 10:17	58.05	2.69
1448	10/10/09 10:18	58.05	2.69
1449	10/10/09 10:19	58.05	2.69
1450	10/10/09 10:20	58.05	2.69
1451	10/10/09 10:21	58.05	2.69
1452	10/10/09 10:22	58.05	2.69
1453	10/10/09 10:23	58.06	2.70
1454	10/10/09 10:24	58.06	2.70
1455	10/10/09 10:25	58.05	2.69
1456	10/10/09 10:26	58.06	2.70
1457	10/10/09 10:27	58.06	2.70
1458	10/10/09 10:28	58.06	2.70
1459	10/10/09 10:29	58.06	2.70
1460	10/10/09 10:30	58.06	2.70
1461	10/10/09 10:31	58.06	2.70
1462	10/10/09 10:32	58.06	2.70
1463	10/10/09 10:33	58.06	2.70
1464	10/10/09 10:34	58.06	2.70
1465	10/10/09 10:35	58.06	2.70
1466	10/10/09 10:36	58.07	2.71
1467	10/10/09 10:37	58.07	2.71
1468	10/10/09 10:38	58.06	2.70
1469	10/10/09 10:39	58.07	2.71
1470	10/10/09 10:40	58.06	2.70
1471	10/10/09 10:41	58.06	2.70
1472	10/10/09 10:42	58.07	2.71
1473	10/10/09 10:43	58.07	2.71
1474	10/10/09 10:44	58.07	2.71
1475	10/10/09 10:45	58.07	2.71
1476	10/10/09 10:46	58.07	2.71
1477	10/10/09 10:47	58.07	2.71
1478	10/10/09 10:48	58.07	2.71
1479	10/10/09 10:49	58.07	2.71
1480	10/10/09 10:50	58.07	2.71
1481	10/10/09 10:51	58.07	2.71
1482	10/10/09 10:52	58.07	2.71
1483	10/10/09 10:53	58.07	2.71
1484	10/10/09 10:54	58.07	2.71
1485	10/10/09 10:55	58.07	2.71
1486	10/10/09 10:56	58.07	2.71
1487	10/10/09 10:57	58.07	2.71
1488	10/10/09 10:58	58.07	2.71
1489	10/10/09 10:59	58.08	2.72
1490	10/10/09 11:00	58.08	2.72
1491	10/10/09 11:01	58.08	2.72
1492	10/10/09 11:02	58.08	2.72
1493	10/10/09 11:03	58.08	2.72
1494	10/10/09 11:04	58.08	2.72
1495	10/10/09 11:05	58.08	2.72
1496	10/10/09 11:06	58.08	2.72
1497	10/10/09 11:07	58.08	2.72

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1498	10/10/09 11:08	58.08	2.72
1499	10/10/09 11:09	58.08	2.72
1500	10/10/09 11:10	58.08	2.72
1501	10/10/09 11:11	58.08	2.72
1502	10/10/09 11:12	58.08	2.72
1503	10/10/09 11:13	58.08	2.72
1504	10/10/09 11:14	58.08	2.72
1505	10/10/09 11:15	58.09	2.73
1506	10/10/09 11:16	58.09	2.73
1507	10/10/09 11:17	58.09	2.73
1508	10/10/09 11:18	58.09	2.73
1509	10/10/09 11:19	58.09	2.73
1510	10/10/09 11:20	58.09	2.73
1511	10/10/09 11:21	58.09	2.73
1512	10/10/09 11:22	58.09	2.73
1513	10/10/09 11:23	58.09	2.73
1514	10/10/09 11:24	58.09	2.73
1515	10/10/09 11:25	58.09	2.73
1516	10/10/09 11:26	58.09	2.73
1517	10/10/09 11:27	58.09	2.73
1518	10/10/09 11:28	58.09	2.73
1519	10/10/09 11:29	58.09	2.73
1520	10/10/09 11:30	58.09	2.73
1521	10/10/09 11:31	58.09	2.73
1522	10/10/09 11:32	58.09	2.73
1523	10/10/09 11:33	58.09	2.73
1524	10/10/09 11:34	58.09	2.73
1525	10/10/09 11:35	58.10	2.74
1526	10/10/09 11:36	58.09	2.73
1527	10/10/09 11:37	58.10	2.74
1528	10/10/09 11:38	58.10	2.74
1529	10/10/09 11:39	58.10	2.74
1530	10/10/09 11:40	58.10	2.74
1531	10/10/09 11:41	58.10	2.74
1532	10/10/09 11:42	58.10	2.74
1533	10/10/09 11:43	58.10	2.74
1534	10/10/09 11:44	58.10	2.74
1535	10/10/09 11:45	58.10	2.74
1536	10/10/09 11:46	58.10	2.74
1537	10/10/09 11:47	58.10	2.74
1538	10/10/09 11:48	58.10	2.74
1539	10/10/09 11:49	58.10	2.74
1540	10/10/09 11:50	58.10	2.74
1541	10/10/09 11:51	58.10	2.74
1542	10/10/09 11:52	58.10	2.74
1543	10/10/09 11:53	58.11	2.75
1544	10/10/09 11:54	58.11	2.75
1545	10/10/09 11:55	58.11	2.75
1546	10/10/09 11:56	58.11	2.75
1547	10/10/09 11:57	58.11	2.75
1548	10/10/09 11:58	58.11	2.75
1549	10/10/09 11:59	58.11	2.75
1550	10/10/09 12:00	58.11	2.75

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
1551	10/10/09 12:01	58.11	2.75
1552	10/10/09 12:02	58.11	2.75
1553	10/10/09 12:03	58.11	2.75
1554	10/10/09 12:04	58.11	2.75
1555	10/10/09 12:05	58.11	2.75
1556	10/10/09 12:06	58.11	2.75
1557	10/10/09 12:07	58.11	2.75
1558	10/10/09 12:08	58.11	2.75
1559	10/10/09 12:09	58.11	2.75
1560	10/10/09 12:10	58.12	2.76
1561	10/10/09 12:11	58.11	2.75
1562	10/10/09 12:12	58.11	2.75
1563	10/10/09 12:13	58.12	2.76
1564	10/10/09 12:14	58.12	2.76
1565	10/10/09 12:15	58.12	2.76
1566	10/10/09 12:16	58.12	2.76
1567	10/10/09 12:17	58.12	2.76
1568	10/10/09 12:18	58.12	2.76
1569	10/10/09 12:19	58.12	2.76
1570	10/10/09 12:20	58.12	2.76
1571	10/10/09 12:21	58.12	2.76
1572	10/10/09 12:22	58.12	2.76
1573	10/10/09 12:23	58.12	2.76
1574	10/10/09 12:24	58.12	2.76
1575	10/10/09 12:25	58.12	2.76
1576	10/10/09 12:26	58.12	2.76
1577	10/10/09 12:27	58.12	2.76
1578	10/10/09 12:28	58.12	2.76
1579	10/10/09 12:29	58.12	2.76
1580	10/10/09 12:30	58.12	2.76
1581	10/10/09 12:31	58.12	2.76
1582	10/10/09 12:32	58.12	2.76
1583	10/10/09 12:33	58.12	2.76
1584	10/10/09 12:34	58.12	2.76
1585	10/10/09 12:35	58.13	2.77
1586	10/10/09 12:36	58.13	2.77
1587	10/10/09 12:37	58.13	2.77
1588	10/10/09 12:38	58.13	2.77
1589	10/10/09 12:39	58.13	2.77
1590	10/10/09 12:40	58.13	2.77
1591	10/10/09 12:41	58.13	2.77
1592	10/10/09 12:42	58.13	2.77
1593	10/10/09 12:43	58.13	2.77
1594	10/10/09 12:44	58.13	2.77
1595	10/10/09 12:45	58.13	2.77
1596	10/10/09 12:46	58.13	2.77
1597	10/10/09 12:47	58.13	2.77
1598	10/10/09 12:48	58.13	2.77
1599	10/10/09 12:49	58.13	2.77
1600	10/10/09 12:50	58.13	2.77
1601	10/10/09 12:51	58.13	2.77
1602	10/10/09 12:52	58.13	2.77
1603	10/10/09 12:53	58.13	2.77

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1604	10/10/09 12:54	58.13	2.77
1605	10/10/09 12:55	58.13	2.77
1606	10/10/09 12:56	58.14	2.78
1607	10/10/09 12:57	58.14	2.78
1608	10/10/09 12:58	58.14	2.78
1609	10/10/09 12:59	58.14	2.78
1610	10/10/09 13:00	58.14	2.78
1611	10/10/09 13:01	58.14	2.78
1612	10/10/09 13:02	58.14	2.78
1613	10/10/09 13:03	58.14	2.78
1614	10/10/09 13:04	58.14	2.78
1615	10/10/09 13:05	58.14	2.78
1616	10/10/09 13:06	58.14	2.78
1617	10/10/09 13:07	58.14	2.78
1618	10/10/09 13:08	58.14	2.78
1619	10/10/09 13:09	58.14	2.78
1620	10/10/09 13:10	58.14	2.78
1621	10/10/09 13:11	58.14	2.78
1622	10/10/09 13:12	58.14	2.78
1623	10/10/09 13:13	58.14	2.78
1624	10/10/09 13:14	58.14	2.78
1625	10/10/09 13:15	58.14	2.78
1626	10/10/09 13:16	58.15	2.79
1627	10/10/09 13:17	58.14	2.78
1628	10/10/09 13:18	58.14	2.78
1629	10/10/09 13:19	58.14	2.78
1630	10/10/09 13:20	58.15	2.79
1631	10/10/09 13:21	58.15	2.79
1632	10/10/09 13:22	58.15	2.79
1633	10/10/09 13:23	58.15	2.79
1634	10/10/09 13:24	58.15	2.79
1635	10/10/09 13:25	58.15	2.79
1636	10/10/09 13:26	58.15	2.79
1637	10/10/09 13:27	58.15	2.79
1638	10/10/09 13:28	58.15	2.79
1639	10/10/09 13:29	58.15	2.79
1640	10/10/09 13:30	58.15	2.79
1641	10/10/09 13:31	58.15	2.79
1642	10/10/09 13:32	58.15	2.79
1643	10/10/09 13:33	58.15	2.79
1644	10/10/09 13:34	58.15	2.79
1645	10/10/09 13:35	58.15	2.79
1646	10/10/09 13:36	58.15	2.79
1647	10/10/09 13:37	58.15	2.79
1648	10/10/09 13:38	58.15	2.79
1649	10/10/09 13:39	58.15	2.79
1650	10/10/09 13:40	58.15	2.79
1651	10/10/09 13:41	58.15	2.79
1652	10/10/09 13:42	58.15	2.79
1653	10/10/09 13:43	58.15	2.79
1654	10/10/09 13:44	58.15	2.79
1655	10/10/09 13:45	58.16	2.80
1656	10/10/09 13:46	58.16	2.80

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
1657	10/10/09 13:47	58.16	2.80
1658	10/10/09 13:48	58.16	2.80
1659	10/10/09 13:49	58.16	2.80
1660	10/10/09 13:50	58.16	2.80
1661	10/10/09 13:51	58.16	2.80
1662	10/10/09 13:52	58.16	2.80
1663	10/10/09 13:53	58.16	2.80
1664	10/10/09 13:54	58.16	2.80
1665	10/10/09 13:55	58.16	2.80
1666	10/10/09 13:56	58.16	2.80
1667	10/10/09 13:57	58.16	2.80
1668	10/10/09 13:58	58.16	2.80
1669	10/10/09 13:59	58.16	2.80
1670	10/10/09 14:00	58.16	2.80
1671	10/10/09 14:01	58.16	2.80
1672	10/10/09 14:02	58.16	2.80
1673	10/10/09 14:03	58.16	2.80
1674	10/10/09 14:04	58.16	2.80
1675	10/10/09 14:05	58.16	2.80
1676	10/10/09 14:06	58.16	2.80
1677	10/10/09 14:07	58.16	2.80
1678	10/10/09 14:08	58.16	2.80
1679	10/10/09 14:09	58.16	2.80
1680	10/10/09 14:10	58.16	2.80
1681	10/10/09 14:11	58.16	2.80
1682	10/10/09 14:12	58.16	2.80
1683	10/10/09 14:13	58.17	2.81
1684	10/10/09 14:14	58.17	2.81
1685	10/10/09 14:15	58.17	2.81
1686	10/10/09 14:16	58.17	2.81
1687	10/10/09 14:17	58.17	2.81
1688	10/10/09 14:18	58.17	2.81
1689	10/10/09 14:19	58.17	2.81
1690	10/10/09 14:20	58.17	2.81
1691	10/10/09 14:21	58.17	2.81
1692	10/10/09 14:22	58.17	2.81
1693	10/10/09 14:23	58.17	2.81
1694	10/10/09 14:24	58.17	2.81
1695	10/10/09 14:25	58.17	2.81
1696	10/10/09 14:26	58.17	2.81
1697	10/10/09 14:27	58.17	2.81
1698	10/10/09 14:28	58.17	2.81
1699	10/10/09 14:29	58.17	2.81
1700	10/10/09 14:30	58.17	2.81
1701	10/10/09 14:31	58.17	2.81
1702	10/10/09 14:32	58.17	2.81
1703	10/10/09 14:33	58.17	2.81
1704	10/10/09 14:34	58.17	2.81
1705	10/10/09 14:35	58.17	2.81
1706	10/10/09 14:36	58.17	2.81
1707	10/10/09 14:37	58.18	2.82
1708	10/10/09 14:38	58.18	2.82
1709	10/10/09 14:39	58.18	2.82

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
1710	10/10/09 14:40	58.18	2.82
1711	10/10/09 14:41	58.18	2.82
1712	10/10/09 14:42	58.18	2.82
1713	10/10/09 14:43	58.18	2.82
1714	10/10/09 14:44	58.18	2.82
1715	10/10/09 14:45	58.18	2.82
1716	10/10/09 14:46	58.18	2.82
1717	10/10/09 14:47	58.18	2.82
1718	10/10/09 14:48	58.18	2.82
1719	10/10/09 14:49	58.18	2.82
1720	10/10/09 14:50	58.18	2.82
1721	10/10/09 14:51	58.18	2.82
1722	10/10/09 14:52	58.18	2.82
1723	10/10/09 14:53	58.18	2.82
1724	10/10/09 14:54	58.18	2.82
1725	10/10/09 14:55	58.18	2.82
1726	10/10/09 14:56	58.19	2.83
1727	10/10/09 14:57	58.19	2.83
1728	10/10/09 14:58	58.18	2.82
1729	10/10/09 14:59	58.19	2.83
1730	10/10/09 15:00	58.19	2.83
1731	10/10/09 15:01	58.19	2.83
1732	10/10/09 15:02	58.19	2.83
1733	10/10/09 15:03	58.19	2.83
1734	10/10/09 15:04	58.19	2.83
1735	10/10/09 15:05	58.19	2.83
1736	10/10/09 15:06	58.19	2.83
1737	10/10/09 15:07	58.19	2.83
1738	10/10/09 15:08	58.19	2.83
1739	10/10/09 15:09	58.19	2.83
1740	10/10/09 15:10	58.19	2.83
1741	10/10/09 15:11	58.19	2.83
1742	10/10/09 15:12	58.19	2.83
1743	10/10/09 15:13	58.19	2.83
1744	10/10/09 15:14	58.19	2.83
1745	10/10/09 15:15	58.19	2.83
1746	10/10/09 15:16	58.19	2.83
1747	10/10/09 15:17	58.20	2.84
1748	10/10/09 15:18	58.19	2.83
1749	10/10/09 15:19	58.19	2.83
1750	10/10/09 15:20	58.19	2.83
1751	10/10/09 15:21	58.19	2.83
1752	10/10/09 15:22	58.20	2.84
1753	10/10/09 15:23	58.20	2.84
1754	10/10/09 15:24	58.20	2.84
1755	10/10/09 15:25	58.20	2.84
1756	10/10/09 15:26	58.20	2.84
1757	10/10/09 15:27	58.20	2.84
1758	10/10/09 15:28	58.20	2.84
1759	10/10/09 15:29	58.20	2.84
1760	10/10/09 15:30	58.20	2.84
1761	10/10/09 15:31	58.20	2.84
1762	10/10/09 15:32	58.20	2.84

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
1763	10/10/09 15:33	58.20	2.84
1764	10/10/09 15:34	58.20	2.84
1765	10/10/09 15:35	58.20	2.84
1766	10/10/09 15:36	58.20	2.84
1767	10/10/09 15:37	58.21	2.85
1768	10/10/09 15:38	58.20	2.84
1769	10/10/09 15:39	58.20	2.84
1770	10/10/09 15:40	58.20	2.84
1771	10/10/09 15:41	58.21	2.85
1772	10/10/09 15:42	58.20	2.84
1773	10/10/09 15:43	58.21	2.85
1774	10/10/09 15:44	58.21	2.85
1775	10/10/09 15:45	58.21	2.85
1776	10/10/09 15:46	58.21	2.85
1777	10/10/09 15:47	58.21	2.85
1781	10/10/09 15:51	58.21	2.85
1782	10/10/09 15:52	58.21	2.85
1783	10/10/09 15:53	58.21	2.85
1784	10/10/09 15:54	58.21	2.85
1785	10/10/09 15:55	58.21	2.85
1786	10/10/09 15:56	58.21	2.85
1787	10/10/09 15:57	58.21	2.85
1788	10/10/09 15:58	58.21	2.85
1789	10/10/09 15:59	58.21	2.85
1790	10/10/09 16:00	58.21	2.85
1791	10/10/09 16:01	58.21	2.85
1792	10/10/09 16:02	58.21	2.85
1793	10/10/09 16:03	58.21	2.85
1794	10/10/09 16:04	58.21	2.85
1795	10/10/09 16:05	58.21	2.85
1796	10/10/09 16:06	58.21	2.85
1797	10/10/09 16:07	58.21	2.85
1798	10/10/09 16:08	58.21	2.85
1799	10/10/09 16:09	58.21	2.85
1800	10/10/09 16:10	58.21	2.85
1801	10/10/09 16:11	58.21	2.85
1802	10/10/09 16:12	58.21	2.85
1803	10/10/09 16:13	58.21	2.85
1804	10/10/09 16:14	58.21	2.85
1805	10/10/09 16:15	58.21	2.85
1806	10/10/09 16:16	58.21	2.85
1807	10/10/09 16:17	58.21	2.85
1808	10/10/09 16:18	58.21	2.85
1809	10/10/09 16:19	58.21	2.85
1810	10/10/09 16:20	58.21	2.85
1811	10/10/09 16:21	58.22	2.86
1812	10/10/09 16:22	58.21	2.85
1813	10/10/09 16:23	58.22	2.86
1814	10/10/09 16:24	58.22	2.86
1815	10/10/09 16:25	58.22	2.86
1816	10/10/09 16:26	58.22	2.86
1817	10/10/09 16:27	58.22	2.86
1818	10/10/09 16:28	58.22	2.86

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1819	10/10/09 16:29	58.22	2.86
1820	10/10/09 16:30	58.22	2.86
1821	10/10/09 16:31	58.22	2.86
1822	10/10/09 16:32	58.22	2.86
1823	10/10/09 16:33	58.22	2.86
1824	10/10/09 16:34	58.22	2.86
1825	10/10/09 16:35	58.22	2.86
1826	10/10/09 16:36	58.22	2.86
1827	10/10/09 16:37	58.22	2.86
1828	10/10/09 16:38	58.22	2.86
1829	10/10/09 16:39	58.23	2.87
1830	10/10/09 16:40	58.22	2.86
1831	10/10/09 16:41	58.23	2.87
1832	10/10/09 16:42	58.23	2.87
1833	10/10/09 16:43	58.22	2.86
1834	10/10/09 16:44	58.23	2.87
1835	10/10/09 16:45	58.23	2.87
1836	10/10/09 16:46	58.23	2.87
1837	10/10/09 16:47	58.23	2.87
1838	10/10/09 16:48	58.23	2.87
1839	10/10/09 16:49	58.23	2.87
1840	10/10/09 16:50	58.23	2.87
1841	10/10/09 16:51	58.23	2.87
1842	10/10/09 16:52	58.23	2.87
1843	10/10/09 16:53	58.23	2.87
1844	10/10/09 16:54	58.23	2.87
1845	10/10/09 16:55	58.23	2.87
1846	10/10/09 16:56	58.23	2.87
1847	10/10/09 16:57	58.23	2.87
1848	10/10/09 16:58	58.23	2.87
1849	10/10/09 16:59	58.23	2.87
1850	10/10/09 17:00	58.23	2.87
1851	10/10/09 17:01	58.23	2.87
1852	10/10/09 17:02	58.24	2.88
1853	10/10/09 17:03	58.24	2.88
1854	10/10/09 17:04	58.24	2.88
1855	10/10/09 17:05	58.24	2.88
1856	10/10/09 17:06	58.24	2.88
1857	10/10/09 17:07	58.24	2.88
1858	10/10/09 17:08	58.24	2.88
1859	10/10/09 17:09	58.24	2.88
1860	10/10/09 17:10	58.24	2.88
1861	10/10/09 17:11	58.24	2.88
1862	10/10/09 17:12	58.24	2.88
1863	10/10/09 17:13	58.24	2.88
1864	10/10/09 17:14	58.24	2.88
1865	10/10/09 17:15	58.24	2.88
1866	10/10/09 17:16	58.24	2.88
1867	10/10/09 17:17	58.24	2.88
1868	10/10/09 17:18	58.25	2.89
1869	10/10/09 17:19	58.25	2.89
1870	10/10/09 17:20	58.25	2.89
1871	10/10/09 17:21	58.25	2.89

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well: Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1872	10/10/09 17:22	58.25	2.89
1873	10/10/09 17:23	58.24	2.88
1874	10/10/09 17:24	58.25	2.89
1875	10/10/09 17:25	58.25	2.89
1876	10/10/09 17:26	58.25	2.89
1877	10/10/09 17:27	58.25	2.89
1878	10/10/09 17:28	58.25	2.89
1879	10/10/09 17:29	58.25	2.89
1880	10/10/09 17:30	58.25	2.89
1881	10/10/09 17:31	58.25	2.89
1882	10/10/09 17:32	58.25	2.89
1883	10/10/09 17:33	58.25	2.89
1884	10/10/09 17:34	58.25	2.89
1885	10/10/09 17:35	58.25	2.89
1886	10/10/09 17:36	58.25	2.89
1887	10/10/09 17:37	58.25	2.89
1888	10/10/09 17:38	58.25	2.89
1889	10/10/09 17:39	58.25	2.89
1890	10/10/09 17:40	58.25	2.89
1891	10/10/09 17:41	58.26	2.90
1892	10/10/09 17:42	58.25	2.89
1893	10/10/09 17:43	58.26	2.90
1894	10/10/09 17:44	58.26	2.90
1895	10/10/09 17:45	58.26	2.90
1896	10/10/09 17:46	58.26	2.90
1897	10/10/09 17:47	58.26	2.90
1898	10/10/09 17:48	58.26	2.90
1899	10/10/09 17:49	58.26	2.90
1900	10/10/09 17:50	58.26	2.90
1901	10/10/09 17:51	58.26	2.90
1902	10/10/09 17:52	58.26	2.90
1903	10/10/09 17:53	58.26	2.90
1904	10/10/09 17:54	58.26	2.90
1905	10/10/09 17:55	58.26	2.90
1906	10/10/09 17:56	58.26	2.90
1907	10/10/09 17:57	58.26	2.90
1908	10/10/09 17:58	58.26	2.90
1909	10/10/09 17:59	58.26	2.90
1910	10/10/09 18:00	58.26	2.90
1911	10/10/09 18:01	58.26	2.90
1912	10/10/09 18:02	58.26	2.90
1913	10/10/09 18:03	58.26	2.90
1914	10/10/09 18:04	58.26	2.90
1915	10/10/09 18:05	58.26	2.90
1916	10/10/09 18:06	58.27	2.91
1917	10/10/09 18:07	58.27	2.91
1918	10/10/09 18:08	58.27	2.91
1919	10/10/09 18:09	58.27	2.91
1920	10/10/09 18:10	58.27	2.91
1921	10/10/09 18:11	58.27	2.91
1922	10/10/09 18:12	58.27	2.91
1923	10/10/09 18:13	58.27	2.91
1924	10/10/09 18:14	58.27	2.91

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1925	10/10/09 18:15	58.27	2.91
1926	10/10/09 18:16	58.27	2.91
1927	10/10/09 18:17	58.27	2.91
1928	10/10/09 18:18	58.27	2.91
1929	10/10/09 18:19	58.27	2.91
1930	10/10/09 18:20	58.27	2.91
1931	10/10/09 18:21	58.27	2.91
1932	10/10/09 18:22	58.27	2.91
1933	10/10/09 18:23	58.27	2.91
1934	10/10/09 18:24	58.27	2.91
1935	10/10/09 18:25	58.27	2.91
1936	10/10/09 18:26	58.27	2.91
1937	10/10/09 18:27	58.27	2.91
1938	10/10/09 18:28	58.27	2.91
1939	10/10/09 18:29	58.28	2.92
1940	10/10/09 18:30	58.28	2.92
1941	10/10/09 18:31	58.28	2.92
1942	10/10/09 18:32	58.28	2.92
1943	10/10/09 18:33	58.28	2.92
1944	10/10/09 18:34	58.28	2.92
1945	10/10/09 18:35	58.28	2.92
1946	10/10/09 18:36	58.28	2.92
1947	10/10/09 18:37	58.28	2.92
1948	10/10/09 18:38	58.28	2.92
1949	10/10/09 18:39	58.28	2.92
1950	10/10/09 18:40	58.28	2.92
1951	10/10/09 18:41	58.28	2.92
1952	10/10/09 18:42	58.28	2.92
1953	10/10/09 18:43	58.28	2.92
1954	10/10/09 18:44	58.28	2.92
1955	10/10/09 18:45	58.28	2.92
1956	10/10/09 18:46	58.28	2.92
1957	10/10/09 18:47	58.28	2.92
1958	10/10/09 18:48	58.28	2.92
1959	10/10/09 18:49	58.28	2.92
1960	10/10/09 18:50	58.29	2.93
1961	10/10/09 18:51	58.29	2.93
1962	10/10/09 18:52	58.28	2.92
1963	10/10/09 18:53	58.29	2.93
1964	10/10/09 18:54	58.29	2.93
1965	10/10/09 18:55	58.29	2.93
1966	10/10/09 18:56	58.29	2.93
1967	10/10/09 18:57	58.29	2.93
1968	10/10/09 18:58	58.29	2.93
1969	10/10/09 18:59	58.29	2.93
1970	10/10/09 19:00	58.29	2.93
1971	10/10/09 19:01	58.29	2.93
1972	10/10/09 19:02	58.29	2.93
1973	10/10/09 19:03	58.29	2.93
1974	10/10/09 19:04	58.29	2.93
1975	10/10/09 19:05	58.29	2.93
1976	10/10/09 19:06	58.29	2.93
1977	10/10/09 19:07	58.29	2.93

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
1978	10/10/09 19:08	58.29	2.93
1979	10/10/09 19:09	58.29	2.93
1980	10/10/09 19:10	58.29	2.93
1981	10/10/09 19:11	58.29	2.93
1982	10/10/09 19:12	58.29	2.93
1983	10/10/09 19:13	58.29	2.93
1984	10/10/09 19:14	58.29	2.93
1985	10/10/09 19:15	58.29	2.93
1986	10/10/09 19:16	58.29	2.93
1987	10/10/09 19:17	58.29	2.93
1988	10/10/09 19:18	58.29	2.93
1989	10/10/09 19:19	58.29	2.93
1990	10/10/09 19:20	58.29	2.93
1991	10/10/09 19:21	58.29	2.93
1992	10/10/09 19:22	58.29	2.93
1993	10/10/09 19:23	58.30	2.94
1994	10/10/09 19:24	58.30	2.94
1995	10/10/09 19:25	58.29	2.93
1996	10/10/09 19:26	58.30	2.94
1997	10/10/09 19:27	58.30	2.94
1998	10/10/09 19:28	58.30	2.94
1999	10/10/09 19:29	58.30	2.94
2000	10/10/09 19:30	58.30	2.94
2001	10/10/09 19:31	58.30	2.94
2002	10/10/09 19:32	58.30	2.94
2003	10/10/09 19:33	58.30	2.94
2004	10/10/09 19:34	58.30	2.94
2005	10/10/09 19:35	58.30	2.94
2006	10/10/09 19:36	58.30	2.94
2007	10/10/09 19:37	58.30	2.94
2008	10/10/09 19:38	58.30	2.94
2009	10/10/09 19:39	58.30	2.94
2010	10/10/09 19:40	58.30	2.94
2011	10/10/09 19:41	58.30	2.94
2012	10/10/09 19:42	58.30	2.94
2013	10/10/09 19:43	58.30	2.94
2014	10/10/09 19:44	58.30	2.94
2015	10/10/09 19:45	58.30	2.94
2016	10/10/09 19:46	58.30	2.94
2017	10/10/09 19:47	58.30	2.94
2018	10/10/09 19:48	58.30	2.94
2019	10/10/09 19:49	58.30	2.94
2020	10/10/09 19:50	58.30	2.94
2021	10/10/09 19:51	58.30	2.94
2022	10/10/09 19:52	58.30	2.94
2023	10/10/09 19:53	58.30	2.94
2024	10/10/09 19:54	58.30	2.94
2025	10/10/09 19:55	58.31	2.95
2026	10/10/09 19:56	58.30	2.94
2027	10/10/09 19:57	58.30	2.94
2028	10/10/09 19:58	58.31	2.95
2029	10/10/09 19:59	58.31	2.95
2030	10/10/09 20:00	58.31	2.95

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
2031	10/10/09 20:01	58.31	2.95
2032	10/10/09 20:02	58.31	2.95
2033	10/10/09 20:03	58.31	2.95
2034	10/10/09 20:04	58.31	2.95
2035	10/10/09 20:05	58.31	2.95
2036	10/10/09 20:06	58.31	2.95
2037	10/10/09 20:07	58.31	2.95
2038	10/10/09 20:08	58.31	2.95
2039	10/10/09 20:09	58.31	2.95
2040	10/10/09 20:10	58.31	2.95
2041	10/10/09 20:11	58.31	2.95
2042	10/10/09 20:12	58.31	2.95
2043	10/10/09 20:13	58.31	2.95
2044	10/10/09 20:14	58.31	2.95
2045	10/10/09 20:15	58.31	2.95
2046	10/10/09 20:16	58.31	2.95
2047	10/10/09 20:17	58.31	2.95
2048	10/10/09 20:18	58.31	2.95
2049	10/10/09 20:19	58.31	2.95
2050	10/10/09 20:20	58.31	2.95
2051	10/10/09 20:21	58.31	2.95
2052	10/10/09 20:22	58.31	2.95
2053	10/10/09 20:23	58.32	2.96
2054	10/10/09 20:24	58.32	2.96
2055	10/10/09 20:25	58.32	2.96
2056	10/10/09 20:26	58.32	2.96
2057	10/10/09 20:27	58.32	2.96
2058	10/10/09 20:28	58.32	2.96
2059	10/10/09 20:29	58.32	2.96
2060	10/10/09 20:30	58.32	2.96
2061	10/10/09 20:31	58.32	2.96
2062	10/10/09 20:32	58.32	2.96
2063	10/10/09 20:33	58.32	2.96
2064	10/10/09 20:34	58.32	2.96
2065	10/10/09 20:35	58.32	2.96
2066	10/10/09 20:36	58.32	2.96
2067	10/10/09 20:37	58.32	2.96
2068	10/10/09 20:38	58.32	2.96
2069	10/10/09 20:39	58.32	2.96
2070	10/10/09 20:40	58.32	2.96
2071	10/10/09 20:41	58.32	2.96
2072	10/10/09 20:42	58.32	2.96
2073	10/10/09 20:43	58.32	2.96
2074	10/10/09 20:44	58.32	2.96
2075	10/10/09 20:45	58.32	2.96
2076	10/10/09 20:46	58.33	2.97
2077	10/10/09 20:47	58.33	2.97
2078	10/10/09 20:48	58.33	2.97
2079	10/10/09 20:49	58.33	2.97
2080	10/10/09 20:50	58.33	2.97
2081	10/10/09 20:51	58.33	2.97
2082	10/10/09 20:52	58.33	2.97
2083	10/10/09 20:53	58.33	2.97

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well: Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2084	10/10/09 20:54	58.33	2.97
2085	10/10/09 20:55	58.33	2.97
2086	10/10/09 20:56	58.33	2.97
2087	10/10/09 20:57	58.33	2.97
2088	10/10/09 20:58	58.33	2.97
2089	10/10/09 20:59	58.33	2.97
2090	10/10/09 21:00	58.33	2.97
2091	10/10/09 21:01	58.33	2.97
2092	10/10/09 21:02	58.33	2.97
2093	10/10/09 21:03	58.33	2.97
2094	10/10/09 21:04	58.33	2.97
2095	10/10/09 21:05	58.33	2.97
2096	10/10/09 21:06	58.33	2.97
2097	10/10/09 21:07	58.34	2.98
2098	10/10/09 21:08	58.34	2.98
2099	10/10/09 21:09	58.33	2.97
2100	10/10/09 21:10	58.34	2.98
2101	10/10/09 21:11	58.34	2.98
2102	10/10/09 21:12	58.33	2.97
2103	10/10/09 21:13	58.33	2.97
2104	10/10/09 21:14	58.33	2.97
2105	10/10/09 21:15	58.34	2.98
2106	10/10/09 21:16	58.34	2.98
2107	10/10/09 21:17	58.34	2.98
2108	10/10/09 21:18	58.34	2.98
2109	10/10/09 21:19	58.34	2.98
2110	10/10/09 21:20	58.34	2.98
2111	10/10/09 21:21	58.34	2.98
2112	10/10/09 21:22	58.34	2.98
2113	10/10/09 21:23	58.34	2.98
2114	10/10/09 21:24	58.34	2.98
2115	10/10/09 21:25	58.34	2.98
2116	10/10/09 21:26	58.34	2.98
2117	10/10/09 21:27	58.34	2.98
2118	10/10/09 21:28	58.34	2.98
2119	10/10/09 21:29	58.34	2.98
2120	10/10/09 21:30	58.34	2.98
2121	10/10/09 21:31	58.34	2.98
2122	10/10/09 21:32	58.34	2.98
2123	10/10/09 21:33	58.34	2.98
2124	10/10/09 21:34	58.34	2.98
2125	10/10/09 21:35	58.34	2.98
2126	10/10/09 21:36	58.35	2.99
2127	10/10/09 21:37	58.35	2.99
2128	10/10/09 21:38	58.35	2.99
2129	10/10/09 21:39	58.35	2.99
2130	10/10/09 21:40	58.35	2.99
2131	10/10/09 21:41	58.35	2.99
2132	10/10/09 21:42	58.35	2.99
2133	10/10/09 21:43	58.35	2.99
2134	10/10/09 21:44	58.35	2.99
2135	10/10/09 21:45	58.35	2.99
2136	10/10/09 21:46	58.35	2.99

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

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Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2137	10/10/09 21:47	58.35	2.99
2138	10/10/09 21:48	58.35	2.99
2139	10/10/09 21:49	58.35	2.99
2140	10/10/09 21:50	58.35	2.99
2141	10/10/09 21:51	58.35	2.99
2142	10/10/09 21:52	58.35	2.99
2143	10/10/09 21:53	58.36	3.00
2144	10/10/09 21:54	58.36	3.00
2145	10/10/09 21:55	58.36	3.00
2146	10/10/09 21:56	58.35	2.99
2147	10/10/09 21:57	58.36	3.00
2148	10/10/09 21:58	58.36	3.00
2149	10/10/09 21:59	58.36	3.00
2150	10/10/09 22:00	58.36	3.00
2151	10/10/09 22:01	58.36	3.00
2152	10/10/09 22:02	58.36	3.00
2153	10/10/09 22:03	58.36	3.00
2154	10/10/09 22:04	58.36	3.00
2155	10/10/09 22:05	58.36	3.00
2156	10/10/09 22:06	58.36	3.00
2157	10/10/09 22:07	58.36	3.00
2158	10/10/09 22:08	58.36	3.00
2159	10/10/09 22:09	58.36	3.00
2160	10/10/09 22:10	58.36	3.00
2161	10/10/09 22:11	58.36	3.00
2162	10/10/09 22:12	58.36	3.00
2163	10/10/09 22:13	58.36	3.00
2164	10/10/09 22:14	58.36	3.00
2165	10/10/09 22:15	58.37	3.01
2166	10/10/09 22:16	58.37	3.01
2167	10/10/09 22:17	58.37	3.01
2168	10/10/09 22:18	58.37	3.01
2169	10/10/09 22:19	58.37	3.01
2170	10/10/09 22:20	58.37	3.01
2171	10/10/09 22:21	58.37	3.01
2172	10/10/09 22:22	58.37	3.01
2173	10/10/09 22:23	58.37	3.01
2174	10/10/09 22:24	58.37	3.01
2175	10/10/09 22:25	58.37	3.01
2176	10/10/09 22:26	58.38	3.02
2177	10/10/09 22:27	58.38	3.02
2178	10/10/09 22:28	58.38	3.02
2179	10/10/09 22:29	58.38	3.02
2180	10/10/09 22:30	58.38	3.02
2181	10/10/09 22:31	58.38	3.02
2182	10/10/09 22:32	58.38	3.02
2183	10/10/09 22:33	58.38	3.02
2184	10/10/09 22:34	58.38	3.02
2185	10/10/09 22:35	58.38	3.02
2186	10/10/09 22:36	58.38	3.02
2187	10/10/09 22:37	58.38	3.02
2188	10/10/09 22:38	58.38	3.02
2189	10/10/09 22:39	58.38	3.02

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
2190	10/10/09 22:40	58.38	3.02
2191	10/10/09 22:41	58.39	3.03
2192	10/10/09 22:42	58.39	3.03
2193	10/10/09 22:43	58.39	3.03
2194	10/10/09 22:44	58.39	3.03
2195	10/10/09 22:45	58.39	3.03
2196	10/10/09 22:46	58.39	3.03
2197	10/10/09 22:47	58.39	3.03
2198	10/10/09 22:48	58.39	3.03
2199	10/10/09 22:49	58.39	3.03
2200	10/10/09 22:50	58.39	3.03
2201	10/10/09 22:51	58.39	3.03
2202	10/10/09 22:52	58.39	3.03
2203	10/10/09 22:53	58.39	3.03
2204	10/10/09 22:54	58.39	3.03
2205	10/10/09 22:55	58.39	3.03
2206	10/10/09 22:56	58.39	3.03
2207	10/10/09 22:57	58.39	3.03
2208	10/10/09 22:58	58.39	3.03
2209	10/10/09 22:59	58.39	3.03
2210	10/10/09 23:00	58.39	3.03
2211	10/10/09 23:01	58.40	3.04
2212	10/10/09 23:02	58.40	3.04
2213	10/10/09 23:03	58.39	3.03
2214	10/10/09 23:04	58.40	3.04
2215	10/10/09 23:05	58.40	3.04
2216	10/10/09 23:06	58.40	3.04
2217	10/10/09 23:07	58.39	3.03
2218	10/10/09 23:08	58.40	3.04
2219	10/10/09 23:09	58.40	3.04
2220	10/10/09 23:10	58.40	3.04
2221	10/10/09 23:11	58.40	3.04
2222	10/10/09 23:12	58.40	3.04
2223	10/10/09 23:13	58.40	3.04
2224	10/10/09 23:14	58.40	3.04
2225	10/10/09 23:15	58.40	3.04
2226	10/10/09 23:16	58.40	3.04
2227	10/10/09 23:17	58.40	3.04
2228	10/10/09 23:18	58.40	3.04
2229	10/10/09 23:19	58.40	3.04
2230	10/10/09 23:20	58.40	3.04
2231	10/10/09 23:21	58.40	3.04
2232	10/10/09 23:22	58.40	3.04
2233	10/10/09 23:23	58.40	3.04
2234	10/10/09 23:24	58.40	3.04
2235	10/10/09 23:25	58.40	3.04
2236	10/10/09 23:26	58.40	3.04
2237	10/10/09 23:27	58.40	3.04
2238	10/10/09 23:28	58.41	3.05
2239	10/10/09 23:29	58.40	3.04
2240	10/10/09 23:30	58.40	3.04
2241	10/10/09 23:31	58.41	3.05
2242	10/10/09 23:32	58.40	3.04

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
2243	10/10/09 23:33	58.41	3.05
2244	10/10/09 23:34	58.41	3.05
2245	10/10/09 23:35	58.41	3.05
2246	10/10/09 23:36	58.41	3.05
2247	10/10/09 23:37	58.41	3.05
2248	10/10/09 23:38	58.41	3.05
2249	10/10/09 23:39	58.41	3.05
2250	10/10/09 23:40	58.41	3.05
2251	10/10/09 23:41	58.41	3.05
2252	10/10/09 23:42	58.41	3.05
2253	10/10/09 23:43	58.41	3.05
2254	10/10/09 23:44	58.41	3.05
2255	10/10/09 23:45	58.41	3.05
2256	10/10/09 23:46	58.41	3.05
2257	10/10/09 23:47	58.41	3.05
2258	10/10/09 23:48	58.41	3.05
2259	10/10/09 23:49	58.41	3.05
2260	10/10/09 23:50	58.41	3.05
2261	10/10/09 23:51	58.41	3.05
2262	10/10/09 23:52	58.41	3.05
2263	10/10/09 23:53	58.41	3.05
2264	10/10/09 23:54	58.41	3.05
2265	10/10/09 23:55	58.41	3.05
2266	10/10/09 23:56	58.41	3.05
2267	10/10/09 23:57	58.42	3.06
2268	10/10/09 23:58	58.41	3.05
2269	10/10/09 23:59	58.42	3.06
2270	10/11/09 0:00	58.41	3.05
2271	10/11/09 0:01	58.42	3.06
2272	10/11/09 0:02	58.42	3.06
2273	10/11/09 0:03	58.42	3.06
2274	10/11/09 0:04	58.42	3.06
2275	10/11/09 0:05	58.42	3.06
2276	10/11/09 0:06	58.42	3.06
2277	10/11/09 0:07	58.42	3.06
2278	10/11/09 0:08	58.42	3.06
2279	10/11/09 0:09	58.42	3.06
2280	10/11/09 0:10	58.42	3.06
2281	10/11/09 0:11	58.42	3.06
2282	10/11/09 0:12	58.42	3.06
2283	10/11/09 0:13	58.42	3.06
2284	10/11/09 0:14	58.42	3.06
2285	10/11/09 0:15	58.42	3.06
2286	10/11/09 0:16	58.42	3.06
2287	10/11/09 0:17	58.42	3.06
2288	10/11/09 0:18	58.42	3.06
2289	10/11/09 0:19	58.42	3.06
2290	10/11/09 0:20	58.42	3.06
2291	10/11/09 0:21	58.42	3.06
2292	10/11/09 0:22	58.42	3.06
2293	10/11/09 0:23	58.42	3.06
2294	10/11/09 0:24	58.43	3.07
2295	10/11/09 0:25	58.42	3.06

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2296	10/11/09 0:26	58.42	3.06
2297	10/11/09 0:27	58.42	3.06
2298	10/11/09 0:28	58.42	3.06
2299	10/11/09 0:29	58.42	3.06
2300	10/11/09 0:30	58.43	3.07
2301	10/11/09 0:31	58.43	3.07
2302	10/11/09 0:32	58.43	3.07
2303	10/11/09 0:33	58.43	3.07
2304	10/11/09 0:34	58.43	3.07
2305	10/11/09 0:35	58.43	3.07
2306	10/11/09 0:36	58.43	3.07
2307	10/11/09 0:37	58.43	3.07
2308	10/11/09 0:38	58.43	3.07
2309	10/11/09 0:39	58.43	3.07
2310	10/11/09 0:40	58.43	3.07
2311	10/11/09 0:41	58.43	3.07
2312	10/11/09 0:42	58.43	3.07
2313	10/11/09 0:43	58.43	3.07
2314	10/11/09 0:44	58.43	3.07
2315	10/11/09 0:45	58.43	3.07
2316	10/11/09 0:46	58.43	3.07
2317	10/11/09 0:47	58.43	3.07
2318	10/11/09 0:48	58.43	3.07
2319	10/11/09 0:49	58.43	3.07
2320	10/11/09 0:50	58.43	3.07
2321	10/11/09 0:51	58.43	3.07
2322	10/11/09 0:52	58.43	3.07
2323	10/11/09 0:53	58.43	3.07
2324	10/11/09 0:54	58.43	3.07
2325	10/11/09 0:55	58.43	3.07
2326	10/11/09 0:56	58.43	3.07
2327	10/11/09 0:57	58.43	3.07
2328	10/11/09 0:58	58.43	3.07
2329	10/11/09 0:59	58.43	3.07
2330	10/11/09 1:00	58.44	3.08
2331	10/11/09 1:01	58.43	3.07
2332	10/11/09 1:02	58.43	3.07
2333	10/11/09 1:03	58.43	3.07
2334	10/11/09 1:04	58.43	3.07
2335	10/11/09 1:05	58.44	3.08
2336	10/11/09 1:06	58.44	3.08
2337	10/11/09 1:07	58.44	3.08
2338	10/11/09 1:08	58.44	3.08
2339	10/11/09 1:09	58.44	3.08
2340	10/11/09 1:10	58.44	3.08
2341	10/11/09 1:11	58.44	3.08
2342	10/11/09 1:12	58.44	3.08
2343	10/11/09 1:13	58.44	3.08
2344	10/11/09 1:14	58.44	3.08
2345	10/11/09 1:15	58.44	3.08
2346	10/11/09 1:16	58.44	3.08
2347	10/11/09 1:17	58.44	3.08
2348	10/11/09 1:18	58.44	3.08

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2349	10/11/09 1:19	58.44	3.08
2350	10/11/09 1:20	58.44	3.08
2351	10/11/09 1:21	58.44	3.08
2352	10/11/09 1:22	58.44	3.08
2353	10/11/09 1:23	58.44	3.08
2354	10/11/09 1:24	58.44	3.08
2355	10/11/09 1:25	58.44	3.08
2356	10/11/09 1:26	58.44	3.08
2357	10/11/09 1:27	58.44	3.08
2358	10/11/09 1:28	58.44	3.08
2359	10/11/09 1:29	58.44	3.08
2360	10/11/09 1:30	58.44	3.08
2361	10/11/09 1:31	58.44	3.08
2362	10/11/09 1:32	58.44	3.08
2363	10/11/09 1:33	58.44	3.08
2364	10/11/09 1:34	58.44	3.08
2365	10/11/09 1:35	58.44	3.08
2366	10/11/09 1:36	58.44	3.08
2367	10/11/09 1:37	58.44	3.08
2368	10/11/09 1:38	58.44	3.08
2369	10/11/09 1:39	58.45	3.09
2370	10/11/09 1:40	58.44	3.08
2371	10/11/09 1:41	58.45	3.09
2372	10/11/09 1:42	58.45	3.09
2373	10/11/09 1:43	58.45	3.09
2374	10/11/09 1:44	58.45	3.09
2375	10/11/09 1:45	58.45	3.09
2376	10/11/09 1:46	58.45	3.09
2377	10/11/09 1:47	58.45	3.09
2378	10/11/09 1:48	58.45	3.09
2379	10/11/09 1:49	58.45	3.09
2380	10/11/09 1:50	58.45	3.09
2381	10/11/09 1:51	58.45	3.09
2382	10/11/09 1:52	58.45	3.09
2383	10/11/09 1:53	58.45	3.09
2384	10/11/09 1:54	58.45	3.09
2385	10/11/09 1:55	58.45	3.09
2386	10/11/09 1:56	58.45	3.09
2387	10/11/09 1:57	58.45	3.09
2388	10/11/09 1:58	58.45	3.09
2389	10/11/09 1:59	58.45	3.09
2390	10/11/09 2:00	58.45	3.09
2391	10/11/09 2:01	58.45	3.09
2392	10/11/09 2:02	58.45	3.09
2393	10/11/09 2:03	58.45	3.09
2394	10/11/09 2:04	58.45	3.09
2395	10/11/09 2:05	58.45	3.09
2396	10/11/09 2:06	58.46	3.10
2397	10/11/09 2:07	58.45	3.09
2398	10/11/09 2:08	58.45	3.09
2399	10/11/09 2:09	58.45	3.09
2400	10/11/09 2:10	58.45	3.09
2401	10/11/09 2:11	58.46	3.10

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2402	10/11/09 2:12	58.46	3.10
2403	10/11/09 2:13	58.46	3.10
2404	10/11/09 2:14	58.46	3.10
2405	10/11/09 2:15	58.46	3.10
2406	10/11/09 2:16	58.46	3.10
2407	10/11/09 2:17	58.46	3.10
2408	10/11/09 2:18	58.46	3.10
2409	10/11/09 2:19	58.46	3.10
2410	10/11/09 2:20	58.46	3.10
2411	10/11/09 2:21	58.46	3.10
2412	10/11/09 2:22	58.46	3.10
2413	10/11/09 2:23	58.46	3.10
2414	10/11/09 2:24	58.46	3.10
2415	10/11/09 2:25	58.46	3.10
2416	10/11/09 2:26	58.46	3.10
2417	10/11/09 2:27	58.46	3.10
2418	10/11/09 2:28	58.46	3.10
2419	10/11/09 2:29	58.46	3.10
2424	10/11/09 2:34	58.46	3.10
2425	10/11/09 2:35	58.47	3.11
2426	10/11/09 2:36	58.47	3.11
2427	10/11/09 2:37	58.47	3.11
2428	10/11/09 2:38	58.47	3.11
2429	10/11/09 2:39	58.47	3.11
2430	10/11/09 2:40	58.47	3.11
2431	10/11/09 2:41	58.47	3.11
2432	10/11/09 2:42	58.47	3.11
2433	10/11/09 2:43	58.47	3.11
2434	10/11/09 2:44	58.47	3.11
2435	10/11/09 2:45	58.47	3.11
2436	10/11/09 2:46	58.47	3.11
2437	10/11/09 2:47	58.47	3.11
2438	10/11/09 2:48	58.47	3.11
2439	10/11/09 2:49	58.47	3.11
2440	10/11/09 2:50	58.47	3.11
2441	10/11/09 2:51	58.47	3.11
2442	10/11/09 2:52	58.47	3.11
2443	10/11/09 2:53	58.47	3.11
2444	10/11/09 2:54	58.48	3.12
2445	10/11/09 2:55	58.47	3.11
2446	10/11/09 2:56	58.47	3.11
2447	10/11/09 2:57	58.48	3.12
2448	10/11/09 2:58	58.47	3.11
2449	10/11/09 2:59	58.48	3.12
2450	10/11/09 3:00	58.47	3.11
2451	10/11/09 3:01	58.47	3.11
2452	10/11/09 3:02	58.48	3.12
2453	10/11/09 3:03	58.48	3.12
2454	10/11/09 3:04	58.48	3.12
2455	10/11/09 3:05	58.48	3.12
2456	10/11/09 3:06	58.48	3.12
2457	10/11/09 3:07	58.48	3.12
2458	10/11/09 3:08	58.48	3.12

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2459	10/11/09 3:09	58.48	3.12
2460	10/11/09 3:10	58.48	3.12
2461	10/11/09 3:11	58.48	3.12
2462	10/11/09 3:12	58.48	3.12
2463	10/11/09 3:13	58.48	3.12
2464	10/11/09 3:14	58.48	3.12
2465	10/11/09 3:15	58.48	3.12
2466	10/11/09 3:16	58.48	3.12
2467	10/11/09 3:17	58.48	3.12
2468	10/11/09 3:18	58.48	3.12
2469	10/11/09 3:19	58.48	3.12
2470	10/11/09 3:20	58.48	3.12
2471	10/11/09 3:21	58.48	3.12
2472	10/11/09 3:22	58.48	3.12
2473	10/11/09 3:23	58.48	3.12
2474	10/11/09 3:24	58.48	3.12
2475	10/11/09 3:25	58.49	3.13
2476	10/11/09 3:26	58.48	3.12
2477	10/11/09 3:27	58.49	3.13
2478	10/11/09 3:28	58.49	3.13
2479	10/11/09 3:29	58.48	3.12
2480	10/11/09 3:30	58.49	3.13
2481	10/11/09 3:31	58.49	3.13
2482	10/11/09 3:32	58.49	3.13
2483	10/11/09 3:33	58.49	3.13
2484	10/11/09 3:34	58.49	3.13
2485	10/11/09 3:35	58.49	3.13
2486	10/11/09 3:36	58.49	3.13
2487	10/11/09 3:37	58.49	3.13
2488	10/11/09 3:38	58.49	3.13
2489	10/11/09 3:39	58.49	3.13
2490	10/11/09 3:40	58.49	3.13
2491	10/11/09 3:41	58.49	3.13
2492	10/11/09 3:42	58.49	3.13
2493	10/11/09 3:43	58.49	3.13
2494	10/11/09 3:44	58.49	3.13
2495	10/11/09 3:45	58.49	3.13
2496	10/11/09 3:46	58.49	3.13
2497	10/11/09 3:47	58.49	3.13
2498	10/11/09 3:48	58.49	3.13
2499	10/11/09 3:49	58.49	3.13
2500	10/11/09 3:50	58.49	3.13
2501	10/11/09 3:51	58.49	3.13
2502	10/11/09 3:52	58.49	3.13
2503	10/11/09 3:53	58.49	3.13
2504	10/11/09 3:54	58.49	3.13
2505	10/11/09 3:55	58.50	3.14
2506	10/11/09 3:56	58.50	3.14
2507	10/11/09 3:57	58.50	3.14
2508	10/11/09 3:58	58.50	3.14
2509	10/11/09 3:59	58.50	3.14
2510	10/11/09 4:00	58.50	3.14
2511	10/11/09 4:01	58.50	3.14

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2512	10/11/09 4:02	58.50	3.14
2513	10/11/09 4:03	58.50	3.14
2514	10/11/09 4:04	58.50	3.14
2515	10/11/09 4:05	58.50	3.14
2516	10/11/09 4:06	58.50	3.14
2517	10/11/09 4:07	58.50	3.14
2518	10/11/09 4:08	58.50	3.14
2519	10/11/09 4:09	58.50	3.14
2520	10/11/09 4:10	58.50	3.14
2521	10/11/09 4:11	58.50	3.14
2522	10/11/09 4:12	58.50	3.14
2523	10/11/09 4:13	58.50	3.14
2524	10/11/09 4:14	58.50	3.14
2525	10/11/09 4:15	58.50	3.14
2526	10/11/09 4:16	58.50	3.14
2527	10/11/09 4:17	58.50	3.14
2528	10/11/09 4:18	58.51	3.15
2529	10/11/09 4:19	58.50	3.14
2530	10/11/09 4:20	58.51	3.15
2531	10/11/09 4:21	58.51	3.15
2532	10/11/09 4:22	58.51	3.15
2533	10/11/09 4:23	58.51	3.15
2534	10/11/09 4:24	58.51	3.15
2535	10/11/09 4:25	58.51	3.15
2536	10/11/09 4:26	58.51	3.15
2537	10/11/09 4:27	58.51	3.15
2538	10/11/09 4:28	58.51	3.15
2539	10/11/09 4:29	58.51	3.15
2540	10/11/09 4:30	58.51	3.15
2541	10/11/09 4:31	58.51	3.15
2542	10/11/09 4:32	58.51	3.15
2543	10/11/09 4:33	58.51	3.15
2544	10/11/09 4:34	58.51	3.15
2545	10/11/09 4:35	58.51	3.15
2546	10/11/09 4:36	58.51	3.15
2547	10/11/09 4:37	58.51	3.15
2548	10/11/09 4:38	58.51	3.15
2549	10/11/09 4:39	58.51	3.15
2550	10/11/09 4:40	58.51	3.15
2551	10/11/09 4:41	58.51	3.15
2552	10/11/09 4:42	58.51	3.15
2553	10/11/09 4:43	58.51	3.15
2554	10/11/09 4:44	58.51	3.15
2555	10/11/09 4:45	58.52	3.16
2556	10/11/09 4:46	58.52	3.16
2557	10/11/09 4:47	58.51	3.15
2558	10/11/09 4:48	58.51	3.15
2559	10/11/09 4:49	58.52	3.16
2560	10/11/09 4:50	58.52	3.16
2561	10/11/09 4:51	58.52	3.16
2562	10/11/09 4:52	58.52	3.16
2563	10/11/09 4:53	58.52	3.16
2564	10/11/09 4:54	58.52	3.16

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
2565	10/11/09 4:55	58.52	3.16
2566	10/11/09 4:56	58.52	3.16
2567	10/11/09 4:57	58.52	3.16
2568	10/11/09 4:58	58.52	3.16
2569	10/11/09 4:59	58.52	3.16
2570	10/11/09 5:00	58.52	3.16
2571	10/11/09 5:01	58.52	3.16
2572	10/11/09 5:02	58.52	3.16
2573	10/11/09 5:03	58.52	3.16
2574	10/11/09 5:04	58.52	3.16
2575	10/11/09 5:05	58.52	3.16
2576	10/11/09 5:06	58.52	3.16
2577	10/11/09 5:07	58.52	3.16
2578	10/11/09 5:08	58.52	3.16
2579	10/11/09 5:09	58.52	3.16
2580	10/11/09 5:10	58.52	3.16
2581	10/11/09 5:11	58.52	3.16
2582	10/11/09 5:12	58.52	3.16
2583	10/11/09 5:13	58.53	3.17
2584	10/11/09 5:14	58.53	3.17
2585	10/11/09 5:15	58.52	3.16
2586	10/11/09 5:16	58.53	3.17
2587	10/11/09 5:17	58.53	3.17
2588	10/11/09 5:18	58.53	3.17
2589	10/11/09 5:19	58.53	3.17
2590	10/11/09 5:20	58.53	3.17
2591	10/11/09 5:21	58.53	3.17
2592	10/11/09 5:22	58.53	3.17
2593	10/11/09 5:23	58.53	3.17
2594	10/11/09 5:24	58.53	3.17
2595	10/11/09 5:25	58.53	3.17
2596	10/11/09 5:26	58.53	3.17
2597	10/11/09 5:27	58.53	3.17
2598	10/11/09 5:28	58.53	3.17
2599	10/11/09 5:29	58.53	3.17
2600	10/11/09 5:30	58.53	3.17
2601	10/11/09 5:31	58.53	3.17
2602	10/11/09 5:32	58.53	3.17
2603	10/11/09 5:33	58.53	3.17
2604	10/11/09 5:34	58.53	3.17
2605	10/11/09 5:35	58.53	3.17
2606	10/11/09 5:36	58.54	3.18
2607	10/11/09 5:37	58.53	3.17
2608	10/11/09 5:38	58.53	3.17
2609	10/11/09 5:39	58.53	3.17
2610	10/11/09 5:40	58.54	3.18
2611	10/11/09 5:41	58.54	3.18
2612	10/11/09 5:42	58.54	3.18
2613	10/11/09 5:43	58.53	3.17
2614	10/11/09 5:44	58.54	3.18
2615	10/11/09 5:45	58.54	3.18
2616	10/11/09 5:46	58.54	3.18
2617	10/11/09 5:47	58.54	3.18

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2618	10/11/09 5:48	58.54	3.18
2619	10/11/09 5:49	58.54	3.18
2620	10/11/09 5:50	58.54	3.18
2621	10/11/09 5:51	58.54	3.18
2622	10/11/09 5:52	58.54	3.18
2623	10/11/09 5:53	58.54	3.18
2624	10/11/09 5:54	58.54	3.18
2625	10/11/09 5:55	58.54	3.18
2626	10/11/09 5:56	58.54	3.18
2627	10/11/09 5:57	58.54	3.18
2628	10/11/09 5:58	58.54	3.18
2629	10/11/09 5:59	58.54	3.18
2630	10/11/09 6:00	58.54	3.18
2631	10/11/09 6:01	58.54	3.18
2632	10/11/09 6:02	58.54	3.18
2633	10/11/09 6:03	58.54	3.18
2634	10/11/09 6:04	58.54	3.18
2635	10/11/09 6:05	58.54	3.18
2636	10/11/09 6:06	58.54	3.18
2637	10/11/09 6:07	58.54	3.18
2638	10/11/09 6:08	58.54	3.18
2639	10/11/09 6:09	58.54	3.18
2640	10/11/09 6:10	58.54	3.18
2641	10/11/09 6:11	58.55	3.19
2642	10/11/09 6:12	58.55	3.19
2643	10/11/09 6:13	58.55	3.19
2644	10/11/09 6:14	58.55	3.19
2645	10/11/09 6:15	58.55	3.19
2646	10/11/09 6:16	58.55	3.19
2647	10/11/09 6:17	58.55	3.19
2648	10/11/09 6:18	58.55	3.19
2649	10/11/09 6:19	58.55	3.19
2650	10/11/09 6:20	58.55	3.19
2651	10/11/09 6:21	58.55	3.19
2652	10/11/09 6:22	58.55	3.19
2653	10/11/09 6:23	58.55	3.19
2654	10/11/09 6:24	58.55	3.19
2655	10/11/09 6:25	58.55	3.19
2656	10/11/09 6:26	58.55	3.19
2657	10/11/09 6:27	58.55	3.19
2658	10/11/09 6:28	58.55	3.19
2659	10/11/09 6:29	58.55	3.19
2660	10/11/09 6:30	58.55	3.19
2661	10/11/09 6:31	58.55	3.19
2662	10/11/09 6:32	58.55	3.19
2663	10/11/09 6:33	58.55	3.19
2664	10/11/09 6:34	58.55	3.19
2665	10/11/09 6:35	58.55	3.19
2666	10/11/09 6:36	58.55	3.19
2667	10/11/09 6:37	58.56	3.20
2668	10/11/09 6:38	58.55	3.19
2669	10/11/09 6:39	58.56	3.20
2670	10/11/09 6:40	58.56	3.20

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2671	10/11/09 6:41	58.56	3.20
2672	10/11/09 6:42	58.56	3.20
2673	10/11/09 6:43	58.56	3.20
2674	10/11/09 6:44	58.56	3.20
2675	10/11/09 6:45	58.56	3.20
2676	10/11/09 6:46	58.56	3.20
2677	10/11/09 6:47	58.56	3.20
2678	10/11/09 6:48	58.56	3.20
2679	10/11/09 6:49	58.56	3.20
2680	10/11/09 6:50	58.56	3.20
2681	10/11/09 6:51	58.56	3.20
2682	10/11/09 6:52	58.56	3.20
2683	10/11/09 6:53	58.56	3.20
2684	10/11/09 6:54	58.56	3.20
2685	10/11/09 6:55	58.56	3.20
2686	10/11/09 6:56	58.56	3.20
2687	10/11/09 6:57	58.56	3.20
2688	10/11/09 6:58	58.56	3.20
2689	10/11/09 6:59	58.56	3.20
2690	10/11/09 7:00	58.56	3.20
2691	10/11/09 7:01	58.56	3.20
2692	10/11/09 7:02	58.56	3.20
2693	10/11/09 7:03	58.56	3.20
2694	10/11/09 7:04	58.56	3.20
2695	10/11/09 7:05	58.57	3.21
2696	10/11/09 7:06	58.57	3.21
2697	10/11/09 7:07	58.57	3.21
2698	10/11/09 7:08	58.57	3.21
2699	10/11/09 7:09	58.57	3.21
2700	10/11/09 7:10	58.57	3.21
2701	10/11/09 7:11	58.57	3.21
2702	10/11/09 7:12	58.57	3.21
2703	10/11/09 7:13	58.57	3.21
2704	10/11/09 7:14	58.57	3.21
2705	10/11/09 7:15	58.57	3.21
2706	10/11/09 7:16	58.57	3.21
2707	10/11/09 7:17	58.57	3.21
2708	10/11/09 7:18	58.57	3.21
2709	10/11/09 7:19	58.57	3.21
2710	10/11/09 7:20	58.57	3.21
2711	10/11/09 7:21	58.57	3.21
2712	10/11/09 7:22	58.57	3.21
2713	10/11/09 7:23	58.57	3.21
2714	10/11/09 7:24	58.57	3.21
2715	10/11/09 7:25	58.57	3.21
2716	10/11/09 7:26	58.57	3.21
2717	10/11/09 7:27	58.57	3.21
2718	10/11/09 7:28	58.57	3.21
2719	10/11/09 7:29	58.58	3.22
2720	10/11/09 7:30	58.58	3.22
2721	10/11/09 7:31	58.58	3.22
2722	10/11/09 7:32	58.58	3.22
2723	10/11/09 7:33	58.58	3.22

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2724	10/11/09 7:34	58.58	3.22
2725	10/11/09 7:35	58.58	3.22
2726	10/11/09 7:36	58.58	3.22
2727	10/11/09 7:37	58.58	3.22
2728	10/11/09 7:38	58.58	3.22
2729	10/11/09 7:39	58.58	3.22
2730	10/11/09 7:40	58.58	3.22
2731	10/11/09 7:41	58.58	3.22
2732	10/11/09 7:42	58.58	3.22
2733	10/11/09 7:43	58.58	3.22
2734	10/11/09 7:44	58.58	3.22
2735	10/11/09 7:45	58.58	3.22
2736	10/11/09 7:46	58.58	3.22
2737	10/11/09 7:47	58.58	3.22
2738	10/11/09 7:48	58.58	3.22
2739	10/11/09 7:49	58.58	3.22
2740	10/11/09 7:50	58.58	3.22
2741	10/11/09 7:51	58.58	3.22
2742	10/11/09 7:52	58.58	3.22
2743	10/11/09 7:53	58.58	3.22
2744	10/11/09 7:54	58.59	3.23
2745	10/11/09 7:55	58.58	3.22
2746	10/11/09 7:56	58.58	3.22
2747	10/11/09 7:57	58.58	3.22
2748	10/11/09 7:58	58.59	3.23
2749	10/11/09 7:59	58.59	3.23
2750	10/11/09 8:00	58.59	3.23
2751	10/11/09 8:01	58.59	3.23
2752	10/11/09 8:02	58.59	3.23
2753	10/11/09 8:03	58.59	3.23
2754	10/11/09 8:04	58.59	3.23
2755	10/11/09 8:05	58.59	3.23
2756	10/11/09 8:06	58.59	3.23
2757	10/11/09 8:07	58.59	3.23
2758	10/11/09 8:08	58.59	3.23
2759	10/11/09 8:09	58.59	3.23
2760	10/11/09 8:10	58.59	3.23
2761	10/11/09 8:11	58.59	3.23
2762	10/11/09 8:12	58.59	3.23
2763	10/11/09 8:13	58.59	3.23
2764	10/11/09 8:14	58.59	3.23
2765	10/11/09 8:15	58.59	3.23
2766	10/11/09 8:16	58.59	3.23
2767	10/11/09 8:17	58.59	3.23
2768	10/11/09 8:18	58.59	3.23
2769	10/11/09 8:19	58.59	3.23
2770	10/11/09 8:20	58.59	3.23
2771	10/11/09 8:21	58.59	3.23
2772	10/11/09 8:22	58.59	3.23
2773	10/11/09 8:23	58.59	3.23
2774	10/11/09 8:24	58.59	3.23
2775	10/11/09 8:25	58.60	3.24
2776	10/11/09 8:26	58.60	3.24

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2777	10/11/09 8:27	58.60	3.24
2778	10/11/09 8:28	58.60	3.24
2779	10/11/09 8:29	58.60	3.24
2780	10/11/09 8:30	58.60	3.24
2781	10/11/09 8:31	58.60	3.24
2782	10/11/09 8:32	58.60	3.24
2783	10/11/09 8:33	58.60	3.24
2784	10/11/09 8:34	58.60	3.24
2785	10/11/09 8:35	58.60	3.24
2786	10/11/09 8:36	58.60	3.24
2787	10/11/09 8:37	58.60	3.24
2788	10/11/09 8:38	58.60	3.24
2789	10/11/09 8:39	58.60	3.24
2790	10/11/09 8:40	58.60	3.24
2791	10/11/09 8:41	58.60	3.24
2792	10/11/09 8:42	58.60	3.24
2793	10/11/09 8:43	58.60	3.24
2794	10/11/09 8:44	58.60	3.24
2795	10/11/09 8:45	58.60	3.24
2796	10/11/09 8:46	58.60	3.24
2797	10/11/09 8:47	58.60	3.24
2798	10/11/09 8:48	58.60	3.24
2799	10/11/09 8:49	58.60	3.24
2800	10/11/09 8:50	58.60	3.24
2801	10/11/09 8:51	58.60	3.24
2802	10/11/09 8:52	58.60	3.24
2803	10/11/09 8:53	58.60	3.24
2804	10/11/09 8:54	58.60	3.24
2805	10/11/09 8:55	58.60	3.24
2806	10/11/09 8:56	58.60	3.24
2807	10/11/09 8:57	58.60	3.24
2808	10/11/09 8:58	58.60	3.24
2809	10/11/09 8:59	58.60	3.24
2810	10/11/09 9:00	58.61	3.25
2811	10/11/09 9:01	58.61	3.25
2812	10/11/09 9:02	58.60	3.24
2813	10/11/09 9:03	58.60	3.24
2814	10/11/09 9:04	58.61	3.25
2815	10/11/09 9:05	58.61	3.25
2816	10/11/09 9:06	58.61	3.25
2817	10/11/09 9:07	58.61	3.25
2818	10/11/09 9:08	58.61	3.25
2819	10/11/09 9:09	58.61	3.25
2820	10/11/09 9:10	58.61	3.25
2821	10/11/09 9:11	58.61	3.25
2822	10/11/09 9:12	58.61	3.25
2823	10/11/09 9:13	58.61	3.25
2824	10/11/09 9:14	58.61	3.25
2825	10/11/09 9:15	58.61	3.25
2826	10/11/09 9:16	58.61	3.25
2827	10/11/09 9:17	58.61	3.25
2828	10/11/09 9:18	58.61	3.25
2829	10/11/09 9:19	58.61	3.25

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2830	10/11/09 9:20	58.61	3.25
2831	10/11/09 9:21	58.61	3.25
2832	10/11/09 9:22	58.61	3.25
2833	10/11/09 9:23	58.61	3.25
2834	10/11/09 9:24	58.61	3.25
2835	10/11/09 9:25	58.61	3.25
2836	10/11/09 9:26	58.61	3.25
2837	10/11/09 9:27	58.61	3.25
2838	10/11/09 9:28	58.61	3.25
2839	10/11/09 9:29	58.61	3.25
2840	10/11/09 9:30	58.61	3.25
2841	10/11/09 9:31	58.61	3.25
2842	10/11/09 9:32	58.61	3.25
2843	10/11/09 9:33	58.61	3.25
2844	10/11/09 9:34	58.61	3.25
2845	10/11/09 9:35	58.61	3.25
2846	10/11/09 9:36	58.61	3.25
2847	10/11/09 9:37	58.61	3.25
2848	10/11/09 9:38	58.61	3.25
2849	10/11/09 9:39	58.61	3.25
2850	10/11/09 9:40	58.61	3.25
2851	10/11/09 9:41	58.61	3.25
2852	10/11/09 9:42	58.61	3.25
2853	10/11/09 9:43	58.61	3.25
2854	10/11/09 9:44	58.61	3.25
2855	10/11/09 9:45	58.62	3.26
2856	10/11/09 9:46	58.61	3.25
2857	10/11/09 9:47	58.61	3.25
2858	10/11/09 9:48	58.62	3.26
2859	10/11/09 9:49	58.61	3.25
2860	10/11/09 9:50	58.62	3.26
2861	10/11/09 9:51	58.62	3.26
2862	10/11/09 9:52	58.62	3.26
2863	10/11/09 9:53	58.62	3.26
2864	10/11/09 9:54	58.62	3.26
2865	10/11/09 9:55	58.62	3.26
2866	10/11/09 9:56	58.62	3.26
2867	10/11/09 9:57	58.62	3.26
2868	10/11/09 9:58	58.62	3.26
2869	10/11/09 9:59	58.62	3.26
2870	10/11/09 10:00	58.62	3.26
2871	10/11/09 10:01	58.62	3.26
2872	10/11/09 10:02	58.62	3.26
2873	10/11/09 10:03	58.62	3.26
2874	10/11/09 10:04	58.62	3.26
2875	10/11/09 10:05	58.62	3.26
2876	10/11/09 10:06	58.62	3.26
2877	10/11/09 10:07	58.62	3.26
2878	10/11/09 10:08	58.62	3.26
2879	10/11/09 10:09	58.62	3.26
2880	10/11/09 10:10	58.62	3.26
2881	10/11/09 10:11	58.62	3.26
2882	10/11/09 10:12	58.62	3.26

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well: Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2883	10/11/09 10:13	58.62	3.26
2884	10/11/09 10:14	58.62	3.26
2885	10/11/09 10:15	58.62	3.26
2886	10/11/09 10:16	58.62	3.26
2887	10/11/09 10:17	58.62	3.26
2888	10/11/09 10:18	58.62	3.26
2889	10/11/09 10:19	58.62	3.26
2890	10/11/09 10:20	58.62	3.26
2891	10/11/09 10:21	58.62	3.26
2892	10/11/09 10:22	58.62	3.26
2893	10/11/09 10:23	58.62	3.26
2894	10/11/09 10:24	58.62	3.26
2895	10/11/09 10:25	58.62	3.26
2896	10/11/09 10:26	58.62	3.26
2897	10/11/09 10:27	58.63	3.27
2898	10/11/09 10:28	58.62	3.26
2899	10/11/09 10:29	58.62	3.26
2900	10/11/09 10:30	58.62	3.26
2901	10/11/09 10:31	58.62	3.26
2902	10/11/09 10:32	58.62	3.26
2903	10/11/09 10:33	58.62	3.26
2904	10/11/09 10:34	58.63	3.27
2905	10/11/09 10:35	58.63	3.27
2906	10/11/09 10:36	58.62	3.26
2907	10/11/09 10:37	58.63	3.27
2908	10/11/09 10:38	58.62	3.26
2909	10/11/09 10:39	58.63	3.27
2910	10/11/09 10:40	58.63	3.27
2911	10/11/09 10:41	58.63	3.27
2912	10/11/09 10:42	58.63	3.27
2913	10/11/09 10:43	58.63	3.27
2914	10/11/09 10:44	58.63	3.27
2915	10/11/09 10:45	58.63	3.27
2916	10/11/09 10:46	58.63	3.27
2917	10/11/09 10:47	58.63	3.27
2918	10/11/09 10:48	58.63	3.27
2919	10/11/09 10:49	58.63	3.27
2920	10/11/09 10:50	58.63	3.27
2921	10/11/09 10:51	58.63	3.27
2922	10/11/09 10:52	58.63	3.27
2923	10/11/09 10:53	58.63	3.27
2924	10/11/09 10:54	58.63	3.27
2925	10/11/09 10:55	58.63	3.27
2926	10/11/09 10:56	58.63	3.27
2927	10/11/09 10:57	58.63	3.27
2928	10/11/09 10:58	58.63	3.27
2929	10/11/09 10:59	58.63	3.27
2930	10/11/09 11:00	58.63	3.27
2931	10/11/09 11:01	58.63	3.27
2932	10/11/09 11:02	58.63	3.27
2933	10/11/09 11:03	58.63	3.27
2934	10/11/09 11:04	58.63	3.27
2935	10/11/09 11:05	58.63	3.27

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
2936	10/11/09 11:06	58.63	3.27
2937	10/11/09 11:07	58.63	3.27
2938	10/11/09 11:08	58.63	3.27
2939	10/11/09 11:09	58.63	3.27
2940	10/11/09 11:10	58.63	3.27
2941	10/11/09 11:11	58.63	3.27
2942	10/11/09 11:12	58.63	3.27
2943	10/11/09 11:13	58.63	3.27
2944	10/11/09 11:14	58.63	3.27
2945	10/11/09 11:15	58.63	3.27
2946	10/11/09 11:16	58.63	3.27
2947	10/11/09 11:17	58.63	3.27
2948	10/11/09 11:18	58.64	3.28
2949	10/11/09 11:19	58.63	3.27
2950	10/11/09 11:20	58.64	3.28
2951	10/11/09 11:21	58.63	3.27
2952	10/11/09 11:22	58.64	3.28
2953	10/11/09 11:23	58.64	3.28
2954	10/11/09 11:24	58.64	3.28
2955	10/11/09 11:25	58.64	3.28
2956	10/11/09 11:26	58.64	3.28
2957	10/11/09 11:27	58.64	3.28
2958	10/11/09 11:28	58.64	3.28
2959	10/11/09 11:29	58.64	3.28
2960	10/11/09 11:30	58.64	3.28
2961	10/11/09 11:31	58.64	3.28
2962	10/11/09 11:32	58.64	3.28
2963	10/11/09 11:33	58.64	3.28
2964	10/11/09 11:34	58.64	3.28
2965	10/11/09 11:35	58.64	3.28
2966	10/11/09 11:36	58.64	3.28
2967	10/11/09 11:37	58.64	3.28
2968	10/11/09 11:38	58.64	3.28
2969	10/11/09 11:39	58.64	3.28
2970	10/11/09 11:40	58.64	3.28
2971	10/11/09 11:41	58.64	3.28
2972	10/11/09 11:42	58.64	3.28
2973	10/11/09 11:43	58.64	3.28
2974	10/11/09 11:44	58.64	3.28
2975	10/11/09 11:45	58.64	3.28
2976	10/11/09 11:46	58.64	3.28
2977	10/11/09 11:47	58.64	3.28
2978	10/11/09 11:48	58.64	3.28
2979	10/11/09 11:49	58.64	3.28
2980	10/11/09 11:50	58.64	3.28
2981	10/11/09 11:51	58.64	3.28
2982	10/11/09 11:52	58.64	3.28
2983	10/11/09 11:53	58.64	3.28
2984	10/11/09 11:54	58.64	3.28
2985	10/11/09 11:55	58.65	3.29
2986	10/11/09 11:56	58.65	3.29
2987	10/11/09 11:57	58.64	3.28
2988	10/11/09 11:58	58.65	3.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
2989	10/11/09 11:59	58.64	3.28
2990	10/11/09 12:00	58.65	3.29
2991	10/11/09 12:01	58.65	3.29
2997	10/11/09 12:07	58.65	3.29
2998	10/11/09 12:08	58.65	3.29
2999	10/11/09 12:09	58.65	3.29
3000	10/11/09 12:10	58.65	3.29
3001	10/11/09 12:11	58.65	3.29
3002	10/11/09 12:12	58.65	3.29
3003	10/11/09 12:13	58.65	3.29
3004	10/11/09 12:14	58.65	3.29
3005	10/11/09 12:15	58.65	3.29
3006	10/11/09 12:16	58.65	3.29
3007	10/11/09 12:17	58.65	3.29
3008	10/11/09 12:18	58.64	3.28
3009	10/11/09 12:19	58.65	3.29
3010	10/11/09 12:20	58.65	3.29
3011	10/11/09 12:21	58.65	3.29
3012	10/11/09 12:22	58.65	3.29
3013	10/11/09 12:23	58.64	3.28
3014	10/11/09 12:24	58.65	3.29
3015	10/11/09 12:25	58.65	3.29
3016	10/11/09 12:26	58.64	3.28
3017	10/11/09 12:27	58.64	3.28
3018	10/11/09 12:28	58.65	3.29
3019	10/11/09 12:29	58.65	3.29
3020	10/11/09 12:30	58.65	3.29
3021	10/11/09 12:31	58.65	3.29
3022	10/11/09 12:32	58.65	3.29
3023	10/11/09 12:33	58.65	3.29
3024	10/11/09 12:34	58.65	3.29
3025	10/11/09 12:35	58.65	3.29
3026	10/11/09 12:36	58.65	3.29
3027	10/11/09 12:37	58.65	3.29
3028	10/11/09 12:38	58.65	3.29
3029	10/11/09 12:39	58.65	3.29
3030	10/11/09 12:40	58.65	3.29
3031	10/11/09 12:41	58.65	3.29
3032	10/11/09 12:42	58.65	3.29
3033	10/11/09 12:43	58.65	3.29
3034	10/11/09 12:44	58.65	3.29
3035	10/11/09 12:45	58.65	3.29
3036	10/11/09 12:46	58.65	3.29
3037	10/11/09 12:47	58.65	3.29
3038	10/11/09 12:48	58.65	3.29
3039	10/11/09 12:49	58.65	3.29
3040	10/11/09 12:50	58.65	3.29
3041	10/11/09 12:51	58.65	3.29
3042	10/11/09 12:52	58.65	3.29
3043	10/11/09 12:53	58.65	3.29
3044	10/11/09 12:54	58.65	3.29
3045	10/11/09 12:55	58.65	3.29
3046	10/11/09 12:56	58.65	3.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3047	10/11/09 12:57	58.65	3.29
3048	10/11/09 12:58	58.65	3.29
3049	10/11/09 12:59	58.65	3.29
3050	10/11/09 13:00	58.65	3.29
3051	10/11/09 13:01	58.65	3.29
3052	10/11/09 13:02	58.65	3.29
3053	10/11/09 13:03	58.65	3.29
3054	10/11/09 13:04	58.65	3.29
3055	10/11/09 13:05	58.65	3.29
3056	10/11/09 13:06	58.65	3.29
3057	10/11/09 13:07	58.65	3.29
3058	10/11/09 13:08	58.65	3.29
3059	10/11/09 13:09	58.65	3.29
3060	10/11/09 13:10	58.65	3.29
3061	10/11/09 13:11	58.65	3.29
3062	10/11/09 13:12	58.65	3.29
3063	10/11/09 13:13	58.65	3.29
3064	10/11/09 13:14	58.65	3.29
3065	10/11/09 13:15	58.65	3.29
3066	10/11/09 13:16	58.65	3.29
3067	10/11/09 13:17	58.65	3.29
3068	10/11/09 13:18	58.65	3.29
3069	10/11/09 13:19	58.65	3.29
3070	10/11/09 13:20	58.65	3.29
3071	10/11/09 13:21	58.65	3.29
3072	10/11/09 13:22	58.65	3.29
3073	10/11/09 13:23	58.65	3.29
3074	10/11/09 13:24	58.65	3.29
3075	10/11/09 13:25	58.65	3.29
3076	10/11/09 13:26	58.65	3.29
3077	10/11/09 13:27	58.65	3.29
3078	10/11/09 13:28	58.65	3.29
3079	10/11/09 13:29	58.65	3.29
3080	10/11/09 13:30	58.65	3.29
3081	10/11/09 13:31	58.65	3.29
3082	10/11/09 13:32	58.65	3.29
3083	10/11/09 13:33	58.65	3.29
3084	10/11/09 13:34	58.65	3.29
3085	10/11/09 13:35	58.65	3.29
3086	10/11/09 13:36	58.65	3.29
3087	10/11/09 13:37	58.65	3.29
3088	10/11/09 13:38	58.65	3.29
3089	10/11/09 13:39	58.65	3.29
3090	10/11/09 13:40	58.65	3.29
3091	10/11/09 13:41	58.65	3.29
3092	10/11/09 13:42	58.65	3.29
3093	10/11/09 13:43	58.65	3.29
3094	10/11/09 13:44	58.65	3.29
3095	10/11/09 13:45	58.65	3.29
3096	10/11/09 13:46	58.65	3.29
3097	10/11/09 13:47	58.65	3.29
3098	10/11/09 13:48	58.65	3.29
3099	10/11/09 13:49	58.65	3.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3100	10/11/09 13:50	58.65	3.29
3101	10/11/09 13:51	58.65	3.29
3102	10/11/09 13:52	58.65	3.29
3103	10/11/09 13:53	58.65	3.29
3104	10/11/09 13:54	58.65	3.29
3105	10/11/09 13:55	58.65	3.29
3106	10/11/09 13:56	58.65	3.29
3107	10/11/09 13:57	58.65	3.29
3108	10/11/09 13:58	58.65	3.29
3109	10/11/09 13:59	58.65	3.29
3110	10/11/09 14:00	58.65	3.29
3111	10/11/09 14:01	58.65	3.29
3112	10/11/09 14:02	58.65	3.29
3113	10/11/09 14:03	58.65	3.29
3114	10/11/09 14:04	58.65	3.29
3115	10/11/09 14:05	58.65	3.29
3116	10/11/09 14:06	58.65	3.29
3117	10/11/09 14:07	58.65	3.29
3118	10/11/09 14:08	58.65	3.29
3119	10/11/09 14:09	58.65	3.29
3120	10/11/09 14:10	58.65	3.29
3121	10/11/09 14:11	58.65	3.29
3122	10/11/09 14:12	58.65	3.29
3123	10/11/09 14:13	58.65	3.29
3124	10/11/09 14:14	58.65	3.29
3125	10/11/09 14:15	58.65	3.29
3126	10/11/09 14:16	58.65	3.29
3127	10/11/09 14:17	58.65	3.29
3128	10/11/09 14:18	58.65	3.29
3129	10/11/09 14:19	58.65	3.29
3130	10/11/09 14:20	58.65	3.29
3131	10/11/09 14:21	58.65	3.29
3132	10/11/09 14:22	58.65	3.29
3133	10/11/09 14:23	58.65	3.29
3134	10/11/09 14:24	58.65	3.29
3135	10/11/09 14:25	58.65	3.29
3136	10/11/09 14:26	58.65	3.29
3137	10/11/09 14:27	58.65	3.29
3138	10/11/09 14:28	58.65	3.29
3139	10/11/09 14:29	58.65	3.29
3140	10/11/09 14:30	58.65	3.29
3141	10/11/09 14:31	58.65	3.29
3142	10/11/09 14:32	58.65	3.29
3143	10/11/09 14:33	58.65	3.29
3144	10/11/09 14:34	58.65	3.29
3145	10/11/09 14:35	58.65	3.29
3146	10/11/09 14:36	58.65	3.29
3147	10/11/09 14:37	58.65	3.29
3148	10/11/09 14:38	58.65	3.29
3149	10/11/09 14:39	58.65	3.29
3150	10/11/09 14:40	58.65	3.29
3151	10/11/09 14:41	58.65	3.29
3152	10/11/09 14:42	58.65	3.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:		2009-10-09 10:10 AM
End Pumping:		2009-10-12 10:10 AM
Initial Volume:		271729 x1000 gal
Final Volume:		272391 x1000 gal
Water Level at Start of Pump Test:		55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3153	10/11/09 14:43	58.65	3.29
3154	10/11/09 14:44	58.65	3.29
3155	10/11/09 14:45	58.65	3.29
3156	10/11/09 14:46	58.65	3.29
3157	10/11/09 14:47	58.65	3.29
3158	10/11/09 14:48	58.65	3.29
3159	10/11/09 14:49	58.65	3.29
3160	10/11/09 14:50	58.65	3.29
3161	10/11/09 14:51	58.65	3.29
3162	10/11/09 14:52	58.65	3.29
3163	10/11/09 14:53	58.65	3.29
3164	10/11/09 14:54	58.65	3.29
3165	10/11/09 14:55	58.65	3.29
3166	10/11/09 14:56	58.65	3.29
3167	10/11/09 14:57	58.65	3.29
3168	10/11/09 14:58	58.65	3.29
3169	10/11/09 14:59	58.65	3.29
3170	10/11/09 15:00	58.64	3.28
3171	10/11/09 15:01	58.64	3.28
3172	10/11/09 15:02	58.64	3.28
3173	10/11/09 15:03	58.65	3.29
3174	10/11/09 15:04	58.65	3.29
3175	10/11/09 15:05	58.65	3.29
3176	10/11/09 15:06	58.65	3.29
3177	10/11/09 15:07	58.65	3.29
3178	10/11/09 15:08	58.65	3.29
3179	10/11/09 15:09	58.65	3.29
3180	10/11/09 15:10	58.65	3.29
3181	10/11/09 15:11	58.65	3.29
3182	10/11/09 15:12	58.65	3.29
3183	10/11/09 15:13	58.65	3.29
3184	10/11/09 15:14	58.65	3.29
3185	10/11/09 15:15	58.65	3.29
3186	10/11/09 15:16	58.65	3.29
3187	10/11/09 15:17	58.65	3.29
3188	10/11/09 15:18	58.65	3.29
3189	10/11/09 15:19	58.65	3.29
3190	10/11/09 15:20	58.65	3.29
3191	10/11/09 15:21	58.65	3.29
3192	10/11/09 15:22	58.65	3.29
3193	10/11/09 15:23	58.65	3.29
3194	10/11/09 15:24	58.65	3.29
3195	10/11/09 15:25	58.65	3.29
3196	10/11/09 15:26	58.65	3.29
3197	10/11/09 15:27	58.65	3.29
3198	10/11/09 15:28	58.65	3.29
3199	10/11/09 15:29	58.65	3.29
3200	10/11/09 15:30	58.65	3.29
3201	10/11/09 15:31	58.65	3.29
3202	10/11/09 15:32	58.65	3.29
3203	10/11/09 15:33	58.65	3.29
3204	10/11/09 15:34	58.65	3.29
3205	10/11/09 15:35	58.65	3.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3206	10/11/09 15:36	58.65	3.29
3207	10/11/09 15:37	58.65	3.29
3208	10/11/09 15:38	58.65	3.29
3209	10/11/09 15:39	58.65	3.29
3210	10/11/09 15:40	58.65	3.29
3211	10/11/09 15:41	58.65	3.29
3212	10/11/09 15:42	58.65	3.29
3213	10/11/09 15:43	58.65	3.29
3214	10/11/09 15:44	58.65	3.29
3215	10/11/09 15:45	58.65	3.29
3216	10/11/09 15:46	58.65	3.29
3217	10/11/09 15:47	58.65	3.29
3218	10/11/09 15:48	58.65	3.29
3219	10/11/09 15:49	58.65	3.29
3220	10/11/09 15:50	58.65	3.29
3221	10/11/09 15:51	58.65	3.29
3222	10/11/09 15:52	58.65	3.29
3223	10/11/09 15:53	58.65	3.29
3224	10/11/09 15:54	58.66	3.30
3225	10/11/09 15:55	58.66	3.30
3226	10/11/09 15:56	58.65	3.29
3227	10/11/09 15:57	58.66	3.30
3228	10/11/09 15:58	58.66	3.30
3229	10/11/09 15:59	58.66	3.30
3230	10/11/09 16:00	58.66	3.30
3231	10/11/09 16:01	58.66	3.30
3232	10/11/09 16:02	58.66	3.30
3233	10/11/09 16:03	58.66	3.30
3234	10/11/09 16:04	58.66	3.30
3235	10/11/09 16:05	58.66	3.30
3236	10/11/09 16:06	58.66	3.30
3237	10/11/09 16:07	58.66	3.30
3238	10/11/09 16:08	58.66	3.30
3239	10/11/09 16:09	58.66	3.30
3240	10/11/09 16:10	58.66	3.30
3241	10/11/09 16:11	58.66	3.30
3242	10/11/09 16:12	58.66	3.30
3243	10/11/09 16:13	58.66	3.30
3244	10/11/09 16:14	58.66	3.30
3245	10/11/09 16:15	58.66	3.30
3246	10/11/09 16:16	58.66	3.30
3247	10/11/09 16:17	58.66	3.30
3248	10/11/09 16:18	58.66	3.30
3249	10/11/09 16:19	58.66	3.30
3250	10/11/09 16:20	58.66	3.30
3251	10/11/09 16:21	58.66	3.30
3252	10/11/09 16:22	58.66	3.30
3253	10/11/09 16:23	58.66	3.30
3254	10/11/09 16:24	58.66	3.30
3255	10/11/09 16:25	58.66	3.30
3256	10/11/09 16:26	58.66	3.30
3257	10/11/09 16:27	58.66	3.30
3258	10/11/09 16:28	58.66	3.30

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
3259	10/11/09 16:29	58.66	3.30
3260	10/11/09 16:30	58.66	3.30
3261	10/11/09 16:31	58.66	3.30
3262	10/11/09 16:32	58.66	3.30
3263	10/11/09 16:33	58.66	3.30
3264	10/11/09 16:34	58.66	3.30
3265	10/11/09 16:35	58.66	3.30
3266	10/11/09 16:36	58.66	3.30
3267	10/11/09 16:37	58.66	3.30
3268	10/11/09 16:38	58.66	3.30
3269	10/11/09 16:39	58.66	3.30
3270	10/11/09 16:40	58.66	3.30
3271	10/11/09 16:41	58.66	3.30
3272	10/11/09 16:42	58.66	3.30
3273	10/11/09 16:43	58.66	3.30
3274	10/11/09 16:44	58.66	3.30
3275	10/11/09 16:45	58.66	3.30
3276	10/11/09 16:46	58.67	3.31
3277	10/11/09 16:47	58.66	3.30
3278	10/11/09 16:48	58.67	3.31
3279	10/11/09 16:49	58.66	3.30
3280	10/11/09 16:50	58.66	3.30
3281	10/11/09 16:51	58.67	3.31
3282	10/11/09 16:52	58.67	3.31
3283	10/11/09 16:53	58.67	3.31
3284	10/11/09 16:54	58.66	3.30
3285	10/11/09 16:55	58.67	3.31
3286	10/11/09 16:56	58.67	3.31
3287	10/11/09 16:57	58.67	3.31
3288	10/11/09 16:58	58.67	3.31
3289	10/11/09 16:59	58.67	3.31
3290	10/11/09 17:00	58.67	3.31
3291	10/11/09 17:01	58.67	3.31
3292	10/11/09 17:02	58.67	3.31
3293	10/11/09 17:03	58.67	3.31
3294	10/11/09 17:04	58.67	3.31
3295	10/11/09 17:05	58.67	3.31
3296	10/11/09 17:06	58.67	3.31
3297	10/11/09 17:07	58.67	3.31
3298	10/11/09 17:08	58.67	3.31
3299	10/11/09 17:09	58.67	3.31
3300	10/11/09 17:10	58.67	3.31
3301	10/11/09 17:11	58.67	3.31
3302	10/11/09 17:12	58.67	3.31
3303	10/11/09 17:13	58.67	3.31
3304	10/11/09 17:14	58.67	3.31
3305	10/11/09 17:15	58.67	3.31
3306	10/11/09 17:16	58.67	3.31
3307	10/11/09 17:17	58.67	3.31
3308	10/11/09 17:18	58.67	3.31
3309	10/11/09 17:19	58.68	3.32
3310	10/11/09 17:20	58.67	3.31
3311	10/11/09 17:21	58.67	3.31

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3312	10/11/09 17:22	58.68	3.32
3313	10/11/09 17:23	58.68	3.32
3314	10/11/09 17:24	58.68	3.32
3315	10/11/09 17:25	58.68	3.32
3316	10/11/09 17:26	58.68	3.32
3317	10/11/09 17:27	58.68	3.32
3318	10/11/09 17:28	58.68	3.32
3319	10/11/09 17:29	58.68	3.32
3320	10/11/09 17:30	58.68	3.32
3321	10/11/09 17:31	58.68	3.32
3322	10/11/09 17:32	58.68	3.32
3323	10/11/09 17:33	58.68	3.32
3324	10/11/09 17:34	58.68	3.32
3325	10/11/09 17:35	58.68	3.32
3326	10/11/09 17:36	58.68	3.32
3327	10/11/09 17:37	58.68	3.32
3328	10/11/09 17:38	58.68	3.32
3329	10/11/09 17:39	58.68	3.32
3330	10/11/09 17:40	58.68	3.32
3331	10/11/09 17:41	58.68	3.32
3332	10/11/09 17:42	58.68	3.32
3333	10/11/09 17:43	58.68	3.32
3334	10/11/09 17:44	58.69	3.33
3335	10/11/09 17:45	58.68	3.32
3336	10/11/09 17:46	58.68	3.32
3337	10/11/09 17:47	58.69	3.33
3338	10/11/09 17:48	58.69	3.33
3339	10/11/09 17:49	58.69	3.33
3340	10/11/09 17:50	58.69	3.33
3341	10/11/09 17:51	58.69	3.33
3342	10/11/09 17:52	58.69	3.33
3343	10/11/09 17:53	58.69	3.33
3344	10/11/09 17:54	58.69	3.33
3345	10/11/09 17:55	58.69	3.33
3346	10/11/09 17:56	58.69	3.33
3347	10/11/09 17:57	58.69	3.33
3348	10/11/09 17:58	58.69	3.33
3349	10/11/09 17:59	58.69	3.33
3350	10/11/09 18:00	58.69	3.33
3351	10/11/09 18:01	58.69	3.33
3352	10/11/09 18:02	58.69	3.33
3353	10/11/09 18:03	58.69	3.33
3354	10/11/09 18:04	58.69	3.33
3355	10/11/09 18:05	58.69	3.33
3356	10/11/09 18:06	58.69	3.33
3357	10/11/09 18:07	58.69	3.33
3358	10/11/09 18:08	58.69	3.33
3359	10/11/09 18:09	58.69	3.33
3360	10/11/09 18:10	58.69	3.33
3361	10/11/09 18:11	58.69	3.33
3369	10/11/09 18:19	58.69	3.33
3370	10/11/09 18:20	58.69	3.33
3371	10/11/09 18:21	58.69	3.33

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3372	10/11/09 18:22	58.69	3.33
3373	10/11/09 18:23	58.69	3.33
3374	10/11/09 18:24	58.69	3.33
3375	10/11/09 18:25	58.69	3.33
3376	10/11/09 18:26	58.69	3.33
3377	10/11/09 18:27	58.69	3.33
3378	10/11/09 18:28	58.69	3.33
3379	10/11/09 18:29	58.69	3.33
3380	10/11/09 18:30	58.69	3.33
3381	10/11/09 18:31	58.69	3.33
3382	10/11/09 18:32	58.69	3.33
3383	10/11/09 18:33	58.69	3.33
3384	10/11/09 18:34	58.69	3.33
3385	10/11/09 18:35	58.69	3.33
3386	10/11/09 18:36	58.69	3.33
3387	10/11/09 18:37	58.69	3.33
3388	10/11/09 18:38	58.70	3.34
3389	10/11/09 18:39	58.70	3.34
3390	10/11/09 18:40	58.70	3.34
3391	10/11/09 18:41	58.70	3.34
3392	10/11/09 18:42	58.70	3.34
3393	10/11/09 18:43	58.70	3.34
3394	10/11/09 18:44	58.70	3.34
3395	10/11/09 18:45	58.70	3.34
3396	10/11/09 18:46	58.70	3.34
3397	10/11/09 18:47	58.70	3.34
3398	10/11/09 18:48	58.70	3.34
3399	10/11/09 18:49	58.70	3.34
3400	10/11/09 18:50	58.70	3.34
3401	10/11/09 18:51	58.70	3.34
3402	10/11/09 18:52	58.70	3.34
3403	10/11/09 18:53	58.70	3.34
3404	10/11/09 18:54	58.70	3.34
3405	10/11/09 18:55	58.70	3.34
3406	10/11/09 18:56	58.70	3.34
3407	10/11/09 18:57	58.70	3.34
3408	10/11/09 18:58	58.70	3.34
3409	10/11/09 18:59	58.70	3.34
3410	10/11/09 19:00	58.70	3.34
3411	10/11/09 19:01	58.70	3.34
3412	10/11/09 19:02	58.70	3.34
3413	10/11/09 19:03	58.70	3.34
3414	10/11/09 19:04	58.70	3.34
3415	10/11/09 19:05	58.70	3.34
3416	10/11/09 19:06	58.70	3.34
3417	10/11/09 19:07	58.70	3.34
3418	10/11/09 19:08	58.70	3.34
3419	10/11/09 19:09	58.70	3.34
3420	10/11/09 19:10	58.70	3.34
3421	10/11/09 19:11	58.70	3.34
3422	10/11/09 19:12	58.70	3.34
3423	10/11/09 19:13	58.70	3.34
3424	10/11/09 19:14	58.70	3.34

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
3425	10/11/09 19:15	58.70	3.34
3426	10/11/09 19:16	58.70	3.34
3427	10/11/09 19:17	58.70	3.34
3428	10/11/09 19:18	58.70	3.34
3429	10/11/09 19:19	58.70	3.34
3430	10/11/09 19:20	58.70	3.34
3431	10/11/09 19:21	58.70	3.34
3432	10/11/09 19:22	58.70	3.34
3433	10/11/09 19:23	58.70	3.34
3434	10/11/09 19:24	58.70	3.34
3435	10/11/09 19:25	58.70	3.34
3436	10/11/09 19:26	58.70	3.34
3437	10/11/09 19:27	58.70	3.34
3438	10/11/09 19:28	58.70	3.34
3439	10/11/09 19:29	58.70	3.34
3440	10/11/09 19:30	58.70	3.34
3441	10/11/09 19:31	58.70	3.34
3442	10/11/09 19:32	58.70	3.34
3443	10/11/09 19:33	58.70	3.34
3444	10/11/09 19:34	58.70	3.34
3445	10/11/09 19:35	58.71	3.35
3446	10/11/09 19:36	58.71	3.35
3447	10/11/09 19:37	58.71	3.35
3448	10/11/09 19:38	58.71	3.35
3449	10/11/09 19:39	58.71	3.35
3450	10/11/09 19:40	58.71	3.35
3451	10/11/09 19:41	58.71	3.35
3452	10/11/09 19:42	58.71	3.35
3453	10/11/09 19:43	58.71	3.35
3454	10/11/09 19:44	58.71	3.35
3455	10/11/09 19:45	58.71	3.35
3456	10/11/09 19:46	58.71	3.35
3457	10/11/09 19:47	58.71	3.35
3458	10/11/09 19:48	58.71	3.35
3459	10/11/09 19:49	58.71	3.35
3460	10/11/09 19:50	58.71	3.35
3461	10/11/09 19:51	58.71	3.35
3462	10/11/09 19:52	58.71	3.35
3463	10/11/09 19:53	58.71	3.35
3464	10/11/09 19:54	58.71	3.35
3465	10/11/09 19:55	58.71	3.35
3466	10/11/09 19:56	58.71	3.35
3467	10/11/09 19:57	58.71	3.35
3468	10/11/09 19:58	58.71	3.35
3469	10/11/09 19:59	58.71	3.35
3470	10/11/09 20:00	58.71	3.35
3471	10/11/09 20:01	58.71	3.35
3472	10/11/09 20:02	58.71	3.35
3473	10/11/09 20:03	58.71	3.35
3474	10/11/09 20:04	58.71	3.35
3475	10/11/09 20:05	58.71	3.35
3476	10/11/09 20:06	58.71	3.35
3477	10/11/09 20:07	58.71	3.35

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3478	10/11/09 20:08	58.71	3.35
3479	10/11/09 20:09	58.71	3.35
3480	10/11/09 20:10	58.71	3.35
3481	10/11/09 20:11	58.71	3.35
3482	10/11/09 20:12	58.71	3.35
3483	10/11/09 20:13	58.71	3.35
3484	10/11/09 20:14	58.71	3.35
3485	10/11/09 20:15	58.71	3.35
3486	10/11/09 20:16	58.71	3.35
3487	10/11/09 20:17	58.71	3.35
3488	10/11/09 20:18	58.71	3.35
3489	10/11/09 20:19	58.71	3.35
3490	10/11/09 20:20	58.71	3.35
3491	10/11/09 20:21	58.71	3.35
3492	10/11/09 20:22	58.71	3.35
3493	10/11/09 20:23	58.71	3.35
3494	10/11/09 20:24	58.72	3.36
3495	10/11/09 20:25	58.71	3.35
3496	10/11/09 20:26	58.71	3.35
3497	10/11/09 20:27	58.71	3.35
3498	10/11/09 20:28	58.71	3.35
3499	10/11/09 20:29	58.71	3.35
3500	10/11/09 20:30	58.71	3.35
3501	10/11/09 20:31	58.71	3.35
3502	10/11/09 20:32	58.71	3.35
3503	10/11/09 20:33	58.72	3.36
3504	10/11/09 20:34	58.72	3.36
3505	10/11/09 20:35	58.72	3.36
3506	10/11/09 20:36	58.72	3.36
3507	10/11/09 20:37	58.71	3.35
3508	10/11/09 20:38	58.72	3.36
3509	10/11/09 20:39	58.71	3.35
3510	10/11/09 20:40	58.71	3.35
3511	10/11/09 20:41	58.72	3.36
3512	10/11/09 20:42	58.72	3.36
3513	10/11/09 20:43	58.72	3.36
3514	10/11/09 20:44	58.71	3.35
3515	10/11/09 20:45	58.72	3.36
3516	10/11/09 20:46	58.71	3.35
3517	10/11/09 20:47	58.71	3.35
3518	10/11/09 20:48	58.71	3.35
3519	10/11/09 20:49	58.72	3.36
3520	10/11/09 20:50	58.71	3.35
3521	10/11/09 20:51	58.72	3.36
3522	10/11/09 20:52	58.72	3.36
3523	10/11/09 20:53	58.72	3.36
3524	10/11/09 20:54	58.71	3.35
3525	10/11/09 20:55	58.71	3.35
3526	10/11/09 20:56	58.72	3.36
3527	10/11/09 20:57	58.72	3.36
3528	10/11/09 20:58	58.72	3.36
3529	10/11/09 20:59	58.72	3.36
3530	10/11/09 21:00	58.72	3.36

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3531	10/11/09 21:01	58.72	3.36
3532	10/11/09 21:02	58.72	3.36
3533	10/11/09 21:03	58.72	3.36
3534	10/11/09 21:04	58.72	3.36
3535	10/11/09 21:05	58.72	3.36
3536	10/11/09 21:06	58.72	3.36
3537	10/11/09 21:07	58.72	3.36
3538	10/11/09 21:08	58.72	3.36
3539	10/11/09 21:09	58.72	3.36
3540	10/11/09 21:10	58.72	3.36
3541	10/11/09 21:11	58.72	3.36
3542	10/11/09 21:12	58.72	3.36
3543	10/11/09 21:13	58.72	3.36
3544	10/11/09 21:14	58.72	3.36
3545	10/11/09 21:15	58.72	3.36
3546	10/11/09 21:16	58.72	3.36
3547	10/11/09 21:17	58.72	3.36
3548	10/11/09 21:18	58.72	3.36
3549	10/11/09 21:19	58.72	3.36
3550	10/11/09 21:20	58.72	3.36
3551	10/11/09 21:21	58.72	3.36
3552	10/11/09 21:22	58.72	3.36
3553	10/11/09 21:23	58.72	3.36
3554	10/11/09 21:24	58.72	3.36
3555	10/11/09 21:25	58.72	3.36
3556	10/11/09 21:26	58.72	3.36
3557	10/11/09 21:27	58.72	3.36
3558	10/11/09 21:28	58.72	3.36
3559	10/11/09 21:29	58.72	3.36
3560	10/11/09 21:30	58.72	3.36
3561	10/11/09 21:31	58.72	3.36
3562	10/11/09 21:32	58.72	3.36
3563	10/11/09 21:33	58.72	3.36
3564	10/11/09 21:34	58.72	3.36
3565	10/11/09 21:35	58.72	3.36
3566	10/11/09 21:36	58.72	3.36
3567	10/11/09 21:37	58.72	3.36
3568	10/11/09 21:38	58.72	3.36
3569	10/11/09 21:39	58.72	3.36
3570	10/11/09 21:40	58.72	3.36
3571	10/11/09 21:41	58.72	3.36
3572	10/11/09 21:42	58.72	3.36
3573	10/11/09 21:43	58.72	3.36
3574	10/11/09 21:44	58.72	3.36
3575	10/11/09 21:45	58.73	3.37
3576	10/11/09 21:46	58.73	3.37
3577	10/11/09 21:47	58.72	3.36
3578	10/11/09 21:48	58.73	3.37
3579	10/11/09 21:49	58.72	3.36
3580	10/11/09 21:50	58.72	3.36
3581	10/11/09 21:51	58.72	3.36
3582	10/11/09 21:52	58.72	3.36
3583	10/11/09 21:53	58.72	3.36

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
3584	10/11/09 21:54	58.73	3.37
3585	10/11/09 21:55	58.73	3.37
3586	10/11/09 21:56	58.72	3.36
3587	10/11/09 21:57	58.73	3.37
3588	10/11/09 21:58	58.73	3.37
3589	10/11/09 21:59	58.73	3.37
3590	10/11/09 22:00	58.73	3.37
3591	10/11/09 22:01	58.73	3.37
3592	10/11/09 22:02	58.73	3.37
3593	10/11/09 22:03	58.73	3.37
3594	10/11/09 22:04	58.73	3.37
3595	10/11/09 22:05	58.73	3.37
3596	10/11/09 22:06	58.73	3.37
3597	10/11/09 22:07	58.73	3.37
3598	10/11/09 22:08	58.73	3.37
3599	10/11/09 22:09	58.73	3.37
3600	10/11/09 22:10	58.73	3.37
3601	10/11/09 22:11	58.73	3.37
3602	10/11/09 22:12	58.73	3.37
3603	10/11/09 22:13	58.73	3.37
3604	10/11/09 22:14	58.73	3.37
3605	10/11/09 22:15	58.73	3.37
3606	10/11/09 22:16	58.73	3.37
3607	10/11/09 22:17	58.73	3.37
3608	10/11/09 22:18	58.73	3.37
3609	10/11/09 22:19	58.73	3.37
3610	10/11/09 22:20	58.73	3.37
3611	10/11/09 22:21	58.73	3.37
3612	10/11/09 22:22	58.73	3.37
3613	10/11/09 22:23	58.73	3.37
3614	10/11/09 22:24	58.73	3.37
3615	10/11/09 22:25	58.73	3.37
3616	10/11/09 22:26	58.73	3.37
3617	10/11/09 22:27	58.73	3.37
3618	10/11/09 22:28	58.73	3.37
3619	10/11/09 22:29	58.73	3.37
3620	10/11/09 22:30	58.73	3.37
3621	10/11/09 22:31	58.73	3.37
3622	10/11/09 22:32	58.73	3.37
3623	10/11/09 22:33	58.73	3.37
3624	10/11/09 22:34	58.73	3.37
3625	10/11/09 22:35	58.73	3.37
3626	10/11/09 22:36	58.73	3.37
3627	10/11/09 22:37	58.73	3.37
3628	10/11/09 22:38	58.73	3.37
3629	10/11/09 22:39	58.73	3.37
3630	10/11/09 22:40	58.73	3.37
3631	10/11/09 22:41	58.73	3.37
3632	10/11/09 22:42	58.73	3.37
3633	10/11/09 22:43	58.73	3.37
3634	10/11/09 22:44	58.73	3.37
3635	10/11/09 22:45	58.73	3.37
3636	10/11/09 22:46	58.73	3.37

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3637	10/11/09 22:47	58.73	3.37
3638	10/11/09 22:48	58.73	3.37
3639	10/11/09 22:49	58.73	3.37
3640	10/11/09 22:50	58.73	3.37
3641	10/11/09 22:51	58.73	3.37
3642	10/11/09 22:52	58.73	3.37
3643	10/11/09 22:53	58.73	3.37
3644	10/11/09 22:54	58.73	3.37
3645	10/11/09 22:55	58.73	3.37
3646	10/11/09 22:56	58.73	3.37
3647	10/11/09 22:57	58.73	3.37
3648	10/11/09 22:58	58.73	3.37
3649	10/11/09 22:59	58.73	3.37
3650	10/11/09 23:00	58.73	3.37
3651	10/11/09 23:01	58.73	3.37
3652	10/11/09 23:02	58.73	3.37
3653	10/11/09 23:03	58.73	3.37
3654	10/11/09 23:04	58.74	3.38
3655	10/11/09 23:05	58.73	3.37
3656	10/11/09 23:06	58.73	3.37
3657	10/11/09 23:07	58.73	3.37
3658	10/11/09 23:08	58.73	3.37
3659	10/11/09 23:09	58.74	3.38
3660	10/11/09 23:10	58.74	3.38
3661	10/11/09 23:11	58.74	3.38
3662	10/11/09 23:12	58.74	3.38
3663	10/11/09 23:13	58.74	3.38
3664	10/11/09 23:14	58.74	3.38
3665	10/11/09 23:15	58.74	3.38
3666	10/11/09 23:16	58.74	3.38
3667	10/11/09 23:17	58.74	3.38
3668	10/11/09 23:18	58.74	3.38
3669	10/11/09 23:19	58.74	3.38
3670	10/11/09 23:20	58.74	3.38
3671	10/11/09 23:21	58.74	3.38
3672	10/11/09 23:22	58.74	3.38
3673	10/11/09 23:23	58.74	3.38
3674	10/11/09 23:24	58.74	3.38
3675	10/11/09 23:25	58.74	3.38
3676	10/11/09 23:26	58.74	3.38
3677	10/11/09 23:27	58.74	3.38
3678	10/11/09 23:28	58.74	3.38
3679	10/11/09 23:29	58.74	3.38
3680	10/11/09 23:30	58.74	3.38
3681	10/11/09 23:31	58.74	3.38
3682	10/11/09 23:32	58.74	3.38
3683	10/11/09 23:33	58.74	3.38
3684	10/11/09 23:34	58.74	3.38
3685	10/11/09 23:35	58.74	3.38
3686	10/11/09 23:36	58.74	3.38
3687	10/11/09 23:37	58.74	3.38
3688	10/11/09 23:38	58.74	3.38
3689	10/11/09 23:39	58.74	3.38

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3690	10/11/09 23:40	58.74	3.38
3691	10/11/09 23:41	58.74	3.38
3692	10/11/09 23:42	58.74	3.38
3693	10/11/09 23:43	58.74	3.38
3694	10/11/09 23:44	58.74	3.38
3695	10/11/09 23:45	58.74	3.38
3696	10/11/09 23:46	58.74	3.38
3697	10/11/09 23:47	58.74	3.38
3698	10/11/09 23:48	58.74	3.38
3699	10/11/09 23:49	58.74	3.38
3700	10/11/09 23:50	58.74	3.38
3701	10/11/09 23:51	58.74	3.38
3702	10/11/09 23:52	58.74	3.38
3703	10/11/09 23:53	58.74	3.38
3704	10/11/09 23:54	58.74	3.38
3705	10/11/09 23:55	58.74	3.38
3706	10/11/09 23:56	58.74	3.38
3707	10/11/09 23:57	58.74	3.38
3708	10/11/09 23:58	58.74	3.38
3709	10/11/09 23:59	58.74	3.38
3710	10/12/09 0:00	58.74	3.38
3711	10/12/09 0:01	58.74	3.38
3712	10/12/09 0:02	58.74	3.38
3713	10/12/09 0:03	58.74	3.38
3714	10/12/09 0:04	58.74	3.38
3715	10/12/09 0:05	58.74	3.38
3716	10/12/09 0:06	58.74	3.38
3717	10/12/09 0:07	58.74	3.38
3718	10/12/09 0:08	58.74	3.38
3719	10/12/09 0:09	58.74	3.38
3720	10/12/09 0:10	58.74	3.38
3721	10/12/09 0:11	58.74	3.38
3722	10/12/09 0:12	58.75	3.39
3723	10/12/09 0:13	58.74	3.38
3724	10/12/09 0:14	58.75	3.39
3725	10/12/09 0:15	58.74	3.38
3726	10/12/09 0:16	58.75	3.39
3727	10/12/09 0:17	58.74	3.38
3728	10/12/09 0:18	58.75	3.39
3729	10/12/09 0:19	58.75	3.39
3730	10/12/09 0:20	58.75	3.39
3731	10/12/09 0:21	58.74	3.38
3732	10/12/09 0:22	58.75	3.39
3733	10/12/09 0:23	58.75	3.39
3734	10/12/09 0:24	58.75	3.39
3735	10/12/09 0:25	58.75	3.39
3736	10/12/09 0:26	58.74	3.38
3737	10/12/09 0:27	58.75	3.39
3738	10/12/09 0:28	58.75	3.39
3739	10/12/09 0:29	58.75	3.39
3740	10/12/09 0:30	58.75	3.39
3741	10/12/09 0:31	58.75	3.39
3742	10/12/09 0:32	58.75	3.39

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
3743	10/12/09 0:33	58.75	3.39
3744	10/12/09 0:34	58.75	3.39
3745	10/12/09 0:35	58.75	3.39
3746	10/12/09 0:36	58.75	3.39
3747	10/12/09 0:37	58.75	3.39
3748	10/12/09 0:38	58.75	3.39
3749	10/12/09 0:39	58.75	3.39
3750	10/12/09 0:40	58.75	3.39
3751	10/12/09 0:41	58.75	3.39
3752	10/12/09 0:42	58.75	3.39
3753	10/12/09 0:43	58.75	3.39
3754	10/12/09 0:44	58.75	3.39
3755	10/12/09 0:45	58.75	3.39
3756	10/12/09 0:46	58.75	3.39
3757	10/12/09 0:47	58.75	3.39
3758	10/12/09 0:48	58.75	3.39
3759	10/12/09 0:49	58.75	3.39
3760	10/12/09 0:50	58.75	3.39
3761	10/12/09 0:51	58.75	3.39
3762	10/12/09 0:52	58.75	3.39
3763	10/12/09 0:53	58.75	3.39
3764	10/12/09 0:54	58.75	3.39
3765	10/12/09 0:55	58.75	3.39
3766	10/12/09 0:56	58.75	3.39
3767	10/12/09 0:57	58.75	3.39
3768	10/12/09 0:58	58.75	3.39
3769	10/12/09 0:59	58.75	3.39
3770	10/12/09 1:00	58.75	3.39
3771	10/12/09 1:01	58.75	3.39
3772	10/12/09 1:02	58.75	3.39
3773	10/12/09 1:03	58.75	3.39
3774	10/12/09 1:04	58.75	3.39
3775	10/12/09 1:05	58.75	3.39
3776	10/12/09 1:06	58.75	3.39
3777	10/12/09 1:07	58.75	3.39
3778	10/12/09 1:08	58.75	3.39
3779	10/12/09 1:09	58.75	3.39
3780	10/12/09 1:10	58.75	3.39
3781	10/12/09 1:11	58.75	3.39
3782	10/12/09 1:12	58.75	3.39
3783	10/12/09 1:13	58.75	3.39
3784	10/12/09 1:14	58.75	3.39
3785	10/12/09 1:15	58.75	3.39
3786	10/12/09 1:16	58.75	3.39
3787	10/12/09 1:17	58.75	3.39
3788	10/12/09 1:18	58.75	3.39
3789	10/12/09 1:19	58.75	3.39
3790	10/12/09 1:20	58.75	3.39
3791	10/12/09 1:21	58.75	3.39
3792	10/12/09 1:22	58.75	3.39
3793	10/12/09 1:23	58.75	3.39
3794	10/12/09 1:24	58.75	3.39
3795	10/12/09 1:25	58.75	3.39

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3796	10/12/09 1:26	58.75	3.39
3797	10/12/09 1:27	58.75	3.39
3798	10/12/09 1:28	58.75	3.39
3799	10/12/09 1:29	58.75	3.39
3800	10/12/09 1:30	58.75	3.39
3801	10/12/09 1:31	58.75	3.39
3802	10/12/09 1:32	58.75	3.39
3803	10/12/09 1:33	58.75	3.39
3804	10/12/09 1:34	58.75	3.39
3805	10/12/09 1:35	58.75	3.39
3806	10/12/09 1:36	58.75	3.39
3807	10/12/09 1:37	58.75	3.39
3808	10/12/09 1:38	58.75	3.39
3809	10/12/09 1:39	58.76	3.40
3810	10/12/09 1:40	58.76	3.40
3811	10/12/09 1:41	58.75	3.39
3812	10/12/09 1:42	58.75	3.39
3813	10/12/09 1:43	58.75	3.39
3814	10/12/09 1:44	58.75	3.39
3815	10/12/09 1:45	58.75	3.39
3816	10/12/09 1:46	58.76	3.40
3817	10/12/09 1:47	58.75	3.39
3818	10/12/09 1:48	58.76	3.40
3819	10/12/09 1:49	58.76	3.40
3820	10/12/09 1:50	58.76	3.40
3821	10/12/09 1:51	58.76	3.40
3822	10/12/09 1:52	58.76	3.40
3823	10/12/09 1:53	58.76	3.40
3824	10/12/09 1:54	58.76	3.40
3825	10/12/09 1:55	58.75	3.39
3826	10/12/09 1:56	58.76	3.40
3827	10/12/09 1:57	58.76	3.40
3828	10/12/09 1:58	58.76	3.40
3829	10/12/09 1:59	58.76	3.40
3830	10/12/09 2:00	58.76	3.40
3831	10/12/09 2:01	58.76	3.40
3832	10/12/09 2:02	58.76	3.40
3833	10/12/09 2:03	58.76	3.40
3834	10/12/09 2:04	58.76	3.40
3835	10/12/09 2:05	58.76	3.40
3836	10/12/09 2:06	58.76	3.40
3837	10/12/09 2:07	58.76	3.40
3838	10/12/09 2:08	58.76	3.40
3839	10/12/09 2:09	58.76	3.40
3840	10/12/09 2:10	58.76	3.40
3841	10/12/09 2:11	58.76	3.40
3842	10/12/09 2:12	58.76	3.40
3843	10/12/09 2:13	58.76	3.40
3844	10/12/09 2:14	58.76	3.40
3845	10/12/09 2:15	58.76	3.40
3846	10/12/09 2:16	58.76	3.40
3847	10/12/09 2:17	58.76	3.40
3848	10/12/09 2:18	58.76	3.40

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3849	10/12/09 2:19	58.76	3.40
3850	10/12/09 2:20	58.76	3.40
3851	10/12/09 2:21	58.76	3.40
3865	10/12/09 2:35	58.76	3.40
3866	10/12/09 2:36	58.76	3.40
3867	10/12/09 2:37	58.76	3.40
3868	10/12/09 2:38	58.76	3.40
3869	10/12/09 2:39	58.76	3.40
3870	10/12/09 2:40	58.76	3.40
3871	10/12/09 2:41	58.76	3.40
3872	10/12/09 2:42	58.76	3.40
3873	10/12/09 2:43	58.76	3.40
3874	10/12/09 2:44	58.76	3.40
3875	10/12/09 2:45	58.76	3.40
3876	10/12/09 2:46	58.76	3.40
3877	10/12/09 2:47	58.76	3.40
3878	10/12/09 2:48	58.76	3.40
3879	10/12/09 2:49	58.76	3.40
3880	10/12/09 2:50	58.76	3.40
3881	10/12/09 2:51	58.76	3.40
3882	10/12/09 2:52	58.76	3.40
3883	10/12/09 2:53	58.76	3.40
3884	10/12/09 2:54	58.76	3.40
3885	10/12/09 2:55	58.76	3.40
3886	10/12/09 2:56	58.76	3.40
3887	10/12/09 2:57	58.76	3.40
3888	10/12/09 2:58	58.76	3.40
3889	10/12/09 2:59	58.76	3.40
3890	10/12/09 3:00	58.76	3.40
3891	10/12/09 3:01	58.76	3.40
3892	10/12/09 3:02	58.76	3.40
3893	10/12/09 3:03	58.76	3.40
3894	10/12/09 3:04	58.76	3.40
3895	10/12/09 3:05	58.76	3.40
3896	10/12/09 3:06	58.76	3.40
3897	10/12/09 3:07	58.76	3.40
3898	10/12/09 3:08	58.76	3.40
3899	10/12/09 3:09	58.76	3.40
3900	10/12/09 3:10	58.76	3.40
3901	10/12/09 3:11	58.76	3.40
3902	10/12/09 3:12	58.76	3.40
3903	10/12/09 3:13	58.76	3.40
3904	10/12/09 3:14	58.76	3.40
3905	10/12/09 3:15	58.76	3.40
3906	10/12/09 3:16	58.76	3.40
3907	10/12/09 3:17	58.76	3.40
3908	10/12/09 3:18	58.76	3.40
3909	10/12/09 3:19	58.76	3.40
3910	10/12/09 3:20	58.76	3.40
3911	10/12/09 3:21	58.76	3.40
3912	10/12/09 3:22	58.76	3.40
3913	10/12/09 3:23	58.76	3.40
3914	10/12/09 3:24	58.76	3.40

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3915	10/12/09 3:25	58.76	3.40
3916	10/12/09 3:26	58.76	3.40
3917	10/12/09 3:27	58.76	3.40
3918	10/12/09 3:28	58.76	3.40
3919	10/12/09 3:29	58.76	3.40
3920	10/12/09 3:30	58.76	3.40
3921	10/12/09 3:31	58.76	3.40
3922	10/12/09 3:32	58.76	3.40
3923	10/12/09 3:33	58.76	3.40
3924	10/12/09 3:34	58.76	3.40
3925	10/12/09 3:35	58.76	3.40
3926	10/12/09 3:36	58.76	3.40
3927	10/12/09 3:37	58.76	3.40
3928	10/12/09 3:38	58.77	3.41
3929	10/12/09 3:39	58.76	3.40
3930	10/12/09 3:40	58.76	3.40
3931	10/12/09 3:41	58.76	3.40
3932	10/12/09 3:42	58.77	3.41
3933	10/12/09 3:43	58.77	3.41
3934	10/12/09 3:44	58.76	3.40
3935	10/12/09 3:45	58.77	3.41
3936	10/12/09 3:46	58.77	3.41
3937	10/12/09 3:47	58.76	3.40
3938	10/12/09 3:48	58.76	3.40
3939	10/12/09 3:49	58.77	3.41
3940	10/12/09 3:50	58.76	3.40
3941	10/12/09 3:51	58.77	3.41
3942	10/12/09 3:52	58.77	3.41
3943	10/12/09 3:53	58.77	3.41
3944	10/12/09 3:54	58.77	3.41
3945	10/12/09 3:55	58.77	3.41
3946	10/12/09 3:56	58.77	3.41
3947	10/12/09 3:57	58.77	3.41
3948	10/12/09 3:58	58.77	3.41
3949	10/12/09 3:59	58.77	3.41
3950	10/12/09 4:00	58.77	3.41
3951	10/12/09 4:01	58.77	3.41
3952	10/12/09 4:02	58.77	3.41
3953	10/12/09 4:03	58.77	3.41
3954	10/12/09 4:04	58.77	3.41
3955	10/12/09 4:05	58.77	3.41
3956	10/12/09 4:06	58.77	3.41
3957	10/12/09 4:07	58.77	3.41
3958	10/12/09 4:08	58.77	3.41
3959	10/12/09 4:09	58.77	3.41
3960	10/12/09 4:10	58.77	3.41
3961	10/12/09 4:11	58.77	3.41
3962	10/12/09 4:12	58.77	3.41
3963	10/12/09 4:13	58.77	3.41
3964	10/12/09 4:14	58.77	3.41
3965	10/12/09 4:15	58.78	3.42
3966	10/12/09 4:16	58.77	3.41
3967	10/12/09 4:17	58.78	3.42

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
3968	10/12/09 4:18	58.77	3.41
3969	10/12/09 4:19	58.78	3.42
3970	10/12/09 4:20	58.78	3.42
3971	10/12/09 4:21	58.78	3.42
3972	10/12/09 4:22	58.78	3.42
3973	10/12/09 4:23	58.78	3.42
3974	10/12/09 4:24	58.78	3.42
3975	10/12/09 4:25	58.78	3.42
3976	10/12/09 4:26	58.78	3.42
3977	10/12/09 4:27	58.78	3.42
3978	10/12/09 4:28	58.78	3.42
3979	10/12/09 4:29	58.78	3.42
3980	10/12/09 4:30	58.78	3.42
3981	10/12/09 4:31	58.78	3.42
3982	10/12/09 4:32	58.78	3.42
3983	10/12/09 4:33	58.78	3.42
3984	10/12/09 4:34	58.78	3.42
3985	10/12/09 4:35	58.78	3.42
3986	10/12/09 4:36	58.78	3.42
3987	10/12/09 4:37	58.78	3.42
3988	10/12/09 4:38	58.78	3.42
3989	10/12/09 4:39	58.78	3.42
3990	10/12/09 4:40	58.78	3.42
3991	10/12/09 4:41	58.78	3.42
3992	10/12/09 4:42	58.78	3.42
3993	10/12/09 4:43	58.78	3.42
3994	10/12/09 4:44	58.78	3.42
3995	10/12/09 4:45	58.78	3.42
3996	10/12/09 4:46	58.78	3.42
3997	10/12/09 4:47	58.78	3.42
3998	10/12/09 4:48	58.78	3.42
3999	10/12/09 4:49	58.78	3.42
4000	10/12/09 4:50	58.78	3.42
4001	10/12/09 4:51	58.78	3.42
4002	10/12/09 4:52	58.78	3.42
4003	10/12/09 4:53	58.78	3.42
4004	10/12/09 4:54	58.78	3.42
4005	10/12/09 4:55	58.78	3.42
4006	10/12/09 4:56	58.78	3.42
4007	10/12/09 4:57	58.79	3.43
4008	10/12/09 4:58	58.78	3.42
4009	10/12/09 4:59	58.79	3.43
4010	10/12/09 5:00	58.78	3.42
4011	10/12/09 5:01	58.78	3.42
4012	10/12/09 5:02	58.79	3.43
4013	10/12/09 5:03	58.79	3.43
4014	10/12/09 5:04	58.79	3.43
4015	10/12/09 5:05	58.79	3.43
4016	10/12/09 5:06	58.79	3.43
4017	10/12/09 5:07	58.79	3.43
4018	10/12/09 5:08	58.79	3.43
4019	10/12/09 5:09	58.79	3.43
4020	10/12/09 5:10	58.78	3.42

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4021	10/12/09 5:11	58.79	3.43
4022	10/12/09 5:12	58.79	3.43
4023	10/12/09 5:13	58.79	3.43
4024	10/12/09 5:14	58.79	3.43
4025	10/12/09 5:15	58.79	3.43
4026	10/12/09 5:16	58.79	3.43
4027	10/12/09 5:17	58.79	3.43
4028	10/12/09 5:18	58.79	3.43
4029	10/12/09 5:19	58.79	3.43
4030	10/12/09 5:20	58.79	3.43
4031	10/12/09 5:21	58.79	3.43
4032	10/12/09 5:22	58.79	3.43
4033	10/12/09 5:23	58.79	3.43
4034	10/12/09 5:24	58.79	3.43
4035	10/12/09 5:25	58.79	3.43
4036	10/12/09 5:26	58.79	3.43
4037	10/12/09 5:27	58.79	3.43
4038	10/12/09 5:28	58.79	3.43
4039	10/12/09 5:29	58.79	3.43
4040	10/12/09 5:30	58.79	3.43
4041	10/12/09 5:31	58.79	3.43
4042	10/12/09 5:32	58.79	3.43
4043	10/12/09 5:33	58.79	3.43
4044	10/12/09 5:34	58.79	3.43
4045	10/12/09 5:35	58.79	3.43
4046	10/12/09 5:36	58.79	3.43
4047	10/12/09 5:37	58.79	3.43
4048	10/12/09 5:38	58.79	3.43
4049	10/12/09 5:39	58.80	3.44
4050	10/12/09 5:40	58.80	3.44
4051	10/12/09 5:41	58.80	3.44
4052	10/12/09 5:42	58.79	3.43
4053	10/12/09 5:43	58.80	3.44
4054	10/12/09 5:44	58.80	3.44
4055	10/12/09 5:45	58.80	3.44
4056	10/12/09 5:46	58.80	3.44
4057	10/12/09 5:47	58.80	3.44
4058	10/12/09 5:48	58.80	3.44
4059	10/12/09 5:49	58.80	3.44
4060	10/12/09 5:50	58.80	3.44
4061	10/12/09 5:51	58.80	3.44
4062	10/12/09 5:52	58.80	3.44
4063	10/12/09 5:53	58.80	3.44
4064	10/12/09 5:54	58.80	3.44
4065	10/12/09 5:55	58.80	3.44
4066	10/12/09 5:56	58.80	3.44
4067	10/12/09 5:57	58.80	3.44
4068	10/12/09 5:58	58.80	3.44
4069	10/12/09 5:59	58.80	3.44
4070	10/12/09 6:00	58.80	3.44
4071	10/12/09 6:01	58.80	3.44
4072	10/12/09 6:02	58.80	3.44
4073	10/12/09 6:03	58.80	3.44

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well: Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4074	10/12/09 6:04	58.80	3.44
4075	10/12/09 6:05	58.80	3.44
4076	10/12/09 6:06	58.80	3.44
4077	10/12/09 6:07	58.80	3.44
4078	10/12/09 6:08	58.80	3.44
4079	10/12/09 6:09	58.80	3.44
4080	10/12/09 6:10	58.80	3.44
4081	10/12/09 6:11	58.80	3.44
4082	10/12/09 6:12	58.80	3.44
4083	10/12/09 6:13	58.80	3.44
4084	10/12/09 6:14	58.81	3.45
4085	10/12/09 6:15	58.80	3.44
4086	10/12/09 6:16	58.80	3.44
4087	10/12/09 6:17	58.81	3.45
4088	10/12/09 6:18	58.80	3.44
4089	10/12/09 6:19	58.81	3.45
4090	10/12/09 6:20	58.81	3.45
4091	10/12/09 6:21	58.80	3.44
4092	10/12/09 6:22	58.81	3.45
4093	10/12/09 6:23	58.80	3.44
4094	10/12/09 6:24	58.81	3.45
4095	10/12/09 6:25	58.81	3.45
4096	10/12/09 6:26	58.81	3.45
4097	10/12/09 6:27	58.81	3.45
4098	10/12/09 6:28	58.81	3.45
4099	10/12/09 6:29	58.81	3.45
4100	10/12/09 6:30	58.81	3.45
4101	10/12/09 6:31	58.81	3.45
4102	10/12/09 6:32	58.81	3.45
4103	10/12/09 6:33	58.81	3.45
4104	10/12/09 6:34	58.81	3.45
4105	10/12/09 6:35	58.81	3.45
4106	10/12/09 6:36	58.81	3.45
4107	10/12/09 6:37	58.81	3.45
4108	10/12/09 6:38	58.81	3.45
4109	10/12/09 6:39	58.81	3.45
4110	10/12/09 6:40	58.81	3.45
4111	10/12/09 6:41	58.81	3.45
4112	10/12/09 6:42	58.81	3.45
4113	10/12/09 6:43	58.81	3.45
4114	10/12/09 6:44	58.81	3.45
4115	10/12/09 6:45	58.81	3.45
4116	10/12/09 6:46	58.81	3.45
4117	10/12/09 6:47	58.81	3.45
4118	10/12/09 6:48	58.81	3.45
4119	10/12/09 6:49	58.81	3.45
4120	10/12/09 6:50	58.81	3.45
4121	10/12/09 6:51	58.81	3.45
4122	10/12/09 6:52	58.81	3.45
4123	10/12/09 6:53	58.81	3.45
4124	10/12/09 6:54	58.81	3.45
4125	10/12/09 6:55	58.81	3.45
4126	10/12/09 6:56	58.81	3.45

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4127	10/12/09 6:57	58.82	3.46
4128	10/12/09 6:58	58.82	3.46
4129	10/12/09 6:59	58.82	3.46
4130	10/12/09 7:00	58.81	3.45
4131	10/12/09 7:01	58.81	3.45
4132	10/12/09 7:02	58.82	3.46
4133	10/12/09 7:03	58.82	3.46
4134	10/12/09 7:04	58.82	3.46
4135	10/12/09 7:05	58.82	3.46
4136	10/12/09 7:06	58.82	3.46
4137	10/12/09 7:07	58.82	3.46
4138	10/12/09 7:08	58.82	3.46
4139	10/12/09 7:09	58.82	3.46
4140	10/12/09 7:10	58.82	3.46
4141	10/12/09 7:11	58.82	3.46
4142	10/12/09 7:12	58.82	3.46
4143	10/12/09 7:13	58.82	3.46
4144	10/12/09 7:14	58.82	3.46
4145	10/12/09 7:15	58.82	3.46
4146	10/12/09 7:16	58.82	3.46
4147	10/12/09 7:17	58.82	3.46
4148	10/12/09 7:18	58.82	3.46
4149	10/12/09 7:19	58.82	3.46
4150	10/12/09 7:20	58.82	3.46
4151	10/12/09 7:21	58.82	3.46
4152	10/12/09 7:22	58.82	3.46
4153	10/12/09 7:23	58.82	3.46
4154	10/12/09 7:24	58.82	3.46
4155	10/12/09 7:25	58.82	3.46
4156	10/12/09 7:26	58.82	3.46
4157	10/12/09 7:27	58.82	3.46
4158	10/12/09 7:28	58.82	3.46
4159	10/12/09 7:29	58.82	3.46
4160	10/12/09 7:30	58.82	3.46
4161	10/12/09 7:31	58.82	3.46
4162	10/12/09 7:32	58.82	3.46
4163	10/12/09 7:33	58.82	3.46
4164	10/12/09 7:34	58.82	3.46
4165	10/12/09 7:35	58.82	3.46
4166	10/12/09 7:36	58.82	3.46
4167	10/12/09 7:37	58.82	3.46
4168	10/12/09 7:38	58.82	3.46
4169	10/12/09 7:39	58.82	3.46
4170	10/12/09 7:40	58.82	3.46
4171	10/12/09 7:41	58.82	3.46
4172	10/12/09 7:42	58.82	3.46
4173	10/12/09 7:43	58.82	3.46
4174	10/12/09 7:44	58.83	3.47
4175	10/12/09 7:45	58.82	3.46
4176	10/12/09 7:46	58.82	3.46
4177	10/12/09 7:47	58.83	3.47
4178	10/12/09 7:48	58.83	3.47
4179	10/12/09 7:49	58.83	3.47

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4180	10/12/09 7:50	58.83	3.47
4181	10/12/09 7:51	58.83	3.47
4182	10/12/09 7:52	58.83	3.47
4183	10/12/09 7:53	58.83	3.47
4184	10/12/09 7:54	58.83	3.47
4185	10/12/09 7:55	58.83	3.47
4186	10/12/09 7:56	58.83	3.47
4187	10/12/09 7:57	58.83	3.47
4188	10/12/09 7:58	58.83	3.47
4189	10/12/09 7:59	58.83	3.47
4190	10/12/09 8:00	58.83	3.47
4191	10/12/09 8:01	58.83	3.47
4192	10/12/09 8:02	58.83	3.47
4193	10/12/09 8:03	58.83	3.47
4194	10/12/09 8:04	58.83	3.47
4195	10/12/09 8:05	58.83	3.47
4196	10/12/09 8:06	58.83	3.47
4197	10/12/09 8:07	58.83	3.47
4198	10/12/09 8:08	58.83	3.47
4199	10/12/09 8:09	58.83	3.47
4200	10/12/09 8:10	58.83	3.47
4201	10/12/09 8:11	58.83	3.47
4202	10/12/09 8:12	58.83	3.47
4203	10/12/09 8:13	58.83	3.47
4204	10/12/09 8:14	58.83	3.47
4205	10/12/09 8:15	58.83	3.47
4206	10/12/09 8:16	58.83	3.47
4207	10/12/09 8:17	58.83	3.47
4208	10/12/09 8:18	58.83	3.47
4209	10/12/09 8:19	58.83	3.47
4210	10/12/09 8:20	58.83	3.47
4211	10/12/09 8:21	58.83	3.47
4212	10/12/09 8:22	58.83	3.47
4213	10/12/09 8:23	58.83	3.47
4214	10/12/09 8:24	58.83	3.47
4215	10/12/09 8:25	58.83	3.47
4216	10/12/09 8:26	58.83	3.47
4217	10/12/09 8:27	58.83	3.47
4218	10/12/09 8:28	58.83	3.47
4219	10/12/09 8:29	58.83	3.47
4220	10/12/09 8:30	58.83	3.47
4221	10/12/09 8:31	58.83	3.47
4222	10/12/09 8:32	58.83	3.47
4223	10/12/09 8:33	58.83	3.47
4224	10/12/09 8:34	58.83	3.47
4225	10/12/09 8:35	58.83	3.47
4226	10/12/09 8:36	58.84	3.48
4227	10/12/09 8:37	58.83	3.47
4228	10/12/09 8:38	58.84	3.48
4229	10/12/09 8:39	58.83	3.47
4230	10/12/09 8:40	58.84	3.48
4231	10/12/09 8:41	58.84	3.48
4232	10/12/09 8:42	58.84	3.48

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4233	10/12/09 8:43	58.84	3.48
4234	10/12/09 8:44	58.84	3.48
4235	10/12/09 8:45	58.84	3.48
4236	10/12/09 8:46	58.84	3.48
4237	10/12/09 8:47	58.84	3.48
4238	10/12/09 8:48	58.84	3.48
4239	10/12/09 8:49	58.84	3.48
4240	10/12/09 8:50	58.84	3.48
4241	10/12/09 8:51	58.84	3.48
4242	10/12/09 8:52	58.84	3.48
4243	10/12/09 8:53	58.84	3.48
4244	10/12/09 8:54	58.84	3.48
4245	10/12/09 8:55	58.84	3.48
4246	10/12/09 8:56	58.84	3.48
4247	10/12/09 8:57	58.84	3.48
4248	10/12/09 8:58	58.84	3.48
4249	10/12/09 8:59	58.84	3.48
4250	10/12/09 9:00	58.84	3.48
4251	10/12/09 9:01	58.84	3.48
4252	10/12/09 9:02	58.84	3.48
4253	10/12/09 9:03	58.84	3.48
4254	10/12/09 9:04	58.84	3.48
4255	10/12/09 9:05	58.84	3.48
4256	10/12/09 9:06	58.84	3.48
4257	10/12/09 9:07	58.84	3.48
4258	10/12/09 9:08	58.84	3.48
4259	10/12/09 9:09	58.84	3.48
4260	10/12/09 9:10	58.84	3.48
4261	10/12/09 9:11	58.84	3.48
4262	10/12/09 9:12	58.84	3.48
4263	10/12/09 9:13	58.84	3.48
4264	10/12/09 9:14	58.84	3.48
4265	10/12/09 9:15	58.84	3.48
4266	10/12/09 9:16	58.84	3.48
4267	10/12/09 9:17	58.84	3.48
4268	10/12/09 9:18	58.84	3.48
4269	10/12/09 9:19	58.84	3.48
4270	10/12/09 9:20	58.84	3.48
4271	10/12/09 9:21	58.84	3.48
4272	10/12/09 9:22	58.84	3.48
4273	10/12/09 9:23	58.84	3.48
4274	10/12/09 9:24	58.84	3.48
4275	10/12/09 9:25	58.84	3.48
4276	10/12/09 9:26	58.84	3.48
4277	10/12/09 9:27	58.84	3.48
4278	10/12/09 9:28	58.84	3.48
4279	10/12/09 9:29	58.84	3.48
4280	10/12/09 9:30	58.84	3.48
4281	10/12/09 9:31	58.84	3.48
4282	10/12/09 9:32	58.84	3.48
4283	10/12/09 9:33	58.84	3.48
4284	10/12/09 9:34	58.84	3.48
4285	10/12/09 9:35	58.84	3.48

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4286	10/12/09 9:36	58.84	3.48
4287	10/12/09 9:37	58.84	3.48
4288	10/12/09 9:38	58.84	3.48
4289	10/12/09 9:39	58.84	3.48
4290	10/12/09 9:40	58.84	3.48
4291	10/12/09 9:41	58.84	3.48
4292	10/12/09 9:42	58.84	3.48
4293	10/12/09 9:43	58.84	3.48
4294	10/12/09 9:44	58.84	3.48
4295	10/12/09 9:45	58.85	3.49
4296	10/12/09 9:46	58.84	3.48
4297	10/12/09 9:47	58.85	3.49
4298	10/12/09 9:48	58.84	3.48
4305	10/12/09 9:55	58.84	3.48
4306	10/12/09 9:56	58.84	3.48
4307	10/12/09 9:57	58.85	3.49
4308	10/12/09 9:58	58.85	3.49
4309	10/12/09 9:59	58.84	3.48
4310	10/12/09 10:00	58.85	3.49
4311	10/12/09 10:01	58.85	3.49
4312	10/12/09 10:02	58.84	3.48
4313	10/12/09 10:03	58.84	3.48
4314	10/12/09 10:04	58.84	3.48
4315	10/12/09 10:05	58.84	3.48
4316	10/12/09 10:06	58.84	3.48
4317	10/12/09 10:07	58.84	3.48
4318	10/12/09 10:08	58.85	3.49
4319	10/12/09 10:09	58.84	3.48
4320	10/12/09 10:10	58.84	3.48
4321	10/12/09 10:11	58.84	3.48
4322	10/12/09 10:12	58.84	3.48
4323	10/12/09 10:13	58.84	3.48
4324	10/12/09 10:14	58.84	3.48
4325	10/12/09 10:15	58.84	3.48
4326	10/12/09 10:16	58.84	3.48
4327	10/12/09 10:17	58.84	3.48
4328	10/12/09 10:18	58.84	3.48
4329	10/12/09 10:19	58.84	3.48
4330	10/12/09 10:20	58.84	3.48
4331	10/12/09 10:21	58.84	3.48
4332	10/12/09 10:22	58.84	3.48
4333	10/12/09 10:23	58.84	3.48
4334	10/12/09 10:24	58.84	3.48
4335	10/12/09 10:25	58.84	3.48
4336	10/12/09 10:26	58.84	3.48
4337	10/12/09 10:27	58.84	3.48
4338	10/12/09 10:28	58.84	3.48
4339	10/12/09 10:29	58.83	3.47
4340	10/12/09 10:30	58.83	3.47
4341	10/12/09 10:31	58.83	3.47
4342	10/12/09 10:32	58.83	3.47
4343	10/12/09 10:33	58.83	3.47
4344	10/12/09 10:34	58.83	3.47

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4345	10/12/09 10:35	58.82	3.46
4346	10/12/09 10:36	58.82	3.46
4347	10/12/09 10:37	58.82	3.46
4348	10/12/09 10:38	58.82	3.46
4349	10/12/09 10:39	58.82	3.46
4350	10/12/09 10:40	58.81	3.45
4351	10/12/09 10:41	58.81	3.45
4352	10/12/09 10:42	58.81	3.45
4353	10/12/09 10:43	58.81	3.45
4354	10/12/09 10:44	58.80	3.44
4355	10/12/09 10:45	58.80	3.44
4356	10/12/09 10:46	58.80	3.44
4357	10/12/09 10:47	58.80	3.44
4358	10/12/09 10:48	58.79	3.43
4359	10/12/09 10:49	58.79	3.43
4360	10/12/09 10:50	58.79	3.43
4361	10/12/09 10:51	58.78	3.42
4362	10/12/09 10:52	58.78	3.42
4363	10/12/09 10:53	58.78	3.42
4364	10/12/09 10:54	58.77	3.41
4365	10/12/09 10:55	58.77	3.41
4366	10/12/09 10:56	58.77	3.41
4367	10/12/09 10:57	58.77	3.41
4368	10/12/09 10:58	58.76	3.40
4369	10/12/09 10:59	58.76	3.40
4370	10/12/09 11:00	58.75	3.39
4371	10/12/09 11:01	58.75	3.39
4372	10/12/09 11:02	58.75	3.39
4373	10/12/09 11:03	58.74	3.38
4374	10/12/09 11:04	58.74	3.38
4375	10/12/09 11:05	58.74	3.38
4376	10/12/09 11:06	58.73	3.37
4377	10/12/09 11:07	58.73	3.37
4378	10/12/09 11:08	58.72	3.36
4379	10/12/09 11:09	58.72	3.36
4380	10/12/09 11:10	58.72	3.36
4381	10/12/09 11:11	58.71	3.35
4382	10/12/09 11:12	58.71	3.35
4383	10/12/09 11:13	58.70	3.34
4384	10/12/09 11:14	58.70	3.34
4385	10/12/09 11:15	58.70	3.34
4386	10/12/09 11:16	58.69	3.33
4387	10/12/09 11:17	58.69	3.33
4388	10/12/09 11:18	58.68	3.32
4389	10/12/09 11:19	58.68	3.32
4390	10/12/09 11:20	58.67	3.31
4391	10/12/09 11:21	58.67	3.31
4392	10/12/09 11:22	58.66	3.30
4393	10/12/09 11:23	58.66	3.30
4394	10/12/09 11:24	58.66	3.30
4395	10/12/09 11:25	58.65	3.29
4396	10/12/09 11:26	58.64	3.28
4397	10/12/09 11:27	58.64	3.28

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
4398	10/12/09 11:28	58.64	3.28
4399	10/12/09 11:29	58.63	3.27
4400	10/12/09 11:30	58.63	3.27
4401	10/12/09 11:31	58.62	3.26
4402	10/12/09 11:32	58.62	3.26
4403	10/12/09 11:33	58.61	3.25
4404	10/12/09 11:34	58.61	3.25
4405	10/12/09 11:35	58.60	3.24
4406	10/12/09 11:36	58.60	3.24
4407	10/12/09 11:37	58.59	3.23
4408	10/12/09 11:38	58.59	3.23
4409	10/12/09 11:39	58.58	3.22
4410	10/12/09 11:40	58.58	3.22
4411	10/12/09 11:41	58.57	3.21
4412	10/12/09 11:42	58.57	3.21
4413	10/12/09 11:43	58.56	3.20
4414	10/12/09 11:44	58.56	3.20
4415	10/12/09 11:45	58.55	3.19
4416	10/12/09 11:46	58.55	3.19
4417	10/12/09 11:47	58.54	3.18
4418	10/12/09 11:48	58.54	3.18
4419	10/12/09 11:49	58.53	3.17
4420	10/12/09 11:50	58.53	3.17
4421	10/12/09 11:51	58.53	3.17
4422	10/12/09 11:52	58.52	3.16
4423	10/12/09 11:53	58.51	3.15
4424	10/12/09 11:54	58.51	3.15
4425	10/12/09 11:55	58.51	3.15
4426	10/12/09 11:56	58.50	3.14
4427	10/12/09 11:57	58.49	3.13
4428	10/12/09 11:58	58.49	3.13
4429	10/12/09 11:59	58.48	3.12
4430	10/12/09 12:00	58.48	3.12
4431	10/12/09 12:01	58.47	3.11
4432	10/12/09 12:02	58.47	3.11
4433	10/12/09 12:03	58.46	3.10
4434	10/12/09 12:04	58.46	3.10
4435	10/12/09 12:05	58.45	3.09
4436	10/12/09 12:06	58.45	3.09
4437	10/12/09 12:07	58.44	3.08
4438	10/12/09 12:08	58.44	3.08
4439	10/12/09 12:09	58.44	3.08
4440	10/12/09 12:10	58.43	3.07
4441	10/12/09 12:11	58.43	3.07
4442	10/12/09 12:12	58.42	3.06
4443	10/12/09 12:13	58.42	3.06
4444	10/12/09 12:14	58.41	3.05
4445	10/12/09 12:15	58.40	3.04
4446	10/12/09 12:16	58.40	3.04
4447	10/12/09 12:17	58.39	3.03
4448	10/12/09 12:18	58.39	3.03
4449	10/12/09 12:19	58.38	3.02
4450	10/12/09 12:20	58.38	3.02

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4451	10/12/09 12:21	58.37	3.01
4452	10/12/09 12:22	58.37	3.01
4453	10/12/09 12:23	58.36	3.00
4454	10/12/09 12:24	58.36	3.00
4455	10/12/09 12:25	58.35	2.99
4456	10/12/09 12:26	58.35	2.99
4457	10/12/09 12:27	58.34	2.98
4458	10/12/09 12:28	58.34	2.98
4459	10/12/09 12:29	58.33	2.97
4460	10/12/09 12:30	58.33	2.97
4461	10/12/09 12:31	58.32	2.96
4462	10/12/09 12:32	58.31	2.95
4463	10/12/09 12:33	58.31	2.95
4464	10/12/09 12:34	58.31	2.95
4465	10/12/09 12:35	58.30	2.94
4466	10/12/09 12:36	58.29	2.93
4467	10/12/09 12:37	58.29	2.93
4468	10/12/09 12:38	58.29	2.93
4469	10/12/09 12:39	58.28	2.92
4470	10/12/09 12:40	58.27	2.91
4471	10/12/09 12:41	58.27	2.91
4472	10/12/09 12:42	58.26	2.90
4473	10/12/09 12:43	58.26	2.90
4474	10/12/09 12:44	58.25	2.89
4475	10/12/09 12:45	58.25	2.89
4476	10/12/09 12:46	58.24	2.88
4477	10/12/09 12:47	58.24	2.88
4478	10/12/09 12:48	58.23	2.87
4479	10/12/09 12:49	58.23	2.87
4480	10/12/09 12:50	58.22	2.86
4481	10/12/09 12:51	58.22	2.86
4482	10/12/09 12:52	58.21	2.85
4483	10/12/09 12:53	58.20	2.84
4484	10/12/09 12:54	58.20	2.84
4485	10/12/09 12:55	58.20	2.84
4486	10/12/09 12:56	58.19	2.83
4487	10/12/09 12:57	58.18	2.82
4488	10/12/09 12:58	58.18	2.82
4489	10/12/09 12:59	58.17	2.81
4490	10/12/09 13:00	58.17	2.81
4491	10/12/09 13:01	58.16	2.80
4492	10/12/09 13:02	58.16	2.80
4493	10/12/09 13:03	58.15	2.79
4494	10/12/09 13:04	58.15	2.79
4495	10/12/09 13:05	58.14	2.78
4496	10/12/09 13:06	58.14	2.78
4497	10/12/09 13:07	58.13	2.77
4498	10/12/09 13:08	58.13	2.77
4499	10/12/09 13:09	58.12	2.76
4500	10/12/09 13:10	58.12	2.76
4501	10/12/09 13:11	58.11	2.75
4502	10/12/09 13:12	58.11	2.75
4503	10/12/09 13:13	58.10	2.74

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4504	10/12/09 13:14	58.10	2.74
4505	10/12/09 13:15	58.09	2.73
4506	10/12/09 13:16	58.09	2.73
4507	10/12/09 13:17	58.08	2.72
4508	10/12/09 13:18	58.08	2.72
4509	10/12/09 13:19	58.07	2.71
4510	10/12/09 13:20	58.07	2.71
4511	10/12/09 13:21	58.06	2.70
4512	10/12/09 13:22	58.06	2.70
4513	10/12/09 13:23	58.05	2.69
4514	10/12/09 13:24	58.05	2.69
4515	10/12/09 13:25	58.04	2.68
4516	10/12/09 13:26	58.03	2.67
4517	10/12/09 13:27	58.03	2.67
4518	10/12/09 13:28	58.02	2.66
4519	10/12/09 13:29	58.02	2.66
4520	10/12/09 13:30	58.02	2.66
4521	10/12/09 13:31	58.01	2.65
4522	10/12/09 13:32	58.00	2.64
4523	10/12/09 13:33	58.00	2.64
4524	10/12/09 13:34	57.99	2.63
4525	10/12/09 13:35	57.99	2.63
4526	10/12/09 13:36	57.98	2.62
4527	10/12/09 13:37	57.98	2.62
4528	10/12/09 13:38	57.97	2.61
4529	10/12/09 13:39	57.97	2.61
4530	10/12/09 13:40	57.96	2.60
4531	10/12/09 13:41	57.96	2.60
4532	10/12/09 13:42	57.95	2.59
4533	10/12/09 13:43	57.95	2.59
4534	10/12/09 13:44	57.94	2.58
4535	10/12/09 13:45	57.94	2.58
4536	10/12/09 13:46	57.93	2.57
4537	10/12/09 13:47	57.93	2.57
4538	10/12/09 13:48	57.92	2.56
4539	10/12/09 13:49	57.92	2.56
4540	10/12/09 13:50	57.91	2.55
4541	10/12/09 13:51	57.91	2.55
4542	10/12/09 13:52	57.90	2.54
4543	10/12/09 13:53	57.90	2.54
4544	10/12/09 13:54	57.89	2.53
4545	10/12/09 13:55	57.89	2.53
4546	10/12/09 13:56	57.88	2.52
4547	10/12/09 13:57	57.88	2.52
4548	10/12/09 13:58	57.87	2.51
4549	10/12/09 13:59	57.87	2.51
4550	10/12/09 14:00	57.86	2.50
4551	10/12/09 14:01	57.86	2.50
4552	10/12/09 14:02	57.85	2.49
4553	10/12/09 14:03	57.85	2.49
4554	10/12/09 14:04	57.84	2.48
4555	10/12/09 14:05	57.84	2.48
4556	10/12/09 14:06	57.83	2.47

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:		2009-10-09 10:10 AM
End Pumping:		2009-10-12 10:10 AM
Initial Volume:		271729 x1000 gal
Final Volume:		272391 x1000 gal
Water Level at Start of Pump Test:		55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4557	10/12/09 14:07	57.83	2.47
4558	10/12/09 14:08	57.82	2.46
4559	10/12/09 14:09	57.82	2.46
4560	10/12/09 14:10	57.81	2.45
4561	10/12/09 14:11	57.81	2.45
4562	10/12/09 14:12	57.80	2.44
4563	10/12/09 14:13	57.80	2.44
4564	10/12/09 14:14	57.79	2.43
4565	10/12/09 14:15	57.79	2.43
4566	10/12/09 14:16	57.78	2.42
4567	10/12/09 14:17	57.78	2.42
4568	10/12/09 14:18	57.78	2.42
4569	10/12/09 14:19	57.77	2.41
4570	10/12/09 14:20	57.76	2.40
4571	10/12/09 14:21	57.76	2.40
4572	10/12/09 14:22	57.76	2.40
4573	10/12/09 14:23	57.75	2.39
4574	10/12/09 14:24	57.75	2.39
4575	10/12/09 14:25	57.74	2.38
4576	10/12/09 14:26	57.74	2.38
4577	10/12/09 14:27	57.73	2.37
4578	10/12/09 14:28	57.73	2.37
4579	10/12/09 14:29	57.72	2.36
4580	10/12/09 14:30	57.72	2.36
4581	10/12/09 14:31	57.71	2.35
4582	10/12/09 14:32	57.71	2.35
4583	10/12/09 14:33	57.70	2.34
4584	10/12/09 14:34	57.70	2.34
4585	10/12/09 14:35	57.69	2.33
4586	10/12/09 14:36	57.69	2.33
4587	10/12/09 14:37	57.68	2.32
4588	10/12/09 14:38	57.68	2.32
4589	10/12/09 14:39	57.67	2.31
4590	10/12/09 14:40	57.67	2.31
4591	10/12/09 14:41	57.66	2.30
4592	10/12/09 14:42	57.66	2.30
4593	10/12/09 14:43	57.66	2.30
4594	10/12/09 14:44	57.65	2.29
4595	10/12/09 14:45	57.64	2.28
4596	10/12/09 14:46	57.64	2.28
4597	10/12/09 14:47	57.63	2.27
4598	10/12/09 14:48	57.63	2.27
4599	10/12/09 14:49	57.63	2.27
4600	10/12/09 14:50	57.62	2.26
4601	10/12/09 14:51	57.62	2.26
4602	10/12/09 14:52	57.61	2.25
4603	10/12/09 14:53	57.61	2.25
4604	10/12/09 14:54	57.60	2.24
4605	10/12/09 14:55	57.60	2.24
4606	10/12/09 14:56	57.59	2.23
4607	10/12/09 14:57	57.59	2.23
4608	10/12/09 14:58	57.58	2.22
4609	10/12/09 14:59	57.58	2.22

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
4610	10/12/09 15:00	57.58	2.22
4611	10/12/09 15:01	57.57	2.21
4612	10/12/09 15:02	57.56	2.20
4613	10/12/09 15:03	57.56	2.20
4614	10/12/09 15:04	57.56	2.20
4615	10/12/09 15:05	57.55	2.19
4616	10/12/09 15:06	57.55	2.19
4617	10/12/09 15:07	57.54	2.18
4618	10/12/09 15:08	57.54	2.18
4619	10/12/09 15:09	57.53	2.17
4622	10/12/09 15:12	57.52	2.16
4623	10/12/09 15:13	57.52	2.16
4624	10/12/09 15:14	57.51	2.15
4625	10/12/09 15:15	57.51	2.15
4626	10/12/09 15:16	57.50	2.14
4627	10/12/09 15:17	57.50	2.14
4628	10/12/09 15:18	57.49	2.13
4629	10/12/09 15:19	57.49	2.13
4630	10/12/09 15:20	57.48	2.12
4631	10/12/09 15:21	57.48	2.12
4632	10/12/09 15:22	57.48	2.12
4633	10/12/09 15:23	57.47	2.11
4634	10/12/09 15:24	57.47	2.11
4635	10/12/09 15:25	57.46	2.10
4636	10/12/09 15:26	57.46	2.10
4637	10/12/09 15:27	57.45	2.09
4638	10/12/09 15:28	57.45	2.09
4639	10/12/09 15:29	57.44	2.08
4640	10/12/09 15:30	57.44	2.08
4641	10/12/09 15:31	57.43	2.07
4642	10/12/09 15:32	57.43	2.07
4643	10/12/09 15:33	57.43	2.07
4644	10/12/09 15:34	57.42	2.06
4645	10/12/09 15:35	57.42	2.06
4646	10/12/09 15:36	57.42	2.06
4647	10/12/09 15:37	57.41	2.05
4648	10/12/09 15:38	57.41	2.05
4649	10/12/09 15:39	57.40	2.04
4650	10/12/09 15:40	57.40	2.04
4651	10/12/09 15:41	57.39	2.03
4652	10/12/09 15:42	57.39	2.03
4653	10/12/09 15:43	57.39	2.03
4654	10/12/09 15:44	57.38	2.02
4655	10/12/09 15:45	57.38	2.02
4656	10/12/09 15:46	57.37	2.01
4657	10/12/09 15:47	57.37	2.01
4658	10/12/09 15:48	57.36	2.00
4659	10/12/09 15:49	57.36	2.00
4660	10/12/09 15:50	57.35	1.99
4661	10/12/09 15:51	57.35	1.99
4662	10/12/09 15:52	57.35	1.99
4663	10/12/09 15:53	57.34	1.98
4664	10/12/09 15:54	57.34	1.98

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4665	10/12/09 15:55	57.33	1.97
4666	10/12/09 15:56	57.33	1.97
4667	10/12/09 15:57	57.32	1.96
4668	10/12/09 15:58	57.32	1.96
4669	10/12/09 15:59	57.32	1.96
4670	10/12/09 16:00	57.31	1.95
4671	10/12/09 16:01	57.31	1.95
4672	10/12/09 16:02	57.30	1.94
4673	10/12/09 16:03	57.30	1.94
4674	10/12/09 16:04	57.29	1.93
4675	10/12/09 16:05	57.29	1.93
4676	10/12/09 16:06	57.29	1.93
4677	10/12/09 16:07	57.28	1.92
4678	10/12/09 16:08	57.28	1.92
4679	10/12/09 16:09	57.27	1.91
4680	10/12/09 16:10	57.27	1.91
4681	10/12/09 16:11	57.27	1.91
4682	10/12/09 16:12	57.26	1.90
4683	10/12/09 16:13	57.26	1.90
4684	10/12/09 16:14	57.25	1.89
4685	10/12/09 16:15	57.25	1.89
4686	10/12/09 16:16	57.24	1.88
4687	10/12/09 16:17	57.24	1.88
4688	10/12/09 16:18	57.23	1.87
4689	10/12/09 16:19	57.23	1.87
4690	10/12/09 16:20	57.23	1.87
4691	10/12/09 16:21	57.22	1.86
4692	10/12/09 16:22	57.22	1.86
4693	10/12/09 16:23	57.22	1.86
4694	10/12/09 16:24	57.21	1.85
4695	10/12/09 16:25	57.21	1.85
4696	10/12/09 16:26	57.20	1.84
4697	10/12/09 16:27	57.20	1.84
4698	10/12/09 16:28	57.19	1.83
4699	10/12/09 16:29	57.19	1.83
4700	10/12/09 16:30	57.18	1.82
4701	10/12/09 16:31	57.18	1.82
4702	10/12/09 16:32	57.17	1.81
4703	10/12/09 16:33	57.17	1.81
4704	10/12/09 16:34	57.17	1.81
4705	10/12/09 16:35	57.16	1.80
4706	10/12/09 16:36	57.16	1.80
4707	10/12/09 16:37	57.15	1.79
4708	10/12/09 16:38	57.15	1.79
4709	10/12/09 16:39	57.15	1.79
4710	10/12/09 16:40	57.14	1.78
4711	10/12/09 16:41	57.14	1.78
4712	10/12/09 16:42	57.14	1.78
4713	10/12/09 16:43	57.13	1.77
4714	10/12/09 16:44	57.12	1.76
4715	10/12/09 16:45	57.12	1.76
4716	10/12/09 16:46	57.12	1.76
4717	10/12/09 16:47	57.11	1.75

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4718	10/12/09 16:48	57.11	1.75
4719	10/12/09 16:49	57.11	1.75
4720	10/12/09 16:50	57.10	1.74
4721	10/12/09 16:51	57.10	1.74
4722	10/12/09 16:52	57.09	1.73
4723	10/12/09 16:53	57.09	1.73
4724	10/12/09 16:54	57.09	1.73
4725	10/12/09 16:55	57.08	1.72
4726	10/12/09 16:56	57.08	1.72
4727	10/12/09 16:57	57.07	1.71
4728	10/12/09 16:58	57.07	1.71
4729	10/12/09 16:59	57.06	1.70
4730	10/12/09 17:00	57.06	1.70
4731	10/12/09 17:01	57.06	1.70
4732	10/12/09 17:02	57.05	1.69
4733	10/12/09 17:03	57.05	1.69
4734	10/12/09 17:04	57.04	1.68
4735	10/12/09 17:05	57.04	1.68
4736	10/12/09 17:06	57.03	1.67
4737	10/12/09 17:07	57.03	1.67
4738	10/12/09 17:08	57.03	1.67
4739	10/12/09 17:09	57.02	1.66
4740	10/12/09 17:10	57.02	1.66
4741	10/12/09 17:11	57.01	1.65
4742	10/12/09 17:12	57.01	1.65
4743	10/12/09 17:13	57.01	1.65
4744	10/12/09 17:14	57.00	1.64
4745	10/12/09 17:15	57.00	1.64
4746	10/12/09 17:16	56.99	1.63
4747	10/12/09 17:17	56.99	1.63
4748	10/12/09 17:18	56.99	1.63
4749	10/12/09 17:19	56.98	1.62
4750	10/12/09 17:20	56.98	1.62
4751	10/12/09 17:21	56.97	1.61
4752	10/12/09 17:22	56.97	1.61
4753	10/12/09 17:23	56.97	1.61
4754	10/12/09 17:24	56.96	1.60
4755	10/12/09 17:25	56.96	1.60
4756	10/12/09 17:26	56.96	1.60
4757	10/12/09 17:27	56.95	1.59
4758	10/12/09 17:28	56.95	1.59
4759	10/12/09 17:29	56.94	1.58
4760	10/12/09 17:30	56.94	1.58
4761	10/12/09 17:31	56.94	1.58
4762	10/12/09 17:32	56.93	1.57
4763	10/12/09 17:33	56.93	1.57
4764	10/12/09 17:34	56.92	1.56
4765	10/12/09 17:35	56.92	1.56
4766	10/12/09 17:36	56.91	1.55
4767	10/12/09 17:37	56.91	1.55
4768	10/12/09 17:38	56.91	1.55
4769	10/12/09 17:39	56.90	1.54
4770	10/12/09 17:40	56.90	1.54

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4771	10/12/09 17:41	56.90	1.54
4772	10/12/09 17:42	56.89	1.53
4773	10/12/09 17:43	56.88	1.52
4774	10/12/09 17:44	56.88	1.52
4775	10/12/09 17:45	56.88	1.52
4776	10/12/09 17:46	56.88	1.52
4777	10/12/09 17:47	56.87	1.51
4778	10/12/09 17:48	56.87	1.51
4779	10/12/09 17:49	56.86	1.50
4780	10/12/09 17:50	56.86	1.50
4781	10/12/09 17:51	56.86	1.50
4782	10/12/09 17:52	56.85	1.49
4783	10/12/09 17:53	56.85	1.49
4784	10/12/09 17:54	56.84	1.48
4785	10/12/09 17:55	56.84	1.48
4786	10/12/09 17:56	56.84	1.48
4787	10/12/09 17:57	56.83	1.47
4788	10/12/09 17:58	56.83	1.47
4789	10/12/09 17:59	56.82	1.46
4790	10/12/09 18:00	56.82	1.46
4791	10/12/09 18:01	56.82	1.46
4792	10/12/09 18:02	56.81	1.45
4793	10/12/09 18:03	56.81	1.45
4794	10/12/09 18:04	56.81	1.45
4795	10/12/09 18:05	56.80	1.44
4796	10/12/09 18:06	56.80	1.44
4797	10/12/09 18:07	56.79	1.43
4798	10/12/09 18:08	56.79	1.43
4799	10/12/09 18:09	56.79	1.43
4800	10/12/09 18:10	56.78	1.42
4801	10/12/09 18:11	56.78	1.42
4802	10/12/09 18:12	56.77	1.41
4803	10/12/09 18:13	56.77	1.41
4804	10/12/09 18:14	56.77	1.41
4805	10/12/09 18:15	56.76	1.40
4806	10/12/09 18:16	56.76	1.40
4807	10/12/09 18:17	56.76	1.40
4808	10/12/09 18:18	56.75	1.39
4809	10/12/09 18:19	56.75	1.39
4810	10/12/09 18:20	56.74	1.38
4811	10/12/09 18:21	56.74	1.38
4812	10/12/09 18:22	56.74	1.38
4813	10/12/09 18:23	56.73	1.37
4814	10/12/09 18:24	56.73	1.37
4815	10/12/09 18:25	56.73	1.37
4816	10/12/09 18:26	56.72	1.36
4817	10/12/09 18:27	56.72	1.36
4818	10/12/09 18:28	56.71	1.35
4819	10/12/09 18:29	56.71	1.35
4820	10/12/09 18:30	56.71	1.35
4821	10/12/09 18:31	56.70	1.34
4822	10/12/09 18:32	56.70	1.34
4823	10/12/09 18:33	56.70	1.34

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4824	10/12/09 18:34	56.69	1.33
4825	10/12/09 18:35	56.69	1.33
4826	10/12/09 18:36	56.68	1.32
4827	10/12/09 18:37	56.68	1.32
4828	10/12/09 18:38	56.68	1.32
4829	10/12/09 18:39	56.67	1.31
4830	10/12/09 18:40	56.67	1.31
4831	10/12/09 18:41	56.66	1.30
4832	10/12/09 18:42	56.66	1.30
4833	10/12/09 18:43	56.66	1.30
4834	10/12/09 18:44	56.66	1.30
4835	10/12/09 18:45	56.65	1.29
4836	10/12/09 18:46	56.65	1.29
4837	10/12/09 18:47	56.64	1.28
4838	10/12/09 18:48	56.64	1.28
4839	10/12/09 18:49	56.64	1.28
4840	10/12/09 18:50	56.63	1.27
4841	10/12/09 18:51	56.63	1.27
4842	10/12/09 18:52	56.62	1.26
4843	10/12/09 18:53	56.62	1.26
4844	10/12/09 18:54	56.62	1.26
4845	10/12/09 18:55	56.61	1.25
4846	10/12/09 18:56	56.61	1.25
4847	10/12/09 18:57	56.61	1.25
4848	10/12/09 18:58	56.60	1.24
4849	10/12/09 18:59	56.60	1.24
4850	10/12/09 19:00	56.59	1.23
4851	10/12/09 19:01	56.59	1.23
4852	10/12/09 19:02	56.59	1.23
4853	10/12/09 19:03	56.58	1.22
4854	10/12/09 19:04	56.58	1.22
4855	10/12/09 19:05	56.58	1.22
4856	10/12/09 19:06	56.57	1.21
4857	10/12/09 19:07	56.57	1.21
4858	10/12/09 19:08	56.57	1.21
4859	10/12/09 19:09	56.56	1.20
4860	10/12/09 19:10	56.56	1.20
4861	10/12/09 19:11	56.56	1.20
4862	10/12/09 19:12	56.55	1.19
4863	10/12/09 19:13	56.55	1.19
4864	10/12/09 19:14	56.54	1.18
4865	10/12/09 19:15	56.54	1.18
4866	10/12/09 19:16	56.54	1.18
4867	10/12/09 19:17	56.53	1.17
4868	10/12/09 19:18	56.53	1.17
4869	10/12/09 19:19	56.52	1.16
4870	10/12/09 19:20	56.52	1.16
4871	10/12/09 19:21	56.52	1.16
4872	10/12/09 19:22	56.51	1.15
4873	10/12/09 19:23	56.51	1.15
4874	10/12/09 19:24	56.51	1.15
4875	10/12/09 19:25	56.50	1.14
4876	10/12/09 19:26	56.50	1.14

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4877	10/12/09 19:27	56.49	1.13
4878	10/12/09 19:28	56.49	1.13
4879	10/12/09 19:29	56.49	1.13
4880	10/12/09 19:30	56.49	1.13
4881	10/12/09 19:31	56.48	1.12
4882	10/12/09 19:32	56.48	1.12
4883	10/12/09 19:33	56.47	1.11
4884	10/12/09 19:34	56.47	1.11
4885	10/12/09 19:35	56.47	1.11
4886	10/12/09 19:36	56.46	1.10
4887	10/12/09 19:37	56.46	1.10
4888	10/12/09 19:38	56.46	1.10
4889	10/12/09 19:39	56.45	1.09
4890	10/12/09 19:40	56.45	1.09
4891	10/12/09 19:41	56.44	1.08
4892	10/12/09 19:42	56.44	1.08
4893	10/12/09 19:43	56.44	1.08
4894	10/12/09 19:44	56.43	1.07
4895	10/12/09 19:45	56.43	1.07
4896	10/12/09 19:46	56.43	1.07
4897	10/12/09 19:47	56.42	1.06
4898	10/12/09 19:48	56.42	1.06
4899	10/12/09 19:49	56.42	1.06
4900	10/12/09 19:50	56.41	1.05
4901	10/12/09 19:51	56.41	1.05
4902	10/12/09 19:52	56.40	1.04
4903	10/12/09 19:53	56.40	1.04
4904	10/12/09 19:54	56.40	1.04
4905	10/12/09 19:55	56.39	1.03
4906	10/12/09 19:56	56.39	1.03
4907	10/12/09 19:57	56.39	1.03
4908	10/12/09 19:58	56.38	1.02
4909	10/12/09 19:59	56.38	1.02
4910	10/12/09 20:00	56.38	1.02
4911	10/12/09 20:01	56.37	1.01
4912	10/12/09 20:02	56.37	1.01
4913	10/12/09 20:03	56.37	1.01
4914	10/12/09 20:04	56.36	1.00
4915	10/12/09 20:05	56.36	1.00
4916	10/12/09 20:06	56.36	1.00
4917	10/12/09 20:07	56.35	0.99
4918	10/12/09 20:08	56.35	0.99
4919	10/12/09 20:09	56.35	0.99
4920	10/12/09 20:10	56.34	0.98
4921	10/12/09 20:11	56.34	0.98
4922	10/12/09 20:12	56.34	0.98
4923	10/12/09 20:13	56.33	0.97
4924	10/12/09 20:14	56.33	0.97
4925	10/12/09 20:15	56.33	0.97
4926	10/12/09 20:16	56.32	0.96
4927	10/12/09 20:17	56.32	0.96
4928	10/12/09 20:18	56.32	0.96
4929	10/12/09 20:19	56.31	0.95

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4930	10/12/09 20:20	56.31	0.95
4931	10/12/09 20:21	56.31	0.95
4932	10/12/09 20:22	56.30	0.94
4933	10/12/09 20:23	56.30	0.94
4934	10/12/09 20:24	56.30	0.94
4935	10/12/09 20:25	56.29	0.93
4936	10/12/09 20:26	56.29	0.93
4937	10/12/09 20:27	56.29	0.93
4938	10/12/09 20:28	56.28	0.92
4939	10/12/09 20:29	56.28	0.92
4940	10/12/09 20:30	56.28	0.92
4941	10/12/09 20:31	56.27	0.91
4942	10/12/09 20:32	56.27	0.91
4943	10/12/09 20:33	56.27	0.91
4944	10/12/09 20:34	56.26	0.90
4945	10/12/09 20:35	56.26	0.90
4946	10/12/09 20:36	56.25	0.89
4947	10/12/09 20:37	56.25	0.89
4948	10/12/09 20:38	56.25	0.89
4949	10/12/09 20:39	56.25	0.89
4950	10/12/09 20:40	56.24	0.88
4951	10/12/09 20:41	56.24	0.88
4952	10/12/09 20:42	56.23	0.87
4953	10/12/09 20:43	56.23	0.87
4954	10/12/09 20:44	56.23	0.87
4955	10/12/09 20:45	56.23	0.87
4956	10/12/09 20:46	56.22	0.86
4957	10/12/09 20:47	56.22	0.86
4958	10/12/09 20:48	56.22	0.86
4959	10/12/09 20:49	56.21	0.85
4960	10/12/09 20:50	56.21	0.85
4961	10/12/09 20:51	56.21	0.85
4962	10/12/09 20:52	56.20	0.84
4963	10/12/09 20:53	56.20	0.84
4964	10/12/09 20:54	56.20	0.84
4965	10/12/09 20:55	56.19	0.83
4966	10/12/09 20:56	56.19	0.83
4967	10/12/09 20:57	56.19	0.83
4968	10/12/09 20:58	56.19	0.83
4969	10/12/09 20:59	56.18	0.82
4970	10/12/09 21:00	56.18	0.82
4971	10/12/09 21:01	56.18	0.82
4972	10/12/09 21:02	56.17	0.81
4973	10/12/09 21:03	56.17	0.81
4974	10/12/09 21:04	56.16	0.80
4975	10/12/09 21:05	56.16	0.80
4976	10/12/09 21:06	56.16	0.80
4977	10/12/09 21:07	56.15	0.79
4978	10/12/09 21:08	56.15	0.79
4979	10/12/09 21:09	56.15	0.79
4980	10/12/09 21:10	56.15	0.79
4981	10/12/09 21:11	56.14	0.78
4982	10/12/09 21:12	56.14	0.78

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
4983	10/12/09 21:13	56.13	0.77
4984	10/12/09 21:14	56.13	0.77
4985	10/12/09 21:15	56.13	0.77
4986	10/12/09 21:16	56.13	0.77
4987	10/12/09 21:17	56.12	0.76
4988	10/12/09 21:18	56.12	0.76
4989	10/12/09 21:19	56.12	0.76
4990	10/12/09 21:20	56.11	0.75
4991	10/12/09 21:21	56.11	0.75
4992	10/12/09 21:22	56.11	0.75
4993	10/12/09 21:23	56.10	0.74
4994	10/12/09 21:24	56.10	0.74
4995	10/12/09 21:25	56.10	0.74
4996	10/12/09 21:26	56.09	0.73
4997	10/12/09 21:27	56.09	0.73
4998	10/12/09 21:28	56.09	0.73
4999	10/12/09 21:29	56.08	0.72
5000	10/12/09 21:30	56.08	0.72
5001	10/12/09 21:31	56.08	0.72
5002	10/12/09 21:32	56.08	0.72
5003	10/12/09 21:33	56.07	0.71
5004	10/12/09 21:34	56.07	0.71
5005	10/12/09 21:35	56.07	0.71
5006	10/12/09 21:36	56.06	0.70
5007	10/12/09 21:37	56.06	0.70
5008	10/12/09 21:38	56.06	0.70
5009	10/12/09 21:39	56.05	0.69
5010	10/12/09 21:40	56.05	0.69
5011	10/12/09 21:41	56.05	0.69
5012	10/12/09 21:42	56.04	0.68
5013	10/12/09 21:43	56.04	0.68
5014	10/12/09 21:44	56.04	0.68
5015	10/12/09 21:45	56.03	0.67
5016	10/12/09 21:46	56.03	0.67
5017	10/12/09 21:47	56.03	0.67
5018	10/12/09 21:48	56.03	0.67
5019	10/12/09 21:49	56.02	0.66
5020	10/12/09 21:50	56.02	0.66
5021	10/12/09 21:51	56.02	0.66
5022	10/12/09 21:52	56.01	0.65
5023	10/12/09 21:53	56.01	0.65
5024	10/12/09 21:54	56.01	0.65
5025	10/12/09 21:55	56.00	0.64
5026	10/12/09 21:56	56.00	0.64
5027	10/12/09 21:57	56.00	0.64
5028	10/12/09 21:58	55.99	0.63
5029	10/12/09 21:59	55.99	0.63
5030	10/12/09 22:00	55.99	0.63
5031	10/12/09 22:01	55.99	0.63
5032	10/12/09 22:02	55.98	0.62
5033	10/12/09 22:03	55.98	0.62
5034	10/12/09 22:04	55.98	0.62
5035	10/12/09 22:05	55.97	0.61

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
5036	10/12/09 22:06	55.97	0.61
5037	10/12/09 22:07	55.97	0.61
5038	10/12/09 22:08	55.96	0.60
5039	10/12/09 22:09	55.96	0.60
5040	10/12/09 22:10	55.96	0.60
5041	10/12/09 22:11	55.96	0.60
5042	10/12/09 22:12	55.96	0.60
5043	10/12/09 22:13	55.95	0.59
5044	10/12/09 22:14	55.95	0.59
5045	10/12/09 22:15	55.94	0.58
5046	10/12/09 22:16	55.94	0.58
5047	10/12/09 22:17	55.94	0.58
5048	10/12/09 22:18	55.94	0.58
5049	10/12/09 22:19	55.93	0.57
5050	10/12/09 22:20	55.93	0.57
5051	10/12/09 22:21	55.93	0.57
5052	10/12/09 22:22	55.93	0.57
5053	10/12/09 22:23	55.92	0.56
5054	10/12/09 22:24	55.92	0.56
5055	10/12/09 22:25	55.92	0.56
5056	10/12/09 22:26	55.92	0.56
5057	10/12/09 22:27	55.91	0.55
5058	10/12/09 22:28	55.91	0.55
5059	10/12/09 22:29	55.91	0.55
5060	10/12/09 22:30	55.90	0.54
5061	10/12/09 22:31	55.90	0.54
5062	10/12/09 22:32	55.90	0.54
5063	10/12/09 22:33	55.90	0.54
5064	10/12/09 22:34	55.89	0.53
5065	10/12/09 22:35	55.89	0.53
5066	10/12/09 22:36	55.89	0.53
5067	10/12/09 22:37	55.89	0.53
5068	10/12/09 22:38	55.88	0.52
5069	10/12/09 22:39	55.88	0.52
5070	10/12/09 22:40	55.88	0.52
5071	10/12/09 22:41	55.87	0.51
5072	10/12/09 22:42	55.87	0.51
5073	10/12/09 22:43	55.87	0.51
5074	10/12/09 22:44	55.87	0.51
5075	10/12/09 22:45	55.86	0.50
5076	10/12/09 22:46	55.86	0.50
5077	10/12/09 22:47	55.86	0.50
5078	10/12/09 22:48	55.85	0.49
5079	10/12/09 22:49	55.85	0.49
5080	10/12/09 22:50	55.85	0.49
5081	10/12/09 22:51	55.84	0.48
5082	10/12/09 22:52	55.84	0.48
5083	10/12/09 22:53	55.84	0.48
5084	10/12/09 22:54	55.84	0.48
5085	10/12/09 22:55	55.83	0.47
5086	10/12/09 22:56	55.83	0.47
5087	10/12/09 22:57	55.83	0.47
5088	10/12/09 22:58	55.82	0.46

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5089	10/12/09 22:59	55.82	0.46
5090	10/12/09 23:00	55.82	0.46
5091	10/12/09 23:01	55.81	0.45
5092	10/12/09 23:02	55.81	0.45
5093	10/12/09 23:03	55.81	0.45
5094	10/12/09 23:04	55.80	0.44
5095	10/12/09 23:05	55.80	0.44
5096	10/12/09 23:06	55.80	0.44
5097	10/12/09 23:07	55.80	0.44
5098	10/12/09 23:08	55.80	0.44
5099	10/12/09 23:09	55.79	0.43
5100	10/12/09 23:10	55.79	0.43
5101	10/12/09 23:11	55.79	0.43
5102	10/12/09 23:12	55.78	0.42
5103	10/12/09 23:13	55.78	0.42
5104	10/12/09 23:14	55.78	0.42
5105	10/12/09 23:15	55.77	0.41
5106	10/12/09 23:16	55.77	0.41
5107	10/12/09 23:17	55.77	0.41
5108	10/12/09 23:18	55.77	0.41
5109	10/12/09 23:19	55.76	0.40
5110	10/12/09 23:20	55.76	0.40
5111	10/12/09 23:21	55.76	0.40
5112	10/12/09 23:22	55.75	0.39
5113	10/12/09 23:23	55.75	0.39
5114	10/12/09 23:24	55.75	0.39
5115	10/12/09 23:25	55.75	0.39
5116	10/12/09 23:26	55.74	0.38
5117	10/12/09 23:27	55.74	0.38
5118	10/12/09 23:28	55.74	0.38
5119	10/12/09 23:29	55.73	0.37
5120	10/12/09 23:30	55.73	0.37
5121	10/12/09 23:31	55.73	0.37
5122	10/12/09 23:32	55.73	0.37
5123	10/12/09 23:33	55.72	0.36
5124	10/12/09 23:34	55.72	0.36
5125	10/12/09 23:35	55.72	0.36
5126	10/12/09 23:36	55.71	0.35
5127	10/12/09 23:37	55.71	0.35
5128	10/12/09 23:38	55.71	0.35
5129	10/12/09 23:39	55.71	0.35
5130	10/12/09 23:40	55.70	0.34
5131	10/12/09 23:41	55.70	0.34
5132	10/12/09 23:42	55.70	0.34
5133	10/12/09 23:43	55.70	0.34
5134	10/12/09 23:44	55.69	0.33
5135	10/12/09 23:45	55.69	0.33
5136	10/12/09 23:46	55.69	0.33
5137	10/12/09 23:47	55.68	0.32
5138	10/12/09 23:48	55.68	0.32
5139	10/12/09 23:49	55.68	0.32
5140	10/12/09 23:50	55.68	0.32
5141	10/12/09 23:51	55.67	0.31

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5142	10/12/09 23:52	55.67	0.31
5143	10/12/09 23:53	55.67	0.31
5144	10/12/09 23:54	55.67	0.31
5145	10/12/09 23:55	55.66	0.30
5146	10/12/09 23:56	55.66	0.30
5147	10/12/09 23:57	55.66	0.30
5148	10/12/09 23:58	55.65	0.29
5149	10/12/09 23:59	55.65	0.29
5150	10/13/09 0:00	55.65	0.29
5151	10/13/09 0:01	55.65	0.29
5152	10/13/09 0:02	55.65	0.29
5153	10/13/09 0:03	55.64	0.28
5154	10/13/09 0:04	55.64	0.28
5155	10/13/09 0:05	55.63	0.27
5156	10/13/09 0:06	55.63	0.27
5157	10/13/09 0:07	55.63	0.27
5158	10/13/09 0:08	55.62	0.26
5159	10/13/09 0:09	55.62	0.26
5160	10/13/09 0:10	55.62	0.26
5161	10/13/09 0:11	55.62	0.26
5162	10/13/09 0:12	55.61	0.25
5163	10/13/09 0:13	55.61	0.25
5164	10/13/09 0:14	55.61	0.25
5165	10/13/09 0:15	55.61	0.25
5166	10/13/09 0:16	55.60	0.24
5167	10/13/09 0:17	55.60	0.24
5168	10/13/09 0:18	55.60	0.24
5169	10/13/09 0:19	55.60	0.24
5170	10/13/09 0:20	55.59	0.23
5171	10/13/09 0:21	55.59	0.23
5172	10/13/09 0:22	55.59	0.23
5173	10/13/09 0:23	55.58	0.22
5174	10/13/09 0:24	55.58	0.22
5175	10/13/09 0:25	55.58	0.22
5176	10/13/09 0:26	55.58	0.22
5177	10/13/09 0:27	55.57	0.21
5178	10/13/09 0:28	55.57	0.21
5179	10/13/09 0:29	55.57	0.21
5180	10/13/09 0:30	55.56	0.20
5181	10/13/09 0:31	55.56	0.20
5182	10/13/09 0:32	55.56	0.20
5183	10/13/09 0:33	55.56	0.20
5184	10/13/09 0:34	55.55	0.19
5185	10/13/09 0:35	55.55	0.19
5186	10/13/09 0:36	55.55	0.19
5187	10/13/09 0:37	55.55	0.19
5188	10/13/09 0:38	55.54	0.18
5189	10/13/09 0:39	55.54	0.18
5190	10/13/09 0:40	55.53	0.17
5191	10/13/09 0:41	55.53	0.17
5192	10/13/09 0:42	55.53	0.17
5193	10/13/09 0:43	55.53	0.17
5194	10/13/09 0:44	55.52	0.16

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5195	10/13/09 0:45	55.52	0.16
5196	10/13/09 0:46	55.52	0.16
5197	10/13/09 0:47	55.52	0.16
5198	10/13/09 0:48	55.51	0.15
5199	10/13/09 0:49	55.51	0.15
5200	10/13/09 0:50	55.51	0.15
5201	10/13/09 0:51	55.50	0.14
5202	10/13/09 0:52	55.50	0.14
5203	10/13/09 0:53	55.50	0.14
5204	10/13/09 0:54	55.50	0.14
5205	10/13/09 0:55	55.49	0.13
5206	10/13/09 0:56	55.49	0.13
5207	10/13/09 0:57	55.49	0.13
5208	10/13/09 0:58	55.49	0.13
5209	10/13/09 0:59	55.48	0.12
5210	10/13/09 1:00	55.48	0.12
5211	10/13/09 1:01	55.48	0.12
5212	10/13/09 1:02	55.47	0.11
5213	10/13/09 1:03	55.47	0.11
5214	10/13/09 1:04	55.47	0.11
5215	10/13/09 1:05	55.47	0.11
5216	10/13/09 1:06	55.46	0.10
5217	10/13/09 1:07	55.46	0.10
5218	10/13/09 1:08	55.46	0.10
5219	10/13/09 1:09	55.46	0.10
5220	10/13/09 1:10	55.45	0.09
5221	10/13/09 1:11	55.45	0.09
5222	10/13/09 1:12	55.45	0.09
5223	10/13/09 1:13	55.44	0.08
5224	10/13/09 1:14	55.44	0.08
5225	10/13/09 1:15	55.44	0.08
5226	10/13/09 1:16	55.43	0.07
5227	10/13/09 1:17	55.43	0.07
5228	10/13/09 1:18	55.43	0.07
5229	10/13/09 1:19	55.43	0.07
5230	10/13/09 1:20	55.43	0.07
5231	10/13/09 1:21	55.42	0.06
5232	10/13/09 1:22	55.42	0.06
5233	10/13/09 1:23	55.42	0.06
5234	10/13/09 1:24	55.41	0.05
5235	10/13/09 1:25	55.41	0.05
5236	10/13/09 1:26	55.41	0.05
5237	10/13/09 1:27	55.40	0.04
5238	10/13/09 1:28	55.40	0.04
5239	10/13/09 1:29	55.40	0.04
5240	10/13/09 1:30	55.40	0.04
5241	10/13/09 1:31	55.39	0.03
5242	10/13/09 1:32	55.39	0.03
5243	10/13/09 1:33	55.39	0.03
5244	10/13/09 1:34	55.39	0.03
5245	10/13/09 1:35	55.39	0.03
5246	10/13/09 1:36	55.38	0.02
5247	10/13/09 1:37	55.38	0.02

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5248	10/13/09 1:38	55.38	0.02
5249	10/13/09 1:39	55.37	0.01
5250	10/13/09 1:40	55.37	0.01
5251	10/13/09 1:41	55.37	0.01
5252	10/13/09 1:42	55.36	0.00
5253	10/13/09 1:43	55.36	0.00
5254	10/13/09 1:44	55.36	0.00
5255	10/13/09 1:45	55.36	0.00
5256	10/13/09 1:46	55.35	-0.01
5257	10/13/09 1:47	55.35	-0.01
5258	10/13/09 1:48	55.35	-0.01
5259	10/13/09 1:49	55.34	-0.02
5260	10/13/09 1:50	55.34	-0.02
5261	10/13/09 1:51	55.34	-0.02
5262	10/13/09 1:52	55.34	-0.02
5263	10/13/09 1:53	55.34	-0.02
5264	10/13/09 1:54	55.33	-0.03
5265	10/13/09 1:55	55.33	-0.03
5266	10/13/09 1:56	55.33	-0.03
5267	10/13/09 1:57	55.32	-0.04
5268	10/13/09 1:58	55.32	-0.04
5269	10/13/09 1:59	55.32	-0.04
5270	10/13/09 2:00	55.32	-0.04
5271	10/13/09 2:01	55.31	-0.05
5272	10/13/09 2:02	55.31	-0.05
5273	10/13/09 2:03	55.31	-0.05
5274	10/13/09 2:04	55.31	-0.05
5275	10/13/09 2:05	55.30	-0.06
5276	10/13/09 2:06	55.30	-0.06
5277	10/13/09 2:07	55.30	-0.06
5278	10/13/09 2:08	55.30	-0.06
5279	10/13/09 2:09	55.29	-0.07
5280	10/13/09 2:10	55.29	-0.07
5281	10/13/09 2:11	55.29	-0.07
5282	10/13/09 2:12	55.29	-0.07
5283	10/13/09 2:13	55.28	-0.08
5284	10/13/09 2:14	55.28	-0.08
5285	10/13/09 2:15	55.28	-0.08
5286	10/13/09 2:16	55.27	-0.09
5287	10/13/09 2:17	55.27	-0.09
5288	10/13/09 2:18	55.27	-0.09
5289	10/13/09 2:19	55.27	-0.09
5290	10/13/09 2:20	55.27	-0.09
5291	10/13/09 2:21	55.26	-0.10
5292	10/13/09 2:22	55.26	-0.10
5293	10/13/09 2:23	55.26	-0.10
5294	10/13/09 2:24	55.26	-0.10
5295	10/13/09 2:25	55.25	-0.11
5296	10/13/09 2:26	55.25	-0.11
5297	10/13/09 2:27	55.25	-0.11
5298	10/13/09 2:28	55.24	-0.12
5299	10/13/09 2:29	55.24	-0.12
5300	10/13/09 2:30	55.24	-0.12

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5301	10/13/09 2:31	55.24	-0.12
5302	10/13/09 2:32	55.24	-0.12
5303	10/13/09 2:33	55.23	-0.13
5304	10/13/09 2:34	55.23	-0.13
5305	10/13/09 2:35	55.23	-0.13
5306	10/13/09 2:36	55.22	-0.14
5307	10/13/09 2:37	55.23	-0.13
5308	10/13/09 2:38	55.22	-0.14
5309	10/13/09 2:39	55.22	-0.14
5310	10/13/09 2:40	55.22	-0.14
5311	10/13/09 2:41	55.21	-0.15
5312	10/13/09 2:42	55.21	-0.15
5313	10/13/09 2:43	55.21	-0.15
5314	10/13/09 2:44	55.21	-0.15
5315	10/13/09 2:45	55.20	-0.16
5316	10/13/09 2:46	55.20	-0.16
5317	10/13/09 2:47	55.20	-0.16
5318	10/13/09 2:48	55.20	-0.16
5319	10/13/09 2:49	55.19	-0.17
5320	10/13/09 2:50	55.19	-0.17
5321	10/13/09 2:51	55.19	-0.17
5322	10/13/09 2:52	55.18	-0.18
5323	10/13/09 2:53	55.18	-0.18
5324	10/13/09 2:54	55.18	-0.18
5325	10/13/09 2:55	55.18	-0.18
5326	10/13/09 2:56	55.17	-0.19
5327	10/13/09 2:57	55.17	-0.19
5328	10/13/09 2:58	55.17	-0.19
5329	10/13/09 2:59	55.17	-0.19
5330	10/13/09 3:00	55.16	-0.20
5331	10/13/09 3:01	55.16	-0.20
5332	10/13/09 3:02	55.16	-0.20
5333	10/13/09 3:03	55.16	-0.20
5334	10/13/09 3:04	55.15	-0.21
5335	10/13/09 3:05	55.15	-0.21
5336	10/13/09 3:06	55.15	-0.21
5337	10/13/09 3:07	55.15	-0.21
5338	10/13/09 3:08	55.15	-0.21
5339	10/13/09 3:09	55.14	-0.22
5340	10/13/09 3:10	55.14	-0.22
5341	10/13/09 3:11	55.14	-0.22
5342	10/13/09 3:12	55.13	-0.23
5343	10/13/09 3:13	55.13	-0.23
5344	10/13/09 3:14	55.13	-0.23
5345	10/13/09 3:15	55.13	-0.23
5346	10/13/09 3:16	55.13	-0.23
5347	10/13/09 3:17	55.12	-0.24
5348	10/13/09 3:18	55.12	-0.24
5349	10/13/09 3:19	55.12	-0.24
5350	10/13/09 3:20	55.12	-0.24
5351	10/13/09 3:21	55.11	-0.25
5352	10/13/09 3:22	55.11	-0.25
5353	10/13/09 3:23	55.11	-0.25

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5354	10/13/09 3:24	55.10	-0.26
5355	10/13/09 3:25	55.10	-0.26
5356	10/13/09 3:26	55.10	-0.26
5357	10/13/09 3:27	55.10	-0.26
5358	10/13/09 3:28	55.09	-0.27
5359	10/13/09 3:29	55.09	-0.27
5360	10/13/09 3:30	55.09	-0.27
5361	10/13/09 3:31	55.09	-0.27
5362	10/13/09 3:32	55.09	-0.27
5363	10/13/09 3:33	55.08	-0.28
5364	10/13/09 3:34	55.08	-0.28
5365	10/13/09 3:35	55.08	-0.28
5366	10/13/09 3:36	55.08	-0.28
5367	10/13/09 3:37	55.07	-0.29
5368	10/13/09 3:38	55.07	-0.29
5369	10/13/09 3:39	55.07	-0.29
5370	10/13/09 3:40	55.06	-0.30
5371	10/13/09 3:41	55.06	-0.30
5372	10/13/09 3:42	55.06	-0.30
5373	10/13/09 3:43	55.06	-0.30
5374	10/13/09 3:44	55.06	-0.30
5375	10/13/09 3:45	55.05	-0.31
5376	10/13/09 3:46	55.05	-0.31
5377	10/13/09 3:47	55.05	-0.31
5378	10/13/09 3:48	55.04	-0.32
5379	10/13/09 3:49	55.04	-0.32
5380	10/13/09 3:50	55.04	-0.32
5381	10/13/09 3:51	55.04	-0.32
5382	10/13/09 3:52	55.03	-0.33
5383	10/13/09 3:53	55.03	-0.33
5384	10/13/09 3:54	55.03	-0.33
5385	10/13/09 3:55	55.02	-0.34
5386	10/13/09 3:56	55.02	-0.34
5387	10/13/09 3:57	55.02	-0.34
5388	10/13/09 3:58	55.02	-0.34
5389	10/13/09 3:59	55.01	-0.35
5390	10/13/09 4:00	55.01	-0.35
5391	10/13/09 4:01	55.01	-0.35
5392	10/13/09 4:02	55.01	-0.35
5393	10/13/09 4:03	55.01	-0.35
5394	10/13/09 4:04	55.01	-0.35
5395	10/13/09 4:05	55.00	-0.36
5396	10/13/09 4:06	55.00	-0.36
5397	10/13/09 4:07	55.00	-0.36
5398	10/13/09 4:08	54.99	-0.37
5399	10/13/09 4:09	54.99	-0.37
5400	10/13/09 4:10	54.99	-0.37
5401	10/13/09 4:11	54.99	-0.37
5402	10/13/09 4:12	54.98	-0.38
5403	10/13/09 4:13	54.98	-0.38
5404	10/13/09 4:14	54.98	-0.38
5405	10/13/09 4:15	54.98	-0.38
5406	10/13/09 4:16	54.98	-0.38

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
5407	10/13/09 4:17	54.97	-0.39
5408	10/13/09 4:18	54.97	-0.39
5409	10/13/09 4:19	54.97	-0.39
5410	10/13/09 4:20	54.96	-0.40
5411	10/13/09 4:21	54.96	-0.40
5412	10/13/09 4:22	54.96	-0.40
5413	10/13/09 4:23	54.95	-0.41
5414	10/13/09 4:24	54.95	-0.41
5415	10/13/09 4:25	54.95	-0.41
5416	10/13/09 4:26	54.95	-0.41
5417	10/13/09 4:27	54.95	-0.41
5418	10/13/09 4:28	54.94	-0.42
5419	10/13/09 4:29	54.94	-0.42
5420	10/13/09 4:30	54.94	-0.42
5421	10/13/09 4:31	54.94	-0.42
5422	10/13/09 4:32	54.93	-0.43
5423	10/13/09 4:33	54.93	-0.43
5424	10/13/09 4:34	54.93	-0.43
5425	10/13/09 4:35	54.93	-0.43
5426	10/13/09 4:36	54.92	-0.44
5427	10/13/09 4:37	54.92	-0.44
5428	10/13/09 4:38	54.92	-0.44
5429	10/13/09 4:39	54.92	-0.44
5430	10/13/09 4:40	54.91	-0.45
5431	10/13/09 4:41	54.91	-0.45
5432	10/13/09 4:42	54.91	-0.45
5433	10/13/09 4:43	54.90	-0.46
5434	10/13/09 4:44	54.90	-0.46
5435	10/13/09 4:45	54.90	-0.46
5436	10/13/09 4:46	54.90	-0.46
5437	10/13/09 4:47	54.90	-0.46
5438	10/13/09 4:48	54.89	-0.47
5439	10/13/09 4:49	54.89	-0.47
5440	10/13/09 4:50	54.89	-0.47
5441	10/13/09 4:51	54.89	-0.47
5442	10/13/09 4:52	54.88	-0.48
5443	10/13/09 4:53	54.88	-0.48
5444	10/13/09 4:54	54.88	-0.48
5445	10/13/09 4:55	54.88	-0.48
5446	10/13/09 4:56	54.88	-0.48
5447	10/13/09 4:57	54.87	-0.49
5448	10/13/09 4:58	54.87	-0.49
5449	10/13/09 4:59	54.87	-0.49
5450	10/13/09 5:00	54.86	-0.50
5451	10/13/09 5:01	54.86	-0.50
5452	10/13/09 5:02	54.86	-0.50
5453	10/13/09 5:03	54.86	-0.50
5454	10/13/09 5:04	54.86	-0.50
5455	10/13/09 5:05	54.85	-0.51
5456	10/13/09 5:06	54.85	-0.51
5457	10/13/09 5:07	54.85	-0.51
5458	10/13/09 5:08	54.84	-0.52
5459	10/13/09 5:09	54.84	-0.52

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
5460	10/13/09 5:10	54.84	-0.52
5461	10/13/09 5:11	54.84	-0.52
5462	10/13/09 5:12	54.84	-0.52
5463	10/13/09 5:13	54.83	-0.53
5464	10/13/09 5:14	54.83	-0.53
5465	10/13/09 5:15	54.83	-0.53
5466	10/13/09 5:16	54.82	-0.54
5467	10/13/09 5:17	54.82	-0.54
5468	10/13/09 5:18	54.82	-0.54
5469	10/13/09 5:19	54.82	-0.54
5470	10/13/09 5:20	54.82	-0.54
5471	10/13/09 5:21	54.81	-0.55
5472	10/13/09 5:22	54.81	-0.55
5473	10/13/09 5:23	54.81	-0.55
5474	10/13/09 5:24	54.81	-0.55
5475	10/13/09 5:25	54.80	-0.56
5476	10/13/09 5:26	54.80	-0.56
5477	10/13/09 5:27	54.80	-0.56
5478	10/13/09 5:28	54.80	-0.56
5479	10/13/09 5:29	54.79	-0.57
5480	10/13/09 5:30	54.79	-0.57
5481	10/13/09 5:31	54.79	-0.57
5482	10/13/09 5:32	54.78	-0.58
5483	10/13/09 5:33	54.78	-0.58
5484	10/13/09 5:34	54.78	-0.58
5485	10/13/09 5:35	54.78	-0.58
5486	10/13/09 5:36	54.78	-0.58
5487	10/13/09 5:37	54.77	-0.59
5488	10/13/09 5:38	54.77	-0.59
5489	10/13/09 5:39	54.77	-0.59
5490	10/13/09 5:40	54.77	-0.59
5491	10/13/09 5:41	54.77	-0.59
5492	10/13/09 5:42	54.76	-0.60
5493	10/13/09 5:43	54.76	-0.60
5494	10/13/09 5:44	54.76	-0.60
5495	10/13/09 5:45	54.76	-0.60
5496	10/13/09 5:46	54.75	-0.61
5497	10/13/09 5:47	54.75	-0.61
5498	10/13/09 5:48	54.75	-0.61
5499	10/13/09 5:49	54.75	-0.61
5500	10/13/09 5:50	54.74	-0.62
5501	10/13/09 5:51	54.74	-0.62
5502	10/13/09 5:52	54.74	-0.62
5503	10/13/09 5:53	54.74	-0.62
5504	10/13/09 5:54	54.73	-0.63
5505	10/13/09 5:55	54.73	-0.63
5506	10/13/09 5:56	54.73	-0.63
5507	10/13/09 5:57	54.72	-0.64
5508	10/13/09 5:58	54.72	-0.64
5509	10/13/09 5:59	54.72	-0.64
5510	10/13/09 6:00	54.72	-0.64
5511	10/13/09 6:01	54.72	-0.64
5512	10/13/09 6:02	54.71	-0.65

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
5513	10/13/09 6:03	54.71	-0.65
5514	10/13/09 6:04	54.71	-0.65
5515	10/13/09 6:05	54.70	-0.66
5516	10/13/09 6:06	54.70	-0.66
5517	10/13/09 6:07	54.70	-0.66
5518	10/13/09 6:08	54.70	-0.66
5519	10/13/09 6:09	54.69	-0.67
5520	10/13/09 6:10	54.69	-0.67
5521	10/13/09 6:11	54.69	-0.67
5522	10/13/09 6:12	54.69	-0.67
5523	10/13/09 6:13	54.68	-0.68
5524	10/13/09 6:14	54.68	-0.68
5525	10/13/09 6:15	54.68	-0.68
5526	10/13/09 6:16	54.68	-0.68
5527	10/13/09 6:17	54.68	-0.68
5528	10/13/09 6:18	54.68	-0.68
5529	10/13/09 6:19	54.67	-0.69
5530	10/13/09 6:20	54.67	-0.69
5531	10/13/09 6:21	54.67	-0.69
5532	10/13/09 6:22	54.66	-0.70
5533	10/13/09 6:23	54.66	-0.70
5534	10/13/09 6:24	54.66	-0.70
5535	10/13/09 6:25	54.66	-0.70
5536	10/13/09 6:26	54.66	-0.70
5537	10/13/09 6:27	54.65	-0.71
5538	10/13/09 6:28	54.65	-0.71
5539	10/13/09 6:29	54.65	-0.71
5540	10/13/09 6:30	54.64	-0.72
5541	10/13/09 6:31	54.64	-0.72
5542	10/13/09 6:32	54.64	-0.72
5543	10/13/09 6:33	54.64	-0.72
5544	10/13/09 6:34	54.63	-0.73
5545	10/13/09 6:35	54.63	-0.73
5546	10/13/09 6:36	54.68	-0.68
5547	10/13/09 6:37	54.79	-0.57
5548	10/13/09 6:38	54.80	-0.56
5549	10/13/09 6:39	54.79	-0.57
5550	10/13/09 6:40	54.78	-0.58
5551	10/13/09 6:41	54.77	-0.59
5552	10/13/09 6:42	54.80	-0.56
5553	10/13/09 6:43	54.82	-0.54
5554	10/13/09 6:44	54.82	-0.54
5555	10/13/09 6:45	54.82	-0.54
5556	10/13/09 6:46	54.82	-0.54
5557	10/13/09 6:47	54.81	-0.55
5558	10/13/09 6:48	54.81	-0.55
5559	10/13/09 6:49	54.81	-0.55
5560	10/13/09 6:50	54.81	-0.55
5561	10/13/09 6:51	54.80	-0.56
5562	10/13/09 6:52	54.80	-0.56
5563	10/13/09 6:53	54.80	-0.56
5564	10/13/09 6:54	54.80	-0.56
5565	10/13/09 6:55	54.80	-0.56

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
5566	10/13/09 6:56	54.80	-0.56
5567	10/13/09 6:57	54.79	-0.57
5568	10/13/09 6:58	54.78	-0.58
5569	10/13/09 6:59	54.78	-0.58
5570	10/13/09 7:00	54.77	-0.59
5571	10/13/09 7:01	54.77	-0.59
5572	10/13/09 7:02	54.77	-0.59
5573	10/13/09 7:03	54.77	-0.59
5574	10/13/09 7:04	54.76	-0.60
5575	10/13/09 7:05	54.76	-0.60
5576	10/13/09 7:06	54.76	-0.60
5577	10/13/09 7:07	54.76	-0.60
5578	10/13/09 7:08	54.76	-0.60
5579	10/13/09 7:09	54.75	-0.61
5580	10/13/09 7:10	54.75	-0.61
5581	10/13/09 7:11	54.75	-0.61
5582	10/13/09 7:12	54.75	-0.61
5583	10/13/09 7:13	54.75	-0.61
5584	10/13/09 7:14	54.75	-0.61
5585	10/13/09 7:15	54.75	-0.61
5586	10/13/09 7:16	54.74	-0.62
5587	10/13/09 7:17	54.74	-0.62
5588	10/13/09 7:18	54.74	-0.62
5589	10/13/09 7:19	54.74	-0.62
5590	10/13/09 7:20	54.73	-0.63
5591	10/13/09 7:21	54.73	-0.63
5592	10/13/09 7:22	54.73	-0.63
5593	10/13/09 7:23	54.73	-0.63
5594	10/13/09 7:24	54.72	-0.64
5595	10/13/09 7:25	54.72	-0.64
5596	10/13/09 7:26	54.72	-0.64
5597	10/13/09 7:27	54.71	-0.65
5598	10/13/09 7:28	54.66	-0.70
5601	10/13/09 7:31	54.66	-0.70
5603	10/13/09 7:33	54.63	-0.73
5613	10/13/09 7:43	54.43	-0.93
5623	10/13/09 7:53	54.40	-0.96
5633	10/13/09 8:03	54.41	-0.95
5643	10/13/09 8:13	54.41	-0.95
5653	10/13/09 8:23	54.38	-0.98
5663	10/13/09 8:33	54.35	-1.01
5673	10/13/09 8:43	54.33	-1.03
5683	10/13/09 8:53	54.30	-1.06
5693	10/13/09 9:03	54.27	-1.09
5703	10/13/09 9:13	54.25	-1.11
5713	10/13/09 9:23	54.22	-1.14
5723	10/13/09 9:33	54.20	-1.16
5733	10/13/09 9:43	54.18	-1.18
5743	10/13/09 9:53	54.15	-1.21
5753	10/13/09 10:03	54.14	-1.22
5763	10/13/09 10:13	54.12	-1.24
5773	10/13/09 10:23	54.09	-1.27
5783	10/13/09 10:33	54.07	-1.29

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	Drawdown (feet)
5793	10/13/09 10:43	54.05	-1.31
5803	10/13/09 10:53	54.04	-1.32
5813	10/13/09 11:03	54.01	-1.35
5823	10/13/09 11:13	53.99	-1.37
5833	10/13/09 11:23	53.98	-1.38
5843	10/13/09 11:33	53.96	-1.40
5853	10/13/09 11:43	53.94	-1.42
5863	10/13/09 11:53	53.92	-1.44
5873	10/13/09 12:03	53.89	-1.47
5883	10/13/09 12:13	53.88	-1.48
5893	10/13/09 12:23	53.85	-1.51
5903	10/13/09 12:33	53.83	-1.53
5913	10/13/09 12:43	53.81	-1.55
5923	10/13/09 12:53	53.79	-1.57
5933	10/13/09 13:03	53.77	-1.59
5943	10/13/09 13:13	53.75	-1.61
5953	10/13/09 13:23	53.73	-1.63
5963	10/13/09 13:33	53.70	-1.66
5973	10/13/09 13:43	53.68	-1.68
5983	10/13/09 13:53	53.67	-1.69
5993	10/13/09 14:03	53.64	-1.72
6003	10/13/09 14:13	53.62	-1.74
6013	10/13/09 14:23	53.60	-1.76
6023	10/13/09 14:33	53.58	-1.78
6033	10/13/09 14:43	53.56	-1.80
6043	10/13/09 14:53	53.55	-1.81
6053	10/13/09 15:03	53.52	-1.84
6063	10/13/09 15:13	53.50	-1.86
6073	10/13/09 15:23	53.49	-1.87
6083	10/13/09 15:33	53.47	-1.89
6093	10/13/09 15:43	53.47	-1.89
6103	10/13/09 15:53	53.45	-1.91
6113	10/13/09 16:03	53.44	-1.92
6123	10/13/09 16:13	53.42	-1.94
6133	10/13/09 16:23	53.41	-1.95
6143	10/13/09 16:33	53.39	-1.97
6153	10/13/09 16:43	53.38	-1.98
6163	10/13/09 16:53	53.36	-2.00
6173	10/13/09 17:03	53.35	-2.01
6183	10/13/09 17:13	53.33	-2.03
6193	10/13/09 17:23	53.32	-2.04
6203	10/13/09 17:33	53.31	-2.05
6213	10/13/09 17:43	53.29	-2.07
6223	10/13/09 17:53	53.28	-2.08
6233	10/13/09 18:03	53.26	-2.10
6243	10/13/09 18:13	53.25	-2.11
6261	10/13/09 18:31	53.23	-2.13
6271	10/13/09 18:41	53.22	-2.14
6281	10/13/09 18:51	53.20	-2.16
6291	10/13/09 19:01	53.19	-2.17
6301	10/13/09 19:11	53.17	-2.19
6311	10/13/09 19:21	53.15	-2.21
6321	10/13/09 19:31	53.15	-2.21

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well: Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
6331	10/13/09 19:41	53.14	-2.22
6341	10/13/09 19:51	53.12	-2.24
6351	10/13/09 20:01	53.11	-2.25
6361	10/13/09 20:11	53.10	-2.26
6371	10/13/09 20:21	53.09	-2.27
6381	10/13/09 20:31	53.08	-2.28
6391	10/13/09 20:41	53.06	-2.30
6401	10/13/09 20:51	53.05	-2.31
6411	10/13/09 21:01	53.04	-2.32
6421	10/13/09 21:11	53.02	-2.34
6431	10/13/09 21:21	53.01	-2.35
6441	10/13/09 21:31	53.00	-2.36
6451	10/13/09 21:41	52.99	-2.37
6461	10/13/09 21:51	52.97	-2.39
6471	10/13/09 22:01	52.96	-2.40
6481	10/13/09 22:11	52.95	-2.41
6491	10/13/09 22:21	52.93	-2.43
6501	10/13/09 22:31	52.92	-2.44
6511	10/13/09 22:41	52.91	-2.45
6521	10/13/09 22:51	52.90	-2.46
6531	10/13/09 23:01	52.88	-2.48
6541	10/13/09 23:11	52.87	-2.49
6551	10/13/09 23:21	52.85	-2.51
6561	10/13/09 23:31	52.84	-2.52
6571	10/13/09 23:41	52.83	-2.53
6581	10/13/09 23:51	52.82	-2.54
6591	10/14/09 0:01	52.80	-2.56
6601	10/14/09 0:11	52.80	-2.56
6611	10/14/09 0:21	52.79	-2.57
6621	10/14/09 0:31	52.77	-2.59
6631	10/14/09 0:41	52.75	-2.61
6641	10/14/09 0:51	52.74	-2.62
6651	10/14/09 1:01	52.73	-2.63
6661	10/14/09 1:11	52.71	-2.65
6671	10/14/09 1:31	52.70	-2.66
6681	10/14/09 1:41	52.68	-2.68
6691	10/14/09 1:51	52.66	-2.70
6701	10/14/09 2:01	52.65	-2.71
6711	10/14/09 2:11	52.63	-2.73
6721	10/14/09 2:21	52.63	-2.73
6731	10/14/09 2:31	52.62	-2.74
6741	10/14/09 2:41	52.60	-2.76
6751	10/14/09 2:51	52.59	-2.77
6761	10/14/09 3:01	52.58	-2.78
6771	10/14/09 3:11	52.57	-2.79
6781	10/14/09 3:21	52.56	-2.80
6791	10/14/09 3:31	52.55	-2.81
6801	10/14/09 3:41	52.53	-2.83
6811	10/14/09 3:51	52.52	-2.84
6821	10/14/09 4:01	52.51	-2.85
6831	10/14/09 4:11	52.50	-2.86
6841	10/14/09 4:21	52.48	-2.88
6851	10/14/09 4:31	52.47	-2.89

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
6861	10/14/09 4:41	52.46	-2.90
6871	10/14/09 4:51	52.44	-2.92
6881	10/14/09 5:01	52.43	-2.93
6891	10/14/09 5:11	52.43	-2.93
6901	10/14/09 5:21	52.41	-2.95
6911	10/14/09 5:31	52.40	-2.96
6921	10/14/09 5:41	52.39	-2.97
6931	10/14/09 5:51	52.38	-2.98
6941	10/14/09 6:01	52.37	-2.99
6951	10/14/09 6:11	52.36	-3.00
6961	10/14/09 6:21	52.35	-3.01
6971	10/14/09 6:31	52.34	-3.02
6981	10/14/09 6:41	52.33	-3.03
6991	10/14/09 6:51	52.32	-3.04
7001	10/14/09 7:01	52.31	-3.05
7011	10/14/09 7:11	52.30	-3.06
7021	10/14/09 7:21	52.29	-3.07
7031	10/14/09 7:31	52.28	-3.08
7041	10/14/09 7:41	52.26	-3.10
7051	10/14/09 7:51	52.26	-3.10
7061	10/14/09 8:01	52.24	-3.12
7071	10/14/09 8:11	52.24	-3.12
7081	10/14/09 8:21	52.23	-3.13
7091	10/14/09 8:31	52.22	-3.14
7101	10/14/09 8:41	52.21	-3.15
7111	10/14/09 8:51	52.20	-3.16
7121	10/14/09 9:01	52.19	-3.17
7131	10/14/09 9:11	52.18	-3.18
7141	10/14/09 9:21	52.17	-3.19
7151	10/14/09 9:31	52.16	-3.20
7161	10/14/09 9:41	52.15	-3.21
7171	10/14/09 9:51	52.14	-3.22
7181	10/14/09 10:01	52.13	-3.23
7191	10/14/09 10:11	52.12	-3.24
7203	10/14/09 10:23	52.11	-3.25
7213	10/14/09 10:33	52.10	-3.26
7223	10/14/09 10:43	52.10	-3.26
7233	10/14/09 10:53	52.08	-3.28
7243	10/14/09 11:03	52.07	-3.29
7253	10/14/09 11:13	52.06	-3.30
7263	10/14/09 11:23	52.05	-3.31
7273	10/14/09 11:33	52.04	-3.32
7283	10/14/09 11:43	52.03	-3.33
7293	10/14/09 11:53	52.03	-3.33
7303	10/14/09 12:03	52.01	-3.35
7313	10/14/09 12:13	51.99	-3.37
7323	10/14/09 12:23	51.99	-3.37
7333	10/14/09 12:33	51.97	-3.39
7343	10/14/09 12:43	51.96	-3.40
7353	10/14/09 12:53	51.95	-3.41
7363	10/14/09 13:03	51.94	-3.42
7373	10/14/09 13:13	51.93	-3.43
7383	10/14/09 13:23	51.92	-3.44

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	55.36	feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
7393	10/14/09 13:33	51.90	-3.46
7403	10/14/09 13:43	51.90	-3.46
7413	10/14/09 13:53	51.88	-3.48
7423	10/14/09 14:03	51.88	-3.48
7433	10/14/09 14:13	51.86	-3.50
7443	10/14/09 14:23	51.85	-3.51
7453	10/14/09 14:33	51.85	-3.51
7463	10/14/09 14:43	51.83	-3.53
7473	10/14/09 14:53	51.82	-3.54
7483	10/14/09 15:03	51.81	-3.55
7493	10/14/09 15:13	51.81	-3.55
7503	10/14/09 15:23	51.79	-3.57
7513	10/14/09 15:33	51.78	-3.58
7523	10/14/09 15:43	51.77	-3.59
7533	10/14/09 15:53	51.76	-3.60
7543	10/14/09 16:03	51.75	-3.61
7553	10/14/09 16:13	51.74	-3.62
7563	10/14/09 16:23	51.73	-3.63
7573	10/14/09 16:33	51.72	-3.64
7583	10/14/09 16:43	51.71	-3.65
7593	10/14/09 16:53	51.70	-3.66
7603	10/14/09 17:03	51.69	-3.67
7613	10/14/09 17:13	51.68	-3.68
7623	10/14/09 17:23	51.67	-3.69
7633	10/14/09 17:33	51.67	-3.69
7643	10/14/09 17:43	51.65	-3.71
7653	10/14/09 17:53	51.65	-3.71
7663	10/14/09 18:03	51.64	-3.72
7673	10/14/09 18:13	51.63	-3.73
7683	10/14/09 18:23	51.62	-3.74
7693	10/14/09 18:33	51.62	-3.74
7703	10/14/09 18:43	51.60	-3.76
7713	10/14/09 18:53	51.60	-3.76
7723	10/14/09 19:03	51.59	-3.77
7733	10/14/09 19:13	51.59	-3.77
7743	10/14/09 19:23	51.57	-3.79
7753	10/14/09 19:33	51.56	-3.80
7763	10/14/09 19:43	51.55	-3.81
7773	10/14/09 19:53	51.53	-3.83
7783	10/14/09 20:03	51.52	-3.84
7793	10/14/09 20:13	51.51	-3.85
7803	10/14/09 20:23	51.51	-3.85
7813	10/14/09 20:33	51.50	-3.86
7823	10/14/09 20:43	51.49	-3.87
7833	10/14/09 20:53	51.48	-3.88
7843	10/14/09 21:03	51.48	-3.88
7853	10/14/09 21:13	51.46	-3.90
7863	10/14/09 21:23	51.46	-3.90
7873	10/14/09 21:33	51.45	-3.91
7883	10/14/09 21:43	51.45	-3.91
7893	10/14/09 21:53	51.43	-3.93
7903	10/14/09 22:03	51.43	-3.93
7913	10/14/09 22:13	51.42	-3.94

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 740 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
7923	10/14/09 22:23	51.41	-3.95
7933	10/14/09 22:33	51.40	-3.96
7943	10/14/09 22:43	51.39	-3.97
7953	10/14/09 22:53	51.39	-3.97
7963	10/14/09 23:03	51.38	-3.98
7973	10/14/09 23:13	51.38	-3.98
7983	10/14/09 23:23	51.36	-4.00
7993	10/14/09 23:33	51.36	-4.00
8003	10/14/09 23:43	51.35	-4.01
8013	10/14/09 23:53	51.34	-4.02
8023	10/15/09 0:03	51.34	-4.02
8033	10/15/09 0:13	51.33	-4.03
8043	10/15/09 0:23	51.31	-4.05
8053	10/15/09 0:33	51.30	-4.06
8063	10/15/09 0:43	51.29	-4.07
8073	10/15/09 0:53	51.28	-4.08
8083	10/15/09 1:03	51.28	-4.08
8093	10/15/09 1:13	51.26	-4.10
8103	10/15/09 1:23	51.26	-4.10
8113	10/15/09 1:33	51.25	-4.11
8123	10/15/09 1:43	51.23	-4.13
8133	10/15/09 1:53	51.23	-4.13
8143	10/15/09 2:03	51.22	-4.14
8153	10/15/09 2:13	51.21	-4.15
8163	10/15/09 2:23	51.20	-4.16
8173	10/15/09 2:33	51.19	-4.17
8183	10/15/09 2:43	51.18	-4.18
8193	10/15/09 2:53	51.17	-4.19
8203	10/15/09 3:03	51.16	-4.20
8213	10/15/09 3:13	51.15	-4.21
8223	10/15/09 3:23	51.15	-4.21
8233	10/15/09 3:33	51.13	-4.23
8243	10/15/09 3:43	51.12	-4.24
8253	10/15/09 3:53	51.11	-4.25
8263	10/15/09 4:03	51.10	-4.26
8273	10/15/09 4:13	51.10	-4.26
8283	10/15/09 4:23	51.09	-4.27
8293	10/15/09 4:33	51.07	-4.29
8303	10/15/09 4:43	51.07	-4.29
8313	10/15/09 4:53	51.06	-4.30
8323	10/15/09 5:03	51.05	-4.31
8333	10/15/09 5:13	51.04	-4.32
8343	10/15/09 5:23	51.03	-4.33
8353	10/15/09 5:33	51.02	-4.34
8363	10/15/09 5:43	51.02	-4.34
8373	10/15/09 5:53	51.01	-4.35
8383	10/15/09 6:03	51.00	-4.36
8393	10/15/09 6:13	51.00	-4.36
8403	10/15/09 6:23	50.99	-4.37
8413	10/15/09 6:33	50.98	-4.38
8423	10/15/09 6:43	50.98	-4.38
8433	10/15/09 6:53	50.97	-4.39
8443	10/15/09 7:03	50.96	-4.40

W-WFC :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 740 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	55.36 feet, below ground surface

Elapsed Time (minutes)	Time	W-WFC Depth to Groundwater (feet, btc)	W-WFC Drawdown (feet)
8453	10/15/09 7:13	50.96	-4.40
8463	10/15/09 7:23	50.94	-4.42
8473	10/15/09 7:33	50.93	-4.43
8483	10/15/09 7:43	50.92	-4.44
8493	10/15/09 7:53	50.92	-4.44
8503	10/15/09 8:03	50.91	-4.45
8513	10/15/09 8:13	50.90	-4.46
8523	10/15/09 8:23	50.89	-4.47
8533	10/15/09 8:33	50.90	-4.46
8543	10/15/09 8:43	50.88	-4.48
8553	10/15/09 8:53	50.88	-4.48
8563	10/15/09 9:03	50.87	-4.49
8573	10/15/09 9:13	50.86	-4.50
8583	10/15/09 9:23	50.85	-4.51
8593	10/15/09 9:33	50.85	-4.51
8603	10/15/09 9:43	50.85	-4.51
8613	10/15/09 9:53	50.83	-4.53
8623	10/15/09 10:03	50.83	-4.53
8633	10/15/09 10:13	50.82	-4.54
8643	10/15/09 10:23	50.81	-4.55
8653	10/15/09 10:33	50.81	-4.55
8663	10/15/09 10:43	50.79	-4.57
8673	10/15/09 10:53	50.79	-4.57
8683	10/15/09 11:03	50.78	-4.58
8693	10/15/09 11:13	50.77	-4.59
8703	10/15/09 11:23	50.76	-4.60
8713	10/15/09 11:33	50.76	-4.60
8723	10/15/09 11:43	50.74	-4.62
8733	10/15/09 11:53	50.75	-4.61
8743	10/15/09 12:03	50.73	-4.63
8753	10/15/09 12:13	50.72	-4.64
8763	10/15/09 12:23	50.72	-4.64
8773	10/15/09 12:33	50.72	-4.64
8783	10/15/09 12:43	50.69	-4.67
8793	10/15/09 12:53	50.69	-4.67
8803	10/15/09 13:03	50.68	-4.68
8813	10/15/09 13:13	50.67	-4.69
8823	10/15/09 13:23	50.66	-4.70
8833	10/15/09 13:33	50.66	-4.70

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
0	10/9/09 10:10	62.21	0.00
1	10/9/09 10:11	62.22	0.01
2	10/9/09 10:12	62.21	0.00
3	10/9/09 10:13	62.21	0.00
4	10/9/09 10:14	62.21	0.00
5	10/9/09 10:15	62.21	0.00
6	10/9/09 10:16	62.21	0.00
7	10/9/09 10:17	62.20	-0.01
8	10/9/09 10:18	62.19	-0.02
9	10/9/09 10:19	62.18	-0.03
10	10/9/09 10:20	62.17	-0.04
11	10/9/09 10:21	62.17	-0.04
12	10/9/09 10:22	62.17	-0.04
13	10/9/09 10:23	62.17	-0.04
14	10/9/09 10:24	62.16	-0.05
15	10/9/09 10:25	62.16	-0.05
16	10/9/09 10:26	62.16	-0.05
17	10/9/09 10:27	62.16	-0.05
18	10/9/09 10:28	62.16	-0.05
19	10/9/09 10:29	62.16	-0.05
20	10/9/09 10:30	62.15	-0.06
21	10/9/09 10:31	62.15	-0.06
22	10/9/09 10:32	62.14	-0.07
23	10/9/09 10:33	62.13	-0.08
24	10/9/09 10:34	62.13	-0.08
25	10/9/09 10:35	62.14	-0.07
26	10/9/09 10:36	62.13	-0.08
27	10/9/09 10:37	62.12	-0.09
28	10/9/09 10:38	62.13	-0.08
29	10/9/09 10:39	62.13	-0.08
30	10/9/09 10:40	62.13	-0.08
31	10/9/09 10:41	62.13	-0.08
32	10/9/09 10:42	62.12	-0.09
33	10/9/09 10:43	62.10	-0.11
34	10/9/09 10:44	62.09	-0.12
35	10/9/09 10:45	62.09	-0.12
36	10/9/09 10:46	62.09	-0.12
37	10/9/09 10:47	62.09	-0.12
38	10/9/09 10:48	62.09	-0.12
39	10/9/09 10:49	62.08	-0.13
40	10/9/09 10:50	62.08	-0.13
41	10/9/09 10:51	62.08	-0.13
42	10/9/09 10:52	62.07	-0.14
43	10/9/09 10:53	62.07	-0.14
44	10/9/09 10:54	62.07	-0.14
45	10/9/09 10:55	62.07	-0.14
46	10/9/09 10:56	62.06	-0.15
47	10/9/09 10:57	62.06	-0.15
48	10/9/09 10:58	62.07	-0.14
49	10/9/09 10:59	62.07	-0.14
50	10/9/09 11:00	62.07	-0.14
51	10/9/09 11:01	62.06	-0.15
52	10/9/09 11:02	62.06	-0.15

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
53	10/9/09 11:03	62.06	-0.15
54	10/9/09 11:04	62.06	-0.15
55	10/9/09 11:05	62.05	-0.16
56	10/9/09 11:06	62.04	-0.17
57	10/9/09 11:07	62.03	-0.18
58	10/9/09 11:08	62.02	-0.19
59	10/9/09 11:09	62.02	-0.19
60	10/9/09 11:10	62.03	-0.18
61	10/9/09 11:11	62.02	-0.19
62	10/9/09 11:12	62.02	-0.19
63	10/9/09 11:13	62.02	-0.19
64	10/9/09 11:14	62.01	-0.20
65	10/9/09 11:15	62.01	-0.20
66	10/9/09 11:16	62.00	-0.21
67	10/9/09 11:17	62.00	-0.21
68	10/9/09 11:18	62.00	-0.21
69	10/9/09 11:19	62.01	-0.20
70	10/9/09 11:20	62.01	-0.20
71	10/9/09 11:21	62.00	-0.21
72	10/9/09 11:22	62.00	-0.21
73	10/9/09 11:23	61.98	-0.23
74	10/9/09 11:24	61.98	-0.23
75	10/9/09 11:25	61.98	-0.23
76	10/9/09 11:26	61.98	-0.23
77	10/9/09 11:27	61.97	-0.24
78	10/9/09 11:28	61.97	-0.24
79	10/9/09 11:29	61.97	-0.24
80	10/9/09 11:30	61.96	-0.25
81	10/9/09 11:31	61.97	-0.24
82	10/9/09 11:32	61.97	-0.24
83	10/9/09 11:33	61.97	-0.24
84	10/9/09 11:34	61.95	-0.26
85	10/9/09 11:35	61.95	-0.26
86	10/9/09 11:36	61.94	-0.27
87	10/9/09 11:37	61.94	-0.27
88	10/9/09 11:38	61.94	-0.27
89	10/9/09 11:39	61.94	-0.27
90	10/9/09 11:40	61.93	-0.28
91	10/9/09 11:41	61.93	-0.28
92	10/9/09 11:42	61.93	-0.28
93	10/9/09 11:43	61.93	-0.28
94	10/9/09 11:44	61.93	-0.28
95	10/9/09 11:45	61.93	-0.28
96	10/9/09 11:46	61.93	-0.28
97	10/9/09 11:47	61.93	-0.28
98	10/9/09 11:48	61.92	-0.29
99	10/9/09 11:49	61.92	-0.29
100	10/9/09 11:50	61.91	-0.30
101	10/9/09 11:51	61.91	-0.30
102	10/9/09 11:52	61.91	-0.30
103	10/9/09 11:53	61.91	-0.30
104	10/9/09 11:54	61.90	-0.31
105	10/9/09 11:55	61.91	-0.30

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
106	10/9/09 11:56	61.93	-0.28
107	10/9/09 11:57	61.93	-0.28
109	10/9/09 11:59	61.90	-0.31
110	10/9/09 12:00	61.89	-0.32
111	10/9/09 12:01	61.89	-0.32
112	10/9/09 12:02	61.89	-0.32
113	10/9/09 12:03	61.88	-0.33
114	10/9/09 12:04	61.88	-0.33
115	10/9/09 12:05	61.87	-0.34
116	10/9/09 12:06	61.88	-0.33
117	10/9/09 12:07	61.89	-0.32
118	10/9/09 12:08	61.88	-0.33
119	10/9/09 12:09	61.87	-0.34
120	10/9/09 12:10	61.87	-0.34
121	10/9/09 12:11	61.87	-0.34
122	10/9/09 12:12	61.87	-0.34
123	10/9/09 12:13	61.87	-0.34
124	10/9/09 12:14	61.86	-0.35
125	10/9/09 12:15	61.86	-0.35
126	10/9/09 12:16	61.86	-0.35
127	10/9/09 12:17	61.86	-0.35
128	10/9/09 12:18	61.86	-0.35
129	10/9/09 12:19	61.86	-0.35
130	10/9/09 12:20	61.86	-0.35
131	10/9/09 12:21	61.86	-0.35
132	10/9/09 12:22	61.86	-0.35
133	10/9/09 12:23	61.86	-0.35
134	10/9/09 12:24	61.85	-0.36
135	10/9/09 12:25	61.86	-0.35
136	10/9/09 12:26	61.85	-0.36
137	10/9/09 12:27	61.85	-0.36
138	10/9/09 12:28	61.85	-0.36
139	10/9/09 12:29	61.85	-0.36
140	10/9/09 12:30	61.84	-0.37
141	10/9/09 12:31	61.83	-0.38
142	10/9/09 12:32	61.83	-0.38
143	10/9/09 12:33	61.83	-0.38
144	10/9/09 12:34	61.82	-0.39
145	10/9/09 12:35	61.82	-0.39
146	10/9/09 12:36	61.81	-0.40
147	10/9/09 12:37	61.81	-0.40
148	10/9/09 12:38	61.82	-0.39
149	10/9/09 12:39	61.83	-0.38
150	10/9/09 12:40	61.83	-0.38
151	10/9/09 12:41	61.83	-0.38
152	10/9/09 12:42	61.83	-0.38
153	10/9/09 12:43	61.81	-0.40
154	10/9/09 12:44	61.81	-0.40
155	10/9/09 12:45	61.80	-0.41
156	10/9/09 12:46	61.81	-0.40
157	10/9/09 12:47	61.80	-0.41
158	10/9/09 12:48	61.80	-0.41
159	10/9/09 12:49	61.80	-0.41

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
160	10/9/09 12:50	61.80	-0.41
161	10/9/09 12:51	61.80	-0.41
162	10/9/09 12:52	61.80	-0.41
163	10/9/09 12:53	61.81	-0.40
164	10/9/09 12:54	61.81	-0.40
165	10/9/09 12:55	61.79	-0.42
166	10/9/09 12:56	61.79	-0.42
167	10/9/09 12:57	61.79	-0.42
168	10/9/09 12:58	61.81	-0.40
169	10/9/09 12:59	61.82	-0.39
170	10/9/09 13:00	61.79	-0.42
171	10/9/09 13:01	61.78	-0.43
172	10/9/09 13:02	61.78	-0.43
173	10/9/09 13:03	61.78	-0.43
174	10/9/09 13:04	61.78	-0.43
175	10/9/09 13:05	61.78	-0.43
176	10/9/09 13:06	61.77	-0.44
177	10/9/09 13:07	61.77	-0.44
178	10/9/09 13:08	61.77	-0.44
179	10/9/09 13:09	61.77	-0.44
180	10/9/09 13:10	61.76	-0.45
181	10/9/09 13:11	61.76	-0.45
182	10/9/09 13:12	61.76	-0.45
183	10/9/09 13:13	61.76	-0.45
184	10/9/09 13:14	61.76	-0.45
185	10/9/09 13:15	61.76	-0.45
186	10/9/09 13:16	61.76	-0.45
187	10/9/09 13:17	61.77	-0.44
188	10/9/09 13:18	61.77	-0.44
189	10/9/09 13:19	61.77	-0.44
190	10/9/09 13:20	61.77	-0.44
191	10/9/09 13:21	61.77	-0.44
192	10/9/09 13:22	61.76	-0.45
193	10/9/09 13:23	61.75	-0.46
194	10/9/09 13:24	61.75	-0.46
195	10/9/09 13:25	61.75	-0.46
196	10/9/09 13:26	61.74	-0.47
197	10/9/09 13:27	61.74	-0.47
198	10/9/09 13:28	61.74	-0.47
199	10/9/09 13:29	61.75	-0.46
200	10/9/09 13:30	61.74	-0.47
201	10/9/09 13:31	61.74	-0.47
202	10/9/09 13:32	61.74	-0.47
203	10/9/09 13:33	61.74	-0.47
204	10/9/09 13:34	61.75	-0.46
205	10/9/09 13:35	61.75	-0.46
206	10/9/09 13:36	61.75	-0.46
207	10/9/09 13:37	61.75	-0.46
208	10/9/09 13:38	61.75	-0.46
209	10/9/09 13:39	61.75	-0.46
210	10/9/09 13:40	61.73	-0.48
211	10/9/09 13:41	61.73	-0.48
212	10/9/09 13:42	61.73	-0.48

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
213	10/9/09 13:43	61.72	-0.49
214	10/9/09 13:44	61.72	-0.49
215	10/9/09 13:45	61.71	-0.50
216	10/9/09 13:46	61.71	-0.50
217	10/9/09 13:47	61.71	-0.50
218	10/9/09 13:48	61.72	-0.49
219	10/9/09 13:49	61.72	-0.49
220	10/9/09 13:50	61.72	-0.49
221	10/9/09 13:51	61.72	-0.49
222	10/9/09 13:52	61.71	-0.50
223	10/9/09 13:53	61.71	-0.50
224	10/9/09 13:54	61.72	-0.49
225	10/9/09 13:55	61.72	-0.49
226	10/9/09 13:56	61.72	-0.49
227	10/9/09 13:57	61.72	-0.49
228	10/9/09 13:58	61.70	-0.51
229	10/9/09 13:59	61.70	-0.51
230	10/9/09 14:00	61.71	-0.50
231	10/9/09 14:01	61.72	-0.49
232	10/9/09 14:02	61.71	-0.50
233	10/9/09 14:03	61.70	-0.51
234	10/9/09 14:04	61.71	-0.50
235	10/9/09 14:05	61.72	-0.49
236	10/9/09 14:06	61.71	-0.50
237	10/9/09 14:07	61.71	-0.50
238	10/9/09 14:08	61.70	-0.51
239	10/9/09 14:09	61.70	-0.51
240	10/9/09 14:10	61.69	-0.52
241	10/9/09 14:11	61.68	-0.53
242	10/9/09 14:12	61.67	-0.54
243	10/9/09 14:13	61.68	-0.53
244	10/9/09 14:14	61.68	-0.53
245	10/9/09 14:15	61.68	-0.53
246	10/9/09 14:16	61.67	-0.54
247	10/9/09 14:17	61.67	-0.54
248	10/9/09 14:18	61.67	-0.54
249	10/9/09 14:19	61.67	-0.54
250	10/9/09 14:20	61.68	-0.53
251	10/9/09 14:21	61.69	-0.52
252	10/9/09 14:22	61.69	-0.52
253	10/9/09 14:23	61.69	-0.52
254	10/9/09 14:24	61.69	-0.52
255	10/9/09 14:25	61.68	-0.53
256	10/9/09 14:26	61.67	-0.54
257	10/9/09 14:27	61.67	-0.54
258	10/9/09 14:28	61.67	-0.54
259	10/9/09 14:29	61.68	-0.53
260	10/9/09 14:30	61.68	-0.53
261	10/9/09 14:31	61.67	-0.54
262	10/9/09 14:32	61.68	-0.53
263	10/9/09 14:33	61.68	-0.53
264	10/9/09 14:34	61.68	-0.53
265	10/9/09 14:35	61.67	-0.54

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6486.200.503	**Geologist: Brooks Ramsdell**	
Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
266	10/9/09 14:36	61.65	-0.56
267	10/9/09 14:37	61.64	-0.57
268	10/9/09 14:38	61.64	-0.57
269	10/9/09 14:39	61.64	-0.57
270	10/9/09 14:40	61.65	-0.56
271	10/9/09 14:41	61.66	-0.55
272	10/9/09 14:42	61.65	-0.56
273	10/9/09 14:43	61.64	-0.57
274	10/9/09 14:44	61.64	-0.57
275	10/9/09 14:45	61.65	-0.56
276	10/9/09 14:46	61.65	-0.56
279	10/9/09 14:49	61.65	-0.56
280	10/9/09 14:50	61.65	-0.56
281	10/9/09 14:51	61.64	-0.57
282	10/9/09 14:52	61.63	-0.58
283	10/9/09 14:53	61.63	-0.58
284	10/9/09 14:54	61.64	-0.57
285	10/9/09 14:55	61.65	-0.56
286	10/9/09 14:56	61.65	-0.56
287	10/9/09 14:57	61.65	-0.56
288	10/9/09 14:58	61.65	-0.56
289	10/9/09 14:59	61.64	-0.57
290	10/9/09 15:00	61.64	-0.57
291	10/9/09 15:01	61.64	-0.57
292	10/9/09 15:02	61.64	-0.57
293	10/9/09 15:03	61.64	-0.57
294	10/9/09 15:04	61.62	-0.59
295	10/9/09 15:05	61.61	-0.60
296	10/9/09 15:06	61.62	-0.59
297	10/9/09 15:07	61.63	-0.58
298	10/9/09 15:08	61.63	-0.58
299	10/9/09 15:09	61.63	-0.58
300	10/9/09 15:10	61.63	-0.58
301	10/9/09 15:11	61.62	-0.59
302	10/9/09 15:12	61.62	-0.59
303	10/9/09 15:13	61.62	-0.59
304	10/9/09 15:14	61.62	-0.59
305	10/9/09 15:15	61.62	-0.59
306	10/9/09 15:16	61.62	-0.59
307	10/9/09 15:17	61.62	-0.59
308	10/9/09 15:18	61.60	-0.61
309	10/9/09 15:19	61.60	-0.61
310	10/9/09 15:20	61.61	-0.60
311	10/9/09 15:21	61.61	-0.60
312	10/9/09 15:22	61.62	-0.59
313	10/9/09 15:23	61.61	-0.60
314	10/9/09 15:24	61.61	-0.60
315	10/9/09 15:25	61.61	-0.60
316	10/9/09 15:26	61.62	-0.59
317	10/9/09 15:27	61.62	-0.59
318	10/9/09 15:28	61.62	-0.59
319	10/9/09 15:29	61.62	-0.59
320	10/9/09 15:30	61.62	-0.59

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
321	10/9/09 15:31	61.62	-0.59
322	10/9/09 15:32	61.61	-0.60
323	10/9/09 15:33	61.59	-0.62
324	10/9/09 15:34	61.58	-0.63
325	10/9/09 15:35	61.59	-0.62
326	10/9/09 15:36	61.60	-0.61
327	10/9/09 15:37	61.60	-0.61
328	10/9/09 15:38	61.59	-0.62
329	10/9/09 15:39	61.58	-0.63
330	10/9/09 15:40	61.59	-0.62
331	10/9/09 15:41	61.59	-0.62
332	10/9/09 15:42	61.58	-0.63
333	10/9/09 15:43	61.58	-0.63
334	10/9/09 15:44	61.59	-0.62
335	10/9/09 15:45	61.60	-0.61
336	10/9/09 15:46	61.61	-0.60
337	10/9/09 15:47	61.59	-0.62
338	10/9/09 15:48	61.58	-0.63
339	10/9/09 15:49	61.58	-0.63
340	10/9/09 15:50	61.58	-0.63
341	10/9/09 15:51	61.58	-0.63
342	10/9/09 15:52	61.57	-0.64
343	10/9/09 15:53	61.58	-0.63
344	10/9/09 15:54	61.58	-0.63
345	10/9/09 15:55	61.57	-0.64
346	10/9/09 15:56	61.56	-0.65
347	10/9/09 15:57	61.56	-0.65
348	10/9/09 15:58	61.57	-0.64
349	10/9/09 15:59	61.58	-0.63
350	10/9/09 16:00	61.58	-0.63
351	10/9/09 16:01	61.58	-0.63
352	10/9/09 16:02	61.58	-0.63
353	10/9/09 16:03	61.59	-0.62
354	10/9/09 16:04	61.59	-0.62
355	10/9/09 16:05	61.58	-0.63
356	10/9/09 16:06	61.57	-0.64
357	10/9/09 16:07	61.57	-0.64
358	10/9/09 16:08	61.57	-0.64
359	10/9/09 16:09	61.57	-0.64
360	10/9/09 16:10	61.56	-0.65
361	10/9/09 16:11	61.57	-0.64
362	10/9/09 16:12	61.58	-0.63
363	10/9/09 16:13	61.57	-0.64
364	10/9/09 16:14	61.56	-0.65
365	10/9/09 16:15	61.56	-0.65
366	10/9/09 16:16	61.56	-0.65
367	10/9/09 16:17	61.56	-0.65
368	10/9/09 16:18	61.55	-0.66
369	10/9/09 16:19	61.55	-0.66
370	10/9/09 16:20	61.55	-0.66
371	10/9/09 16:21	61.54	-0.67
372	10/9/09 16:22	61.54	-0.67
373	10/9/09 16:23	61.54	-0.67

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
374	10/9/09 16:24	61.54	-0.67
375	10/9/09 16:25	61.55	-0.66
376	10/9/09 16:26	61.55	-0.66
377	10/9/09 16:27	61.55	-0.66
378	10/9/09 16:28	61.54	-0.67
379	10/9/09 16:29	61.54	-0.67
380	10/9/09 16:30	61.55	-0.66
381	10/9/09 16:31	61.55	-0.66
382	10/9/09 16:32	61.54	-0.67
383	10/9/09 16:33	61.54	-0.67
384	10/9/09 16:34	61.55	-0.66
385	10/9/09 16:35	61.55	-0.66
386	10/9/09 16:36	61.55	-0.66
387	10/9/09 16:37	61.54	-0.67
388	10/9/09 16:38	61.54	-0.67
389	10/9/09 16:39	61.55	-0.66
390	10/9/09 16:40	61.55	-0.66
391	10/9/09 16:41	61.56	-0.65
392	10/9/09 16:42	61.54	-0.67
393	10/9/09 16:43	61.53	-0.68
394	10/9/09 16:44	61.53	-0.68
395	10/9/09 16:45	61.53	-0.68
396	10/9/09 16:46	61.53	-0.68
397	10/9/09 16:47	61.54	-0.67
398	10/9/09 16:48	61.53	-0.68
399	10/9/09 16:49	61.52	-0.69
400	10/9/09 16:50	61.53	-0.68
401	10/9/09 16:51	61.54	-0.67
402	10/9/09 16:52	61.53	-0.68
403	10/9/09 16:53	61.52	-0.69
404	10/9/09 16:54	61.52	-0.69
405	10/9/09 16:55	61.52	-0.69
406	10/9/09 16:56	61.52	-0.69
407	10/9/09 16:57	61.53	-0.68
408	10/9/09 16:58	61.52	-0.69
409	10/9/09 16:59	61.53	-0.68
410	10/9/09 17:00	61.54	-0.67
411	10/9/09 17:01	61.55	-0.66
412	10/9/09 17:02	61.55	-0.66
413	10/9/09 17:03	61.54	-0.67
414	10/9/09 17:04	61.52	-0.69
415	10/9/09 17:05	61.51	-0.70
416	10/9/09 17:06	61.51	-0.70
417	10/9/09 17:07	61.51	-0.70
418	10/9/09 17:08	61.51	-0.70
419	10/9/09 17:09	61.51	-0.70
420	10/9/09 17:10	61.51	-0.70
421	10/9/09 17:11	61.52	-0.69
422	10/9/09 17:12	61.52	-0.69
423	10/9/09 17:13	61.52	-0.69
424	10/9/09 17:14	61.51	-0.70
425	10/9/09 17:15	61.51	-0.70
426	10/9/09 17:16	61.50	-0.71

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
427	10/9/09 17:17	61.50	-0.71
428	10/9/09 17:18	61.50	-0.71
429	10/9/09 17:19	61.50	-0.71
430	10/9/09 17:20	61.49	-0.72
431	10/9/09 17:21	61.50	-0.71
432	10/9/09 17:22	61.51	-0.70
433	10/9/09 17:23	61.51	-0.70
434	10/9/09 17:24	61.51	-0.70
435	10/9/09 17:25	61.50	-0.71
436	10/9/09 17:26	61.51	-0.70
437	10/9/09 17:27	61.52	-0.69
438	10/9/09 17:28	61.52	-0.69
439	10/9/09 17:29	61.50	-0.71
440	10/9/09 17:30	61.49	-0.72
441	10/9/09 17:31	61.49	-0.72
442	10/9/09 17:32	61.49	-0.72
443	10/9/09 17:33	61.49	-0.72
444	10/9/09 17:34	61.48	-0.73
445	10/9/09 17:35	61.48	-0.73
446	10/9/09 17:36	61.48	-0.73
447	10/9/09 17:37	61.49	-0.72
448	10/9/09 17:38	61.49	-0.72
449	10/9/09 17:39	61.50	-0.71
450	10/9/09 17:40	61.49	-0.72
451	10/9/09 17:41	61.48	-0.73
452	10/9/09 17:42	61.48	-0.73
453	10/9/09 17:43	61.48	-0.73
454	10/9/09 17:44	61.49	-0.72
455	10/9/09 17:45	61.48	-0.73
456	10/9/09 17:46	61.49	-0.72
457	10/9/09 17:47	61.49	-0.72
458	10/9/09 17:48	61.48	-0.73
459	10/9/09 17:49	61.49	-0.72
460	10/9/09 17:50	61.50	-0.71
461	10/9/09 17:51	61.50	-0.71
462	10/9/09 17:52	61.50	-0.71
463	10/9/09 17:53	61.49	-0.72
464	10/9/09 17:54	61.48	-0.73
465	10/9/09 17:55	61.47	-0.74
466	10/9/09 17:56	61.47	-0.74
467	10/9/09 17:57	61.47	-0.74
468	10/9/09 17:58	61.48	-0.73
469	10/9/09 17:59	61.47	-0.74
470	10/9/09 18:00	61.47	-0.74
471	10/9/09 18:01	61.47	-0.74
472	10/9/09 18:02	61.47	-0.74
473	10/9/09 18:03	61.48	-0.73
474	10/9/09 18:04	61.47	-0.74
475	10/9/09 18:05	61.48	-0.73
476	10/9/09 18:06	61.47	-0.74
477	10/9/09 18:07	61.47	-0.74
480	10/9/09 18:10	61.47	-0.74
481	10/9/09 18:11	61.46	-0.75

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
482	10/9/09 18:12	61.46	-0.75
483	10/9/09 18:13	61.46	-0.75
484	10/9/09 18:14	61.46	-0.75
485	10/9/09 18:15	61.47	-0.74
486	10/9/09 18:16	61.47	-0.74
487	10/9/09 18:17	61.47	-0.74
488	10/9/09 18:18	61.47	-0.74
489	10/9/09 18:19	61.47	-0.74
490	10/9/09 18:20	61.47	-0.74
491	10/9/09 18:21	61.46	-0.75
492	10/9/09 18:22	61.46	-0.75
493	10/9/09 18:23	61.45	-0.76
494	10/9/09 18:24	61.45	-0.76
495	10/9/09 18:25	61.44	-0.77
496	10/9/09 18:26	61.45	-0.76
497	10/9/09 18:27	61.45	-0.76
498	10/9/09 18:28	61.45	-0.76
499	10/9/09 18:29	61.45	-0.76
500	10/9/09 18:30	61.44	-0.77
501	10/9/09 18:31	61.44	-0.77
502	10/9/09 18:32	61.46	-0.75
503	10/9/09 18:33	61.45	-0.76
504	10/9/09 18:34	61.45	-0.76
505	10/9/09 18:35	61.44	-0.77
506	10/9/09 18:36	61.44	-0.77
507	10/9/09 18:37	61.44	-0.77
508	10/9/09 18:38	61.44	-0.77
509	10/9/09 18:39	61.45	-0.76
510	10/9/09 18:40	61.45	-0.76
511	10/9/09 18:41	61.44	-0.77
512	10/9/09 18:42	61.44	-0.77
513	10/9/09 18:43	61.45	-0.76
514	10/9/09 18:44	61.45	-0.76
515	10/9/09 18:45	61.45	-0.76
516	10/9/09 18:46	61.45	-0.76
517	10/9/09 18:47	61.44	-0.77
518	10/9/09 18:48	61.43	-0.78
519	10/9/09 18:49	61.44	-0.77
520	10/9/09 18:50	61.44	-0.77
521	10/9/09 18:51	61.44	-0.77
522	10/9/09 18:52	61.44	-0.77
523	10/9/09 18:53	61.44	-0.77
524	10/9/09 18:54	61.44	-0.77
525	10/9/09 18:55	61.45	-0.76
526	10/9/09 18:56	61.44	-0.77
527	10/9/09 18:57	61.44	-0.77
528	10/9/09 18:58	61.44	-0.77
529	10/9/09 18:59	61.43	-0.78
530	10/9/09 19:00	61.44	-0.77
531	10/9/09 19:01	61.44	-0.77
532	10/9/09 19:02	61.43	-0.78
533	10/9/09 19:03	61.43	-0.78
534	10/9/09 19:04	61.42	-0.79

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
535	10/9/09 19:05	61.43	-0.78
536	10/9/09 19:06	61.43	-0.78
537	10/9/09 19:07	61.43	-0.78
538	10/9/09 19:08	61.42	-0.79
539	10/9/09 19:09	61.42	-0.79
540	10/9/09 19:10	61.42	-0.79
541	10/9/09 19:11	61.43	-0.78
542	10/9/09 19:12	61.42	-0.79
543	10/9/09 19:13	61.43	-0.78
544	10/9/09 19:14	61.42	-0.79
545	10/9/09 19:15	61.43	-0.78
546	10/9/09 19:16	61.43	-0.78
547	10/9/09 19:17	61.43	-0.78
548	10/9/09 19:18	61.43	-0.78
549	10/9/09 19:19	61.42	-0.79
550	10/9/09 19:20	61.42	-0.79
551	10/9/09 19:21	61.41	-0.80
552	10/9/09 19:22	61.41	-0.80
553	10/9/09 19:23	61.41	-0.80
554	10/9/09 19:24	61.41	-0.80
555	10/9/09 19:25	61.41	-0.80
556	10/9/09 19:26	61.41	-0.80
557	10/9/09 19:27	61.41	-0.80
558	10/9/09 19:28	61.42	-0.79
559	10/9/09 19:29	61.41	-0.80
560	10/9/09 19:30	61.41	-0.80
561	10/9/09 19:31	61.41	-0.80
562	10/9/09 19:32	61.41	-0.80
563	10/9/09 19:33	61.41	-0.80
564	10/9/09 19:34	61.40	-0.81
565	10/9/09 19:35	61.40	-0.81
566	10/9/09 19:36	61.40	-0.81
567	10/9/09 19:37	61.40	-0.81
568	10/9/09 19:38	61.40	-0.81
569	10/9/09 19:39	61.40	-0.81
570	10/9/09 19:40	61.41	-0.80
571	10/9/09 19:41	61.41	-0.80
572	10/9/09 19:42	61.41	-0.80
573	10/9/09 19:43	61.41	-0.80
574	10/9/09 19:44	61.40	-0.81
575	10/9/09 19:45	61.40	-0.81
576	10/9/09 19:46	61.39	-0.82
577	10/9/09 19:47	61.40	-0.81
578	10/9/09 19:48	61.40	-0.81
579	10/9/09 19:49	61.40	-0.81
580	10/9/09 19:50	61.41	-0.80
581	10/9/09 19:51	61.40	-0.81
582	10/9/09 19:52	61.40	-0.81
583	10/9/09 19:53	61.39	-0.82
584	10/9/09 19:54	61.38	-0.83
585	10/9/09 19:55	61.39	-0.82
586	10/9/09 19:56	61.38	-0.83
587	10/9/09 19:57	61.38	-0.83

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
588	10/9/09 19:58	61.38	-0.83
589	10/9/09 19:59	61.37	-0.84
590	10/9/09 20:00	61.38	-0.83
591	10/9/09 20:01	61.38	-0.83
592	10/9/09 20:02	61.39	-0.82
593	10/9/09 20:03	61.40	-0.81
594	10/9/09 20:04	61.39	-0.82
595	10/9/09 20:05	61.38	-0.83
596	10/9/09 20:06	61.37	-0.84
597	10/9/09 20:07	61.37	-0.84
598	10/9/09 20:08	61.38	-0.83
599	10/9/09 20:09	61.38	-0.83
600	10/9/09 20:10	61.37	-0.84
601	10/9/09 20:11	61.38	-0.83
602	10/9/09 20:12	61.39	-0.82
603	10/9/09 20:13	61.38	-0.83
604	10/9/09 20:14	61.37	-0.84
605	10/9/09 20:15	61.37	-0.84
606	10/9/09 20:16	61.37	-0.84
607	10/9/09 20:17	61.37	-0.84
608	10/9/09 20:18	61.37	-0.84
609	10/9/09 20:19	61.36	-0.85
610	10/9/09 20:20	61.36	-0.85
611	10/9/09 20:21	61.36	-0.85
612	10/9/09 20:22	61.36	-0.85
613	10/9/09 20:23	61.36	-0.85
614	10/9/09 20:24	61.36	-0.85
615	10/9/09 20:25	61.36	-0.85
616	10/9/09 20:26	61.36	-0.85
617	10/9/09 20:27	61.36	-0.85
618	10/9/09 20:28	61.36	-0.85
619	10/9/09 20:29	61.36	-0.85
620	10/9/09 20:30	61.36	-0.85
621	10/9/09 20:31	61.37	-0.84
622	10/9/09 20:32	61.37	-0.84
623	10/9/09 20:33	61.37	-0.84
624	10/9/09 20:34	61.36	-0.85
625	10/9/09 20:35	61.35	-0.86
626	10/9/09 20:36	61.35	-0.86
627	10/9/09 20:37	61.35	-0.86
628	10/9/09 20:38	61.36	-0.85
629	10/9/09 20:39	61.36	-0.85
630	10/9/09 20:40	61.36	-0.85
631	10/9/09 20:41	61.36	-0.85
632	10/9/09 20:42	61.36	-0.85
633	10/9/09 20:43	61.36	-0.85
634	10/9/09 20:44	61.35	-0.86
635	10/9/09 20:45	61.35	-0.86
636	10/9/09 20:46	61.36	-0.85
637	10/9/09 20:47	61.35	-0.86
638	10/9/09 20:48	61.35	-0.86
639	10/9/09 20:49	61.35	-0.86
640	10/9/09 20:50	61.35	-0.86

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
641	10/9/09 20:51	61.35	-0.86
642	10/9/09 20:52	61.35	-0.86
643	10/9/09 20:53	61.34	-0.87
644	10/9/09 20:54	61.34	-0.87
645	10/9/09 20:55	61.33	-0.88
646	10/9/09 20:56	61.33	-0.88
647	10/9/09 20:57	61.33	-0.88
648	10/9/09 20:58	61.33	-0.88
649	10/9/09 20:59	61.33	-0.88
650	10/9/09 21:00	61.34	-0.87
651	10/9/09 21:01	61.34	-0.87
652	10/9/09 21:02	61.34	-0.87
653	10/9/09 21:03	61.33	-0.88
654	10/9/09 21:04	61.33	-0.88
655	10/9/09 21:05	61.33	-0.88
656	10/9/09 21:06	61.33	-0.88
657	10/9/09 21:07	61.34	-0.87
658	10/9/09 21:08	61.35	-0.86
659	10/9/09 21:09	61.36	-0.85
660	10/9/09 21:10	61.35	-0.86
661	10/9/09 21:11	61.35	-0.86
662	10/9/09 21:12	61.34	-0.87
663	10/9/09 21:13	61.35	-0.86
664	10/9/09 21:14	61.34	-0.87
665	10/9/09 21:15	61.34	-0.87
666	10/9/09 21:16	61.33	-0.88
667	10/9/09 21:17	61.33	-0.88
668	10/9/09 21:18	61.32	-0.89
669	10/9/09 21:19	61.32	-0.89
670	10/9/09 21:20	61.32	-0.89
671	10/9/09 21:21	61.31	-0.90
672	10/9/09 21:22	61.31	-0.90
673	10/9/09 21:23	61.31	-0.90
674	10/9/09 21:24	61.32	-0.89
675	10/9/09 21:25	61.33	-0.88
676	10/9/09 21:26	61.32	-0.89
677	10/9/09 21:27	61.32	-0.89
678	10/9/09 21:28	61.32	-0.89
679	10/9/09 21:29	61.32	-0.89
680	10/9/09 21:30	61.32	-0.89
681	10/9/09 21:31	61.33	-0.88
682	10/9/09 21:32	61.33	-0.88
683	10/9/09 21:33	61.31	-0.90
684	10/9/09 21:34	61.31	-0.90
685	10/9/09 21:35	61.31	-0.90
686	10/9/09 21:36	61.31	-0.90
687	10/9/09 21:37	61.30	-0.91
688	10/9/09 21:38	61.30	-0.91
689	10/9/09 21:39	61.30	-0.91
690	10/9/09 21:40	61.31	-0.90
691	10/9/09 21:41	61.31	-0.90
692	10/9/09 21:42	61.31	-0.90
693	10/9/09 21:43	61.31	-0.90

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
694	10/9/09 21:44	61.30	-0.91
695	10/9/09 21:45	61.31	-0.90
696	10/9/09 21:46	61.30	-0.91
697	10/9/09 21:47	61.30	-0.91
698	10/9/09 21:48	61.30	-0.91
699	10/9/09 21:49	61.29	-0.92
700	10/9/09 21:50	61.29	-0.92
701	10/9/09 21:51	61.29	-0.92
702	10/9/09 21:52	61.29	-0.92
703	10/9/09 21:53	61.29	-0.92
704	10/9/09 21:54	61.29	-0.92
705	10/9/09 21:55	61.29	-0.92
706	10/9/09 21:56	61.29	-0.92
707	10/9/09 21:57	61.29	-0.92
708	10/9/09 21:58	61.29	-0.92
709	10/9/09 21:59	61.29	-0.92
710	10/9/09 22:00	61.29	-0.92
711	10/9/09 22:01	61.29	-0.92
712	10/9/09 22:02	61.29	-0.92
713	10/9/09 22:03	61.29	-0.92
714	10/9/09 22:04	61.30	-0.91
715	10/9/09 22:05	61.31	-0.90
716	10/9/09 22:06	61.32	-0.89
717	10/9/09 22:07	61.30	-0.91
718	10/9/09 22:08	61.29	-0.92
719	10/9/09 22:09	61.28	-0.93
720	10/9/09 22:10	61.29	-0.92
721	10/9/09 22:11	61.29	-0.92
722	10/9/09 22:12	61.29	-0.92
723	10/9/09 22:13	61.28	-0.93
724	10/9/09 22:14	61.28	-0.93
725	10/9/09 22:15	61.29	-0.92
726	10/9/09 22:16	61.29	-0.92
727	10/9/09 22:17	61.30	-0.91
728	10/9/09 22:18	61.30	-0.91
729	10/9/09 22:19	61.30	-0.91
730	10/9/09 22:20	61.30	-0.91
731	10/9/09 22:21	61.30	-0.91
732	10/9/09 22:22	61.30	-0.91
733	10/9/09 22:23	61.30	-0.91
734	10/9/09 22:24	61.30	-0.91
735	10/9/09 22:25	61.30	-0.91
736	10/9/09 22:26	61.29	-0.92
737	10/9/09 22:27	61.29	-0.92
738	10/9/09 22:28	61.29	-0.92
739	10/9/09 22:29	61.26	-0.95
740	10/9/09 22:30	61.26	-0.95
741	10/9/09 22:31	61.26	-0.95
742	10/9/09 22:32	61.27	-0.94
743	10/9/09 22:33	61.27	-0.94
744	10/9/09 22:34	61.27	-0.94
745	10/9/09 22:35	61.27	-0.94
746	10/9/09 22:36	61.26	-0.95

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
747	10/9/09 22:37	61.27	-0.94
748	10/9/09 22:38	61.27	-0.94
749	10/9/09 22:39	61.26	-0.95
750	10/9/09 22:40	61.27	-0.94
751	10/9/09 22:41	61.27	-0.94
752	10/9/09 22:42	61.27	-0.94
753	10/9/09 22:43	61.26	-0.95
754	10/9/09 22:44	61.27	-0.94
755	10/9/09 22:45	61.26	-0.95
756	10/9/09 22:46	61.26	-0.95
757	10/9/09 22:47	61.27	-0.94
758	10/9/09 22:48	61.27	-0.94
759	10/9/09 22:49	61.27	-0.94
760	10/9/09 22:50	61.27	-0.94
761	10/9/09 22:51	61.27	-0.94
762	10/9/09 22:52	61.27	-0.94
763	10/9/09 22:53	61.27	-0.94
764	10/9/09 22:54	61.26	-0.95
765	10/9/09 22:55	61.26	-0.95
766	10/9/09 22:56	61.25	-0.96
767	10/9/09 22:57	61.25	-0.96
768	10/9/09 22:58	61.26	-0.95
769	10/9/09 22:59	61.27	-0.94
770	10/9/09 23:00	61.27	-0.94
771	10/9/09 23:01	61.26	-0.95
772	10/9/09 23:02	61.26	-0.95
773	10/9/09 23:03	61.25	-0.96
774	10/9/09 23:04	61.25	-0.96
775	10/9/09 23:05	61.26	-0.95
776	10/9/09 23:06	61.26	-0.95
777	10/9/09 23:07	61.25	-0.96
778	10/9/09 23:08	61.25	-0.96
779	10/9/09 23:09	61.25	-0.96
780	10/9/09 23:10	61.26	-0.95
781	10/9/09 23:11	61.26	-0.95
782	10/9/09 23:12	61.27	-0.94
783	10/9/09 23:13	61.28	-0.93
784	10/9/09 23:14	61.26	-0.95
785	10/9/09 23:15	61.25	-0.96
786	10/9/09 23:16	61.26	-0.95
787	10/9/09 23:17	61.27	-0.94
788	10/9/09 23:18	61.25	-0.96
789	10/9/09 23:19	61.24	-0.97
790	10/9/09 23:20	61.24	-0.97
791	10/9/09 23:21	61.25	-0.96
792	10/9/09 23:22	61.25	-0.96
793	10/9/09 23:23	61.25	-0.96
794	10/9/09 23:24	61.25	-0.96
795	10/9/09 23:25	61.25	-0.96
796	10/9/09 23:26	61.24	-0.97
797	10/9/09 23:27	61.24	-0.97
798	10/9/09 23:28	61.24	-0.97
799	10/9/09 23:29	61.24	-0.97

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
800	10/9/09 23:30	61.24	-0.97
801	10/9/09 23:31	61.24	-0.97
802	10/9/09 23:32	61.25	-0.96
803	10/9/09 23:33	61.24	-0.97
804	10/9/09 23:34	61.24	-0.97
805	10/9/09 23:35	61.23	-0.98
806	10/9/09 23:36	61.23	-0.98
807	10/9/09 23:37	61.23	-0.98
808	10/9/09 23:38	61.23	-0.98
809	10/9/09 23:39	61.23	-0.98
810	10/9/09 23:40	61.23	-0.98
811	10/9/09 23:41	61.24	-0.97
812	10/9/09 23:42	61.24	-0.97
813	10/9/09 23:43	61.24	-0.97
814	10/9/09 23:44	61.24	-0.97
815	10/9/09 23:45	61.23	-0.98
816	10/9/09 23:46	61.24	-0.97
817	10/9/09 23:47	61.25	-0.96
818	10/9/09 23:48	61.25	-0.96
819	10/9/09 23:49	61.25	-0.96
820	10/9/09 23:50	61.24	-0.97
821	10/9/09 23:51	61.24	-0.97
822	10/9/09 23:52	61.24	-0.97
823	10/9/09 23:53	61.23	-0.98
824	10/9/09 23:54	61.23	-0.98
825	10/9/09 23:55	61.23	-0.98
826	10/9/09 23:56	61.24	-0.97
827	10/9/09 23:57	61.24	-0.97
828	10/9/09 23:58	61.24	-0.97
829	10/9/09 23:59	61.23	-0.98
830	10/10/09 0:00	61.24	-0.97
831	10/10/09 0:01	61.25	-0.96
832	10/10/09 0:02	61.25	-0.96
833	10/10/09 0:03	61.25	-0.96
834	10/10/09 0:04	61.24	-0.97
835	10/10/09 0:05	61.23	-0.98
836	10/10/09 0:06	61.23	-0.98
837	10/10/09 0:07	61.24	-0.97
838	10/10/09 0:08	61.24	-0.97
839	10/10/09 0:09	61.24	-0.97
840	10/10/09 0:10	61.24	-0.97
841	10/10/09 0:11	61.24	-0.97
842	10/10/09 0:12	61.24	-0.97
843	10/10/09 0:13	61.24	-0.97
844	10/10/09 0:14	61.23	-0.98
845	10/10/09 0:15	61.23	-0.98
846	10/10/09 0:16	61.23	-0.98
847	10/10/09 0:17	61.24	-0.97
848	10/10/09 0:18	61.24	-0.97
849	10/10/09 0:19	61.23	-0.98
850	10/10/09 0:20	61.22	-0.99
851	10/10/09 0:21	61.22	-0.99
852	10/10/09 0:22	61.23	-0.98

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
853	10/10/09 0:23	61.23	-0.98
854	10/10/09 0:24	61.22	-0.99
855	10/10/09 0:25	61.23	-0.98
856	10/10/09 0:26	61.23	-0.98
857	10/10/09 0:27	61.23	-0.98
858	10/10/09 0:28	61.23	-0.98
859	10/10/09 0:29	61.23	-0.98
860	10/10/09 0:30	61.24	-0.97
861	10/10/09 0:31	61.24	-0.97
862	10/10/09 0:32	61.24	-0.97
863	10/10/09 0:33	61.23	-0.98
864	10/10/09 0:34	61.23	-0.98
865	10/10/09 0:35	61.23	-0.98
866	10/10/09 0:36	61.23	-0.98
867	10/10/09 0:37	61.23	-0.98
868	10/10/09 0:38	61.23	-0.98
869	10/10/09 0:39	61.23	-0.98
870	10/10/09 0:40	61.23	-0.98
871	10/10/09 0:41	61.23	-0.98
872	10/10/09 0:42	61.23	-0.98
873	10/10/09 0:43	61.23	-0.98
874	10/10/09 0:44	61.23	-0.98
875	10/10/09 0:45	61.22	-0.99
876	10/10/09 0:46	61.22	-0.99
877	10/10/09 0:47	61.22	-0.99
878	10/10/09 0:48	61.23	-0.98
879	10/10/09 0:49	61.23	-0.98
880	10/10/09 0:50	61.21	-1.00
881	10/10/09 0:51	61.21	-1.00
882	10/10/09 0:52	61.22	-0.99
883	10/10/09 0:53	61.23	-0.98
884	10/10/09 0:54	61.23	-0.98
885	10/10/09 0:55	61.23	-0.98
886	10/10/09 0:56	61.22	-0.99
887	10/10/09 0:57	61.22	-0.99
888	10/10/09 0:58	61.22	-0.99
889	10/10/09 0:59	61.22	-0.99
890	10/10/09 1:00	61.22	-0.99
891	10/10/09 1:01	61.22	-0.99
892	10/10/09 1:02	61.22	-0.99
893	10/10/09 1:03	61.21	-1.00
894	10/10/09 1:04	61.21	-1.00
895	10/10/09 1:05	61.21	-1.00
896	10/10/09 1:06	61.21	-1.00
897	10/10/09 1:07	61.21	-1.00
898	10/10/09 1:08	61.21	-1.00
899	10/10/09 1:09	61.22	-0.99
900	10/10/09 1:10	61.22	-0.99
901	10/10/09 1:11	61.22	-0.99
902	10/10/09 1:12	61.22	-0.99
903	10/10/09 1:13	61.22	-0.99
904	10/10/09 1:14	61.22	-0.99
905	10/10/09 1:15	61.22	-0.99

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
906	10/10/09 1:16	61.22	-0.99
907	10/10/09 1:17	61.22	-0.99
908	10/10/09 1:18	61.22	-0.99
909	10/10/09 1:19	61.21	-1.00
910	10/10/09 1:20	61.21	-1.00
911	10/10/09 1:21	61.21	-1.00
912	10/10/09 1:22	61.21	-1.00
913	10/10/09 1:23	61.21	-1.00
914	10/10/09 1:24	61.21	-1.00
915	10/10/09 1:25	61.21	-1.00
916	10/10/09 1:26	61.21	-1.00
917	10/10/09 1:27	61.21	-1.00
918	10/10/09 1:28	61.22	-0.99
919	10/10/09 1:29	61.22	-0.99
920	10/10/09 1:30	61.22	-0.99
921	10/10/09 1:31	61.23	-0.98
922	10/10/09 1:32	61.23	-0.98
923	10/10/09 1:33	61.23	-0.98
924	10/10/09 1:34	61.22	-0.99
925	10/10/09 1:35	61.20	-1.01
926	10/10/09 1:36	61.20	-1.01
927	10/10/09 1:37	61.20	-1.01
928	10/10/09 1:38	61.20	-1.01
929	10/10/09 1:39	61.20	-1.01
930	10/10/09 1:40	61.21	-1.00
931	10/10/09 1:41	61.21	-1.00
932	10/10/09 1:42	61.21	-1.00
933	10/10/09 1:43	61.20	-1.01
934	10/10/09 1:44	61.20	-1.01
935	10/10/09 1:45	61.20	-1.01
936	10/10/09 1:46	61.20	-1.01
937	10/10/09 1:47	61.20	-1.01
938	10/10/09 1:48	61.20	-1.01
939	10/10/09 1:49	61.20	-1.01
940	10/10/09 1:50	61.20	-1.01
941	10/10/09 1:51	61.21	-1.00
942	10/10/09 1:52	61.21	-1.00
943	10/10/09 1:53	61.20	-1.01
944	10/10/09 1:54	61.20	-1.01
945	10/10/09 1:55	61.21	-1.00
946	10/10/09 1:56	61.20	-1.01
947	10/10/09 1:57	61.19	-1.02
948	10/10/09 1:58	61.19	-1.02
949	10/10/09 1:59	61.19	-1.02
950	10/10/09 2:00	61.19	-1.02
951	10/10/09 2:01	61.19	-1.02
952	10/10/09 2:02	61.19	-1.02
953	10/10/09 2:03	61.19	-1.02
954	10/10/09 2:04	61.19	-1.02
955	10/10/09 2:05	61.19	-1.02
956	10/10/09 2:06	61.19	-1.02
957	10/10/09 2:07	61.19	-1.02
958	10/10/09 2:08	61.20	-1.01

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Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
959	10/10/09 2:09	61.20	-1.01
960	10/10/09 2:10	61.20	-1.01
961	10/10/09 2:11	61.19	-1.02
962	10/10/09 2:12	61.19	-1.02
963	10/10/09 2:13	61.20	-1.01
964	10/10/09 2:14	61.20	-1.01
965	10/10/09 2:15	61.21	-1.00
966	10/10/09 2:16	61.21	-1.00
967	10/10/09 2:17	61.21	-1.00
968	10/10/09 2:18	61.21	-1.00
969	10/10/09 2:19	61.19	-1.02
970	10/10/09 2:20	61.17	-1.04
971	10/10/09 2:21	61.18	-1.03
972	10/10/09 2:22	61.19	-1.02
973	10/10/09 2:23	61.19	-1.02
974	10/10/09 2:24	61.19	-1.02
975	10/10/09 2:25	61.18	-1.03
976	10/10/09 2:26	61.18	-1.03
977	10/10/09 2:27	61.19	-1.02
978	10/10/09 2:28	61.19	-1.02
979	10/10/09 2:29	61.18	-1.03
980	10/10/09 2:30	61.19	-1.02
981	10/10/09 2:31	61.19	-1.02
982	10/10/09 2:32	61.18	-1.03
983	10/10/09 2:33	61.17	-1.04
984	10/10/09 2:34	61.18	-1.03
985	10/10/09 2:35	61.17	-1.04
986	10/10/09 2:36	61.17	-1.04
987	10/10/09 2:37	61.18	-1.03
988	10/10/09 2:38	61.18	-1.03
989	10/10/09 2:39	61.18	-1.03
990	10/10/09 2:40	61.18	-1.03
991	10/10/09 2:41	61.19	-1.02
992	10/10/09 2:42	61.18	-1.03
993	10/10/09 2:43	61.18	-1.03
994	10/10/09 2:44	61.17	-1.04
995	10/10/09 2:45	61.17	-1.04
996	10/10/09 2:46	61.17	-1.04
997	10/10/09 2:47	61.17	-1.04
998	10/10/09 2:48	61.18	-1.03
999	10/10/09 2:49	61.18	-1.03
1000	10/10/09 2:50	61.19	-1.02
1001	10/10/09 2:51	61.20	-1.01
1002	10/10/09 2:52	61.19	-1.02
1003	10/10/09 2:53	61.17	-1.04
1004	10/10/09 2:54	61.17	-1.04
1005	10/10/09 2:55	61.17	-1.04
1006	10/10/09 2:56	61.16	-1.05
1007	10/10/09 2:57	61.16	-1.05
1008	10/10/09 2:58	61.16	-1.05
1009	10/10/09 2:59	61.16	-1.05
1010	10/10/09 3:00	61.16	-1.05
1011	10/10/09 3:01	61.16	-1.05

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1012	10/10/09 3:02	61.16	-1.05
1013	10/10/09 3:03	61.17	-1.04
1014	10/10/09 3:04	61.16	-1.05
1015	10/10/09 3:05	61.16	-1.05
1016	10/10/09 3:06	61.15	-1.06
1017	10/10/09 3:07	61.15	-1.06
1018	10/10/09 3:08	61.17	-1.04
1019	10/10/09 3:09	61.16	-1.05
1020	10/10/09 3:10	61.16	-1.05
1021	10/10/09 3:11	61.16	-1.05
1022	10/10/09 3:12	61.16	-1.05
1023	10/10/09 3:13	61.16	-1.05
1024	10/10/09 3:14	61.16	-1.05
1025	10/10/09 3:15	61.16	-1.05
1026	10/10/09 3:16	61.16	-1.05
1027	10/10/09 3:17	61.15	-1.06
1028	10/10/09 3:18	61.16	-1.05
1029	10/10/09 3:19	61.15	-1.06
1030	10/10/09 3:20	61.15	-1.06
1031	10/10/09 3:21	61.15	-1.06
1032	10/10/09 3:22	61.15	-1.06
1033	10/10/09 3:23	61.15	-1.06
1034	10/10/09 3:24	61.15	-1.06
1035	10/10/09 3:25	61.15	-1.06
1036	10/10/09 3:26	61.15	-1.06
1037	10/10/09 3:27	61.15	-1.06
1038	10/10/09 3:28	61.16	-1.05
1039	10/10/09 3:29	61.16	-1.05
1040	10/10/09 3:30	61.16	-1.05
1041	10/10/09 3:31	61.16	-1.05
1042	10/10/09 3:32	61.16	-1.05
1043	10/10/09 3:33	61.16	-1.05
1044	10/10/09 3:34	61.17	-1.04
1045	10/10/09 3:35	61.17	-1.04
1046	10/10/09 3:36	61.16	-1.05
1047	10/10/09 3:37	61.16	-1.05
1048	10/10/09 3:38	61.16	-1.05
1049	10/10/09 3:39	61.15	-1.06
1050	10/10/09 3:40	61.15	-1.06
1051	10/10/09 3:41	61.14	-1.07
1052	10/10/09 3:42	61.13	-1.08
1053	10/10/09 3:43	61.14	-1.07
1054	10/10/09 3:44	61.13	-1.08
1055	10/10/09 3:45	61.13	-1.08
1056	10/10/09 3:46	61.13	-1.08
1057	10/10/09 3:47	61.14	-1.07
1058	10/10/09 3:48	61.13	-1.08
1059	10/10/09 3:49	61.13	-1.08
1060	10/10/09 3:50	61.14	-1.07
1061	10/10/09 3:51	61.13	-1.08
1062	10/10/09 3:52	61.14	-1.07
1063	10/10/09 3:53	61.13	-1.08
1064	10/10/09 3:54	61.13	-1.08

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1065	10/10/09 3:55	61.13	-1.08
1066	10/10/09 3:56	61.13	-1.08
1067	10/10/09 3:57	61.14	-1.07
1068	10/10/09 3:58	61.13	-1.08
1069	10/10/09 3:59	61.13	-1.08
1070	10/10/09 4:00	61.13	-1.08
1071	10/10/09 4:01	61.13	-1.08
1072	10/10/09 4:02	61.13	-1.08
1073	10/10/09 4:03	61.13	-1.08
1074	10/10/09 4:04	61.13	-1.08
1075	10/10/09 4:05	61.14	-1.07
1076	10/10/09 4:06	61.14	-1.07
1077	10/10/09 4:07	61.13	-1.08
1078	10/10/09 4:08	61.13	-1.08
1079	10/10/09 4:09	61.13	-1.08
1080	10/10/09 4:10	61.13	-1.08
1081	10/10/09 4:11	61.13	-1.08
1082	10/10/09 4:12	61.12	-1.09
1083	10/10/09 4:13	61.12	-1.09
1084	10/10/09 4:14	61.12	-1.09
1085	10/10/09 4:15	61.11	-1.10
1086	10/10/09 4:16	61.12	-1.09
1087	10/10/09 4:17	61.12	-1.09
1088	10/10/09 4:18	61.12	-1.09
1089	10/10/09 4:19	61.12	-1.09
1090	10/10/09 4:20	61.12	-1.09
1091	10/10/09 4:21	61.12	-1.09
1092	10/10/09 4:22	61.13	-1.08
1093	10/10/09 4:23	61.14	-1.07
1094	10/10/09 4:24	61.14	-1.07
1095	10/10/09 4:25	61.14	-1.07
1096	10/10/09 4:26	61.13	-1.08
1097	10/10/09 4:27	61.13	-1.08
1098	10/10/09 4:28	61.14	-1.07
1099	10/10/09 4:29	61.14	-1.07
1100	10/10/09 4:30	61.14	-1.07
1101	10/10/09 4:31	61.14	-1.07
1102	10/10/09 4:32	61.13	-1.08
1103	10/10/09 4:33	61.13	-1.08
1104	10/10/09 4:34	61.12	-1.09
1105	10/10/09 4:35	61.11	-1.10
1106	10/10/09 4:36	61.11	-1.10
1107	10/10/09 4:37	61.11	-1.10
1108	10/10/09 4:38	61.11	-1.10
1109	10/10/09 4:39	61.11	-1.10
1110	10/10/09 4:40	61.11	-1.10
1111	10/10/09 4:41	61.11	-1.10
1112	10/10/09 4:42	61.11	-1.10
1113	10/10/09 4:43	61.11	-1.10
1114	10/10/09 4:44	61.11	-1.10
1115	10/10/09 4:45	61.11	-1.10
1116	10/10/09 4:46	61.11	-1.10
1117	10/10/09 4:47	61.12	-1.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well: Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1118	10/10/09 4:48	61.12	-1.09
1119	10/10/09 4:49	61.11	-1.10
1120	10/10/09 4:50	61.11	-1.10
1121	10/10/09 4:51	61.12	-1.09
1122	10/10/09 4:52	61.12	-1.09
1123	10/10/09 4:53	61.12	-1.09
1124	10/10/09 4:54	61.12	-1.09
1125	10/10/09 4:55	61.12	-1.09
1126	10/10/09 4:56	61.13	-1.08
1127	10/10/09 4:57	61.13	-1.08
1128	10/10/09 4:58	61.12	-1.09
1129	10/10/09 4:59	61.12	-1.09
1130	10/10/09 5:00	61.12	-1.09
1131	10/10/09 5:01	61.12	-1.09
1132	10/10/09 5:02	61.12	-1.09
1133	10/10/09 5:03	61.12	-1.09
1134	10/10/09 5:04	61.13	-1.08
1135	10/10/09 5:05	61.12	-1.09
1136	10/10/09 5:06	61.12	-1.09
1137	10/10/09 5:07	61.12	-1.09
1138	10/10/09 5:08	61.12	-1.09
1139	10/10/09 5:09	61.11	-1.10
1140	10/10/09 5:10	61.12	-1.09
1141	10/10/09 5:11	61.12	-1.09
1142	10/10/09 5:12	61.12	-1.09
1143	10/10/09 5:13	61.11	-1.10
1144	10/10/09 5:14	61.11	-1.10
1145	10/10/09 5:15	61.11	-1.10
1146	10/10/09 5:16	61.10	-1.11
1147	10/10/09 5:17	61.10	-1.11
1148	10/10/09 5:18	61.10	-1.11
1149	10/10/09 5:19	61.10	-1.11
1150	10/10/09 5:20	61.10	-1.11
1151	10/10/09 5:21	61.10	-1.11
1152	10/10/09 5:22	61.10	-1.11
1153	10/10/09 5:23	61.10	-1.11
1154	10/10/09 5:24	61.10	-1.11
1155	10/10/09 5:25	61.10	-1.11
1156	10/10/09 5:26	61.10	-1.11
1157	10/10/09 5:27	61.12	-1.09
1158	10/10/09 5:28	61.11	-1.10
1159	10/10/09 5:29	61.10	-1.11
1160	10/10/09 5:30	61.10	-1.11
1161	10/10/09 5:31	61.10	-1.11
1162	10/10/09 5:32	61.10	-1.11
1163	10/10/09 5:33	61.10	-1.11
1164	10/10/09 5:34	61.11	-1.10
1165	10/10/09 5:35	61.11	-1.10
1166	10/10/09 5:36	61.10	-1.11
1167	10/10/09 5:37	61.10	-1.11
1168	10/10/09 5:38	61.11	-1.10
1169	10/10/09 5:39	61.11	-1.10
1170	10/10/09 5:40	61.10	-1.11

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1171	10/10/09 5:41	61.10	-1.11
1172	10/10/09 5:42	61.10	-1.11
1173	10/10/09 5:43	61.10	-1.11
1174	10/10/09 5:44	61.10	-1.11
1175	10/10/09 5:45	61.11	-1.10
1176	10/10/09 5:46	61.11	-1.10
1177	10/10/09 5:47	61.11	-1.10
1178	10/10/09 5:48	61.11	-1.10
1179	10/10/09 5:49	61.10	-1.11
1180	10/10/09 5:50	61.09	-1.12
1181	10/10/09 5:51	61.09	-1.12
1182	10/10/09 5:52	61.10	-1.11
1183	10/10/09 5:53	61.10	-1.11
1184	10/10/09 5:54	61.10	-1.11
1185	10/10/09 5:55	61.11	-1.10
1186	10/10/09 5:56	61.13	-1.08
1187	10/10/09 5:57	61.13	-1.08
1188	10/10/09 5:58	61.11	-1.10
1189	10/10/09 5:59	61.09	-1.12
1190	10/10/09 6:00	61.09	-1.12
1191	10/10/09 6:01	61.09	-1.12
1192	10/10/09 6:02	61.10	-1.11
1193	10/10/09 6:03	61.09	-1.12
1194	10/10/09 6:04	61.09	-1.12
1195	10/10/09 6:05	61.09	-1.12
1196	10/10/09 6:06	61.09	-1.12
1197	10/10/09 6:07	61.09	-1.12
1198	10/10/09 6:08	61.10	-1.11
1199	10/10/09 6:09	61.11	-1.10
1200	10/10/09 6:10	61.10	-1.11
1201	10/10/09 6:11	61.10	-1.11
1202	10/10/09 6:12	61.10	-1.11
1203	10/10/09 6:13	61.11	-1.10
1204	10/10/09 6:14	61.11	-1.10
1205	10/10/09 6:15	61.10	-1.11
1206	10/10/09 6:16	61.09	-1.12
1207	10/10/09 6:17	61.09	-1.12
1208	10/10/09 6:18	61.09	-1.12
1209	10/10/09 6:19	61.10	-1.11
1210	10/10/09 6:20	61.10	-1.11
1211	10/10/09 6:21	61.09	-1.12
1212	10/10/09 6:22	61.09	-1.12
1213	10/10/09 6:23	61.09	-1.12
1214	10/10/09 6:24	61.09	-1.12
1215	10/10/09 6:25	61.09	-1.12
1216	10/10/09 6:26	61.10	-1.11
1217	10/10/09 6:27	61.10	-1.11
1218	10/10/09 6:28	61.10	-1.11
1219	10/10/09 6:29	61.10	-1.11
1220	10/10/09 6:30	61.09	-1.12
1221	10/10/09 6:31	61.09	-1.12
1222	10/10/09 6:32	61.09	-1.12
1223	10/10/09 6:33	61.10	-1.11

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1224	10/10/09 6:34	61.10	-1.11
1225	10/10/09 6:35	61.09	-1.12
1226	10/10/09 6:36	61.09	-1.12
1227	10/10/09 6:37	61.08	-1.13
1228	10/10/09 6:38	61.09	-1.12
1229	10/10/09 6:39	61.08	-1.13
1230	10/10/09 6:40	61.09	-1.12
1231	10/10/09 6:41	61.09	-1.12
1232	10/10/09 6:42	61.09	-1.12
1233	10/10/09 6:43	61.08	-1.13
1234	10/10/09 6:44	61.08	-1.13
1235	10/10/09 6:45	61.08	-1.13
1236	10/10/09 6:46	61.09	-1.12
1237	10/10/09 6:47	61.09	-1.12
1238	10/10/09 6:48	61.08	-1.13
1239	10/10/09 6:49	61.08	-1.13
1240	10/10/09 6:50	61.08	-1.13
1241	10/10/09 6:51	61.09	-1.12
1242	10/10/09 6:52	61.09	-1.12
1243	10/10/09 6:53	61.09	-1.12
1244	10/10/09 6:54	61.09	-1.12
1245	10/10/09 6:55	61.08	-1.13
1246	10/10/09 6:56	61.08	-1.13
1247	10/10/09 6:57	61.08	-1.13
1248	10/10/09 6:58	61.08	-1.13
1249	10/10/09 6:59	61.08	-1.13
1250	10/10/09 7:00	61.08	-1.13
1251	10/10/09 7:01	61.08	-1.13
1252	10/10/09 7:02	61.08	-1.13
1253	10/10/09 7:03	61.07	-1.14
1254	10/10/09 7:04	61.07	-1.14
1255	10/10/09 7:05	61.07	-1.14
1256	10/10/09 7:06	61.07	-1.14
1257	10/10/09 7:07	61.09	-1.12
1258	10/10/09 7:08	61.10	-1.11
1259	10/10/09 7:09	61.08	-1.13
1260	10/10/09 7:10	61.07	-1.14
1261	10/10/09 7:11	61.08	-1.13
1262	10/10/09 7:12	61.09	-1.12
1263	10/10/09 7:13	61.08	-1.13
1264	10/10/09 7:14	61.07	-1.14
1265	10/10/09 7:15	61.07	-1.14
1266	10/10/09 7:16	61.07	-1.14
1267	10/10/09 7:17	61.07	-1.14
1268	10/10/09 7:18	61.08	-1.13
1269	10/10/09 7:19	61.08	-1.13
1270	10/10/09 7:20	61.08	-1.13
1271	10/10/09 7:21	61.07	-1.14
1272	10/10/09 7:22	61.06	-1.15
1273	10/10/09 7:23	61.06	-1.15
1274	10/10/09 7:24	61.06	-1.15
1275	10/10/09 7:25	61.06	-1.15
1276	10/10/09 7:26	61.06	-1.15

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
1277	10/10/09 7:27	61.06	-1.15
1278	10/10/09 7:28	61.06	-1.15
1279	10/10/09 7:29	61.07	-1.14
1280	10/10/09 7:30	61.07	-1.14
1281	10/10/09 7:31	61.07	-1.14
1282	10/10/09 7:32	61.08	-1.13
1283	10/10/09 7:33	61.08	-1.13
1284	10/10/09 7:34	61.07	-1.14
1285	10/10/09 7:35	61.06	-1.15
1286	10/10/09 7:36	61.06	-1.15
1287	10/10/09 7:37	61.06	-1.15
1288	10/10/09 7:38	61.05	-1.16
1289	10/10/09 7:39	61.06	-1.15
1290	10/10/09 7:40	61.07	-1.14
1291	10/10/09 7:41	61.07	-1.14
1292	10/10/09 7:42	61.06	-1.15
1293	10/10/09 7:43	61.06	-1.15
1294	10/10/09 7:44	61.06	-1.15
1295	10/10/09 7:45	61.06	-1.15
1296	10/10/09 7:46	61.06	-1.15
1297	10/10/09 7:47	61.07	-1.14
1298	10/10/09 7:48	61.06	-1.15
1299	10/10/09 7:49	61.05	-1.16
1300	10/10/09 7:50	61.04	-1.17
1301	10/10/09 7:51	61.04	-1.17
1302	10/10/09 7:52	61.04	-1.17
1303	10/10/09 7:53	61.05	-1.16
1304	10/10/09 7:54	61.06	-1.15
1305	10/10/09 7:55	61.05	-1.16
1306	10/10/09 7:56	61.05	-1.16
1307	10/10/09 7:57	61.05	-1.16
1308	10/10/09 7:58	61.04	-1.17
1309	10/10/09 7:59	61.04	-1.17
1310	10/10/09 8:00	61.05	-1.16
1311	10/10/09 8:01	61.05	-1.16
1312	10/10/09 8:02	61.04	-1.17
1313	10/10/09 8:03	61.04	-1.17
1314	10/10/09 8:04	61.04	-1.17
1315	10/10/09 8:05	61.04	-1.17
1316	10/10/09 8:06	61.04	-1.17
1317	10/10/09 8:07	61.04	-1.17
1318	10/10/09 8:08	61.03	-1.18
1319	10/10/09 8:09	61.03	-1.18
1320	10/10/09 8:10	61.04	-1.17
1321	10/10/09 8:11	61.05	-1.16
1322	10/10/09 8:12	61.06	-1.15
1323	10/10/09 8:13	61.06	-1.15
1324	10/10/09 8:14	61.05	-1.16
1325	10/10/09 8:15	61.05	-1.16
1326	10/10/09 8:16	61.06	-1.15
1327	10/10/09 8:17	61.06	-1.15
1328	10/10/09 8:18	61.05	-1.16
1329	10/10/09 8:19	61.04	-1.17

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
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Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1330	10/10/09 8:20	61.03	-1.18
1331	10/10/09 8:21	61.04	-1.17
1332	10/10/09 8:22	61.04	-1.17
1333	10/10/09 8:23	61.05	-1.16
1334	10/10/09 8:24	61.04	-1.17
1335	10/10/09 8:25	61.04	-1.17
1336	10/10/09 8:26	61.04	-1.17
1340	10/10/09 8:30	61.02	-1.19
1341	10/10/09 8:31	61.02	-1.19
1342	10/10/09 8:32	61.01	-1.20
1343	10/10/09 8:33	61.01	-1.20
1344	10/10/09 8:34	61.01	-1.20
1345	10/10/09 8:35	61.02	-1.19
1346	10/10/09 8:36	61.02	-1.19
1347	10/10/09 8:37	61.02	-1.19
1348	10/10/09 8:38	61.02	-1.19
1349	10/10/09 8:39	61.02	-1.19
1350	10/10/09 8:40	61.02	-1.19
1351	10/10/09 8:41	61.02	-1.19
1352	10/10/09 8:42	61.01	-1.20
1353	10/10/09 8:43	61.01	-1.20
1354	10/10/09 8:44	61.01	-1.20
1355	10/10/09 8:45	61.01	-1.20
1356	10/10/09 8:46	61.01	-1.20
1357	10/10/09 8:47	61.01	-1.20
1358	10/10/09 8:48	61.01	-1.20
1359	10/10/09 8:49	61.02	-1.19
1360	10/10/09 8:50	61.02	-1.19
1361	10/10/09 8:51	61.02	-1.19
1362	10/10/09 8:52	61.02	-1.19
1363	10/10/09 8:53	61.03	-1.18
1364	10/10/09 8:54	61.03	-1.18
1365	10/10/09 8:55	61.03	-1.18
1366	10/10/09 8:56	61.02	-1.19
1367	10/10/09 8:57	61.02	-1.19
1368	10/10/09 8:58	61.01	-1.20
1369	10/10/09 8:59	61.00	-1.21
1370	10/10/09 9:00	61.00	-1.21
1371	10/10/09 9:01	61.00	-1.21
1372	10/10/09 9:02	61.00	-1.21
1373	10/10/09 9:03	61.00	-1.21
1374	10/10/09 9:04	61.00	-1.21
1375	10/10/09 9:05	61.01	-1.20
1376	10/10/09 9:06	61.00	-1.21
1377	10/10/09 9:07	61.00	-1.21
1378	10/10/09 9:08	61.01	-1.20
1379	10/10/09 9:09	61.01	-1.20
1380	10/10/09 9:10	61.00	-1.21
1381	10/10/09 9:11	60.99	-1.22
1382	10/10/09 9:12	60.99	-1.22
1383	10/10/09 9:13	61.00	-1.21
1384	10/10/09 9:14	61.00	-1.21
1385	10/10/09 9:15	60.99	-1.22

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1386	10/10/09 9:16	60.99	-1.22
1387	10/10/09 9:17	60.98	-1.23
1388	10/10/09 9:18	60.98	-1.23
1389	10/10/09 9:19	61.00	-1.21
1390	10/10/09 9:20	61.01	-1.20
1391	10/10/09 9:21	61.00	-1.21
1392	10/10/09 9:22	60.99	-1.22
1393	10/10/09 9:23	60.98	-1.23
1394	10/10/09 9:24	60.99	-1.22
1395	10/10/09 9:25	61.00	-1.21
1396	10/10/09 9:26	60.99	-1.22
1397	10/10/09 9:27	61.00	-1.21
1398	10/10/09 9:28	61.01	-1.20
1399	10/10/09 9:29	61.01	-1.20
1400	10/10/09 9:30	61.00	-1.21
1401	10/10/09 9:31	60.99	-1.22
1402	10/10/09 9:32	60.99	-1.22
1403	10/10/09 9:33	60.98	-1.23
1404	10/10/09 9:34	61.00	-1.21
1405	10/10/09 9:35	61.01	-1.20
1406	10/10/09 9:36	60.99	-1.22
1407	10/10/09 9:37	60.99	-1.22
1408	10/10/09 9:38	60.98	-1.23
1409	10/10/09 9:39	60.98	-1.23
1410	10/10/09 9:40	60.98	-1.23
1411	10/10/09 9:41	60.98	-1.23
1412	10/10/09 9:42	60.98	-1.23
1413	10/10/09 9:43	60.97	-1.24
1414	10/10/09 9:44	60.98	-1.23
1415	10/10/09 9:45	60.99	-1.22
1416	10/10/09 9:46	60.99	-1.22
1417	10/10/09 9:47	61.00	-1.21
1418	10/10/09 9:48	60.99	-1.22
1419	10/10/09 9:49	60.97	-1.24
1420	10/10/09 9:50	60.97	-1.24
1421	10/10/09 9:51	60.97	-1.24
1422	10/10/09 9:52	60.97	-1.24
1423	10/10/09 9:53	60.97	-1.24
1424	10/10/09 9:54	60.97	-1.24
1425	10/10/09 9:55	60.96	-1.25
1426	10/10/09 9:56	60.96	-1.25
1427	10/10/09 9:57	60.96	-1.25
1428	10/10/09 9:58	60.97	-1.24
1429	10/10/09 9:59	60.97	-1.24
1430	10/10/09 10:00	60.96	-1.25
1431	10/10/09 10:01	60.96	-1.25
1432	10/10/09 10:02	60.96	-1.25
1433	10/10/09 10:03	60.96	-1.25
1434	10/10/09 10:04	60.96	-1.25
1435	10/10/09 10:05	60.96	-1.25
1436	10/10/09 10:06	60.96	-1.25
1437	10/10/09 10:07	60.97	-1.24
1438	10/10/09 10:08	60.97	-1.24

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1439	10/10/09 10:09	60.97	-1.24
1440	10/10/09 10:10	60.96	-1.25
1441	10/10/09 10:11	60.96	-1.25
1442	10/10/09 10:12	60.96	-1.25
1443	10/10/09 10:13	60.95	-1.26
1444	10/10/09 10:14	60.95	-1.26
1445	10/10/09 10:15	60.95	-1.26
1446	10/10/09 10:16	60.95	-1.26
1447	10/10/09 10:17	60.95	-1.26
1448	10/10/09 10:18	60.95	-1.26
1449	10/10/09 10:19	60.95	-1.26
1450	10/10/09 10:20	60.96	-1.25
1451	10/10/09 10:21	60.95	-1.26
1452	10/10/09 10:22	60.95	-1.26
1453	10/10/09 10:23	60.95	-1.26
1454	10/10/09 10:24	60.94	-1.27
1455	10/10/09 10:25	60.95	-1.26
1456	10/10/09 10:26	60.96	-1.25
1457	10/10/09 10:27	60.96	-1.25
1458	10/10/09 10:28	60.96	-1.25
1459	10/10/09 10:29	60.95	-1.26
1460	10/10/09 10:30	60.96	-1.25
1461	10/10/09 10:31	60.95	-1.26
1462	10/10/09 10:32	60.94	-1.27
1463	10/10/09 10:33	60.94	-1.27
1464	10/10/09 10:34	60.94	-1.27
1465	10/10/09 10:35	60.94	-1.27
1466	10/10/09 10:36	60.93	-1.28
1467	10/10/09 10:37	60.93	-1.28
1468	10/10/09 10:38	60.94	-1.27
1469	10/10/09 10:39	60.94	-1.27
1470	10/10/09 10:40	60.93	-1.28
1471	10/10/09 10:41	60.93	-1.28
1472	10/10/09 10:42	60.93	-1.28
1473	10/10/09 10:43	60.93	-1.28
1474	10/10/09 10:44	60.93	-1.28
1475	10/10/09 10:45	60.93	-1.28
1476	10/10/09 10:46	60.93	-1.28
1477	10/10/09 10:47	60.94	-1.27
1478	10/10/09 10:48	60.94	-1.27
1479	10/10/09 10:49	60.94	-1.27
1480	10/10/09 10:50	60.93	-1.28
1481	10/10/09 10:51	60.93	-1.28
1482	10/10/09 10:52	60.93	-1.28
1483	10/10/09 10:53	60.92	-1.29
1484	10/10/09 10:54	60.92	-1.29
1485	10/10/09 10:55	60.92	-1.29
1486	10/10/09 10:56	60.93	-1.28
1487	10/10/09 10:57	60.92	-1.29
1488	10/10/09 10:58	60.92	-1.29
1489	10/10/09 10:59	60.92	-1.29
1490	10/10/09 11:00	60.92	-1.29
1491	10/10/09 11:01	60.93	-1.28

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1492	10/10/09 11:02	60.93	-1.28
1493	10/10/09 11:03	60.93	-1.28
1494	10/10/09 11:04	60.93	-1.28
1495	10/10/09 11:05	60.93	-1.28
1496	10/10/09 11:06	60.92	-1.29
1497	10/10/09 11:07	60.92	-1.29
1498	10/10/09 11:08	60.92	-1.29
1499	10/10/09 11:09	60.92	-1.29
1500	10/10/09 11:10	60.91	-1.30
1501	10/10/09 11:11	60.90	-1.31
1502	10/10/09 11:12	60.91	-1.30
1503	10/10/09 11:13	60.93	-1.28
1504	10/10/09 11:14	60.93	-1.28
1505	10/10/09 11:15	60.92	-1.29
1506	10/10/09 11:16	60.92	-1.29
1507	10/10/09 11:17	60.92	-1.29
1508	10/10/09 11:18	60.91	-1.30
1509	10/10/09 11:19	60.91	-1.30
1510	10/10/09 11:20	60.91	-1.30
1511	10/10/09 11:21	60.90	-1.31
1512	10/10/09 11:22	60.91	-1.30
1513	10/10/09 11:23	60.91	-1.30
1514	10/10/09 11:24	60.90	-1.31
1515	10/10/09 11:25	60.90	-1.31
1516	10/10/09 11:26	60.90	-1.31
1517	10/10/09 11:27	60.90	-1.31
1518	10/10/09 11:28	60.90	-1.31
1519	10/10/09 11:29	60.90	-1.31
1520	10/10/09 11:30	60.90	-1.31
1521	10/10/09 11:31	60.91	-1.30
1522	10/10/09 11:32	60.91	-1.30
1523	10/10/09 11:33	60.92	-1.29
1524	10/10/09 11:34	60.92	-1.29
1525	10/10/09 11:35	60.91	-1.30
1526	10/10/09 11:36	60.90	-1.31
1527	10/10/09 11:37	60.89	-1.32
1528	10/10/09 11:38	60.89	-1.32
1529	10/10/09 11:39	60.90	-1.31
1530	10/10/09 11:40	60.90	-1.31
1531	10/10/09 11:41	60.90	-1.31
1532	10/10/09 11:42	60.90	-1.31
1533	10/10/09 11:43	60.91	-1.30
1534	10/10/09 11:44	60.91	-1.30
1535	10/10/09 11:45	60.91	-1.30
1536	10/10/09 11:46	60.91	-1.30
1537	10/10/09 11:47	60.91	-1.30
1538	10/10/09 11:48	60.91	-1.30
1539	10/10/09 11:49	60.89	-1.32
1540	10/10/09 11:50	60.88	-1.33
1541	10/10/09 11:51	60.89	-1.32
1542	10/10/09 11:52	60.89	-1.32
1543	10/10/09 11:53	60.88	-1.33
1544	10/10/09 11:54	60.88	-1.33

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1545	10/10/09 11:55	60.88	-1.33
1546	10/10/09 11:56	60.88	-1.33
1547	10/10/09 11:57	60.88	-1.33
1548	10/10/09 11:58	60.88	-1.33
1549	10/10/09 11:59	60.88	-1.33
1550	10/10/09 12:00	60.88	-1.33
1551	10/10/09 12:01	60.89	-1.32
1552	10/10/09 12:02	60.89	-1.32
1553	10/10/09 12:03	60.87	-1.34
1554	10/10/09 12:04	60.87	-1.34
1555	10/10/09 12:05	60.87	-1.34
1556	10/10/09 12:06	60.87	-1.34
1557	10/10/09 12:07	60.88	-1.33
1558	10/10/09 12:08	60.88	-1.33
1559	10/10/09 12:09	60.87	-1.34
1560	10/10/09 12:10	60.87	-1.34
1561	10/10/09 12:11	60.88	-1.33
1562	10/10/09 12:12	60.88	-1.33
1563	10/10/09 12:13	60.88	-1.33
1564	10/10/09 12:14	60.88	-1.33
1565	10/10/09 12:15	60.88	-1.33
1566	10/10/09 12:16	60.88	-1.33
1567	10/10/09 12:17	60.87	-1.34
1568	10/10/09 12:18	60.87	-1.34
1569	10/10/09 12:19	60.86	-1.35
1570	10/10/09 12:20	60.86	-1.35
1571	10/10/09 12:21	60.85	-1.36
1572	10/10/09 12:22	60.85	-1.36
1573	10/10/09 12:23	60.85	-1.36
1574	10/10/09 12:24	60.86	-1.35
1575	10/10/09 12:25	60.86	-1.35
1576	10/10/09 12:26	60.86	-1.35
1577	10/10/09 12:27	60.86	-1.35
1578	10/10/09 12:28	60.86	-1.35
1579	10/10/09 12:29	60.86	-1.35
1580	10/10/09 12:30	60.87	-1.34
1581	10/10/09 12:31	60.88	-1.33
1582	10/10/09 12:32	60.87	-1.34
1583	10/10/09 12:33	60.88	-1.33
1584	10/10/09 12:34	60.87	-1.34
1585	10/10/09 12:35	60.86	-1.35
1586	10/10/09 12:36	60.87	-1.34
1587	10/10/09 12:37	60.87	-1.34
1588	10/10/09 12:38	60.86	-1.35
1589	10/10/09 12:39	60.87	-1.34
1590	10/10/09 12:40	60.86	-1.35
1591	10/10/09 12:41	60.85	-1.36
1592	10/10/09 12:42	60.85	-1.36
1593	10/10/09 12:43	60.86	-1.35
1594	10/10/09 12:44	60.86	-1.35
1595	10/10/09 12:45	60.85	-1.36
1596	10/10/09 12:46	60.84	-1.37
1597	10/10/09 12:47	60.84	-1.37

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1598	10/10/09 12:48	60.84	-1.37
1599	10/10/09 12:49	60.84	-1.37
1600	10/10/09 12:50	60.84	-1.37
1601	10/10/09 12:51	60.84	-1.37
1602	10/10/09 12:52	60.84	-1.37
1603	10/10/09 12:53	60.84	-1.37
1604	10/10/09 12:54	60.83	-1.38
1605	10/10/09 12:55	60.83	-1.38
1606	10/10/09 12:56	60.84	-1.37
1607	10/10/09 12:57	60.85	-1.36
1608	10/10/09 12:58	60.86	-1.35
1609	10/10/09 12:59	60.85	-1.36
1610	10/10/09 13:00	60.85	-1.36
1611	10/10/09 13:01	60.85	-1.36
1612	10/10/09 13:02	60.85	-1.36
1613	10/10/09 13:03	60.84	-1.37
1614	10/10/09 13:04	60.84	-1.37
1615	10/10/09 13:05	60.83	-1.38
1616	10/10/09 13:06	60.83	-1.38
1617	10/10/09 13:07	60.83	-1.38
1618	10/10/09 13:08	60.83	-1.38
1619	10/10/09 13:09	60.83	-1.38
1620	10/10/09 13:10	60.83	-1.38
1621	10/10/09 13:11	60.82	-1.39
1622	10/10/09 13:12	60.83	-1.38
1623	10/10/09 13:13	60.83	-1.38
1624	10/10/09 13:14	60.82	-1.39
1625	10/10/09 13:15	60.81	-1.40
1626	10/10/09 13:16	60.81	-1.40
1627	10/10/09 13:17	60.82	-1.39
1628	10/10/09 13:18	60.82	-1.39
1629	10/10/09 13:19	60.81	-1.40
1630	10/10/09 13:20	60.82	-1.39
1631	10/10/09 13:21	60.83	-1.38
1632	10/10/09 13:22	60.81	-1.40
1633	10/10/09 13:23	60.81	-1.40
1634	10/10/09 13:24	60.81	-1.40
1635	10/10/09 13:25	60.81	-1.40
1636	10/10/09 13:26	60.82	-1.39
1637	10/10/09 13:27	60.82	-1.39
1638	10/10/09 13:28	60.82	-1.39
1639	10/10/09 13:29	60.81	-1.40
1640	10/10/09 13:30	60.82	-1.39
1641	10/10/09 13:31	60.82	-1.39
1642	10/10/09 13:32	60.82	-1.39
1643	10/10/09 13:33	60.82	-1.39
1644	10/10/09 13:34	60.82	-1.39
1645	10/10/09 13:35	60.81	-1.40
1646	10/10/09 13:36	60.81	-1.40
1647	10/10/09 13:37	60.81	-1.40
1648	10/10/09 13:38	60.80	-1.41
1649	10/10/09 13:39	60.81	-1.40
1650	10/10/09 13:40	60.82	-1.39

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1651	10/10/09 13:41	60.81	-1.40
1652	10/10/09 13:42	60.80	-1.41
1653	10/10/09 13:43	60.79	-1.42
1654	10/10/09 13:44	60.79	-1.42
1655	10/10/09 13:45	60.80	-1.41
1656	10/10/09 13:46	60.80	-1.41
1657	10/10/09 13:47	60.80	-1.41
1658	10/10/09 13:48	60.82	-1.39
1659	10/10/09 13:49	60.83	-1.38
1660	10/10/09 13:50	60.82	-1.39
1661	10/10/09 13:51	60.79	-1.42
1662	10/10/09 13:52	60.80	-1.41
1663	10/10/09 13:53	60.81	-1.40
1664	10/10/09 13:54	60.81	-1.40
1665	10/10/09 13:55	60.80	-1.41
1666	10/10/09 13:56	60.79	-1.42
1667	10/10/09 13:57	60.79	-1.42
1668	10/10/09 13:58	60.79	-1.42
1669	10/10/09 13:59	60.78	-1.43
1670	10/10/09 14:00	60.78	-1.43
1671	10/10/09 14:01	60.78	-1.43
1672	10/10/09 14:02	60.78	-1.43
1673	10/10/09 14:03	60.79	-1.42
1674	10/10/09 14:04	60.79	-1.42
1675	10/10/09 14:05	60.79	-1.42
1676	10/10/09 14:06	60.78	-1.43
1677	10/10/09 14:07	60.78	-1.43
1678	10/10/09 14:08	60.79	-1.42
1679	10/10/09 14:09	60.79	-1.42
1680	10/10/09 14:10	60.80	-1.41
1681	10/10/09 14:11	60.80	-1.41
1682	10/10/09 14:12	60.79	-1.42
1683	10/10/09 14:13	60.77	-1.44
1684	10/10/09 14:14	60.78	-1.43
1685	10/10/09 14:15	60.79	-1.42
1686	10/10/09 14:16	60.80	-1.41
1687	10/10/09 14:17	60.79	-1.42
1688	10/10/09 14:18	60.78	-1.43
1689	10/10/09 14:19	60.77	-1.44
1690	10/10/09 14:20	60.76	-1.45
1691	10/10/09 14:21	60.77	-1.44
1692	10/10/09 14:22	60.76	-1.45
1693	10/10/09 14:23	60.76	-1.45
1694	10/10/09 14:24	60.77	-1.44
1695	10/10/09 14:25	60.76	-1.45
1696	10/10/09 14:26	60.76	-1.45
1697	10/10/09 14:27	60.76	-1.45
1698	10/10/09 14:28	60.77	-1.44
1699	10/10/09 14:29	60.77	-1.44
1700	10/10/09 14:30	60.76	-1.45
1701	10/10/09 14:31	60.76	-1.45
1702	10/10/09 14:32	60.76	-1.45
1703	10/10/09 14:33	60.76	-1.45

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1704	10/10/09 14:34	60.76	-1.45
1705	10/10/09 14:35	60.76	-1.45
1706	10/10/09 14:36	60.76	-1.45
1707	10/10/09 14:37	60.76	-1.45
1708	10/10/09 14:38	60.76	-1.45
1709	10/10/09 14:39	60.76	-1.45
1710	10/10/09 14:40	60.76	-1.45
1711	10/10/09 14:41	60.75	-1.46
1712	10/10/09 14:42	60.75	-1.46
1713	10/10/09 14:43	60.76	-1.45
1714	10/10/09 14:44	60.77	-1.44
1715	10/10/09 14:45	60.77	-1.44
1716	10/10/09 14:46	60.76	-1.45
1717	10/10/09 14:47	60.76	-1.45
1718	10/10/09 14:48	60.75	-1.46
1719	10/10/09 14:49	60.75	-1.46
1720	10/10/09 14:50	60.75	-1.46
1721	10/10/09 14:51	60.75	-1.46
1722	10/10/09 14:52	60.75	-1.46
1723	10/10/09 14:53	60.76	-1.45
1724	10/10/09 14:54	60.76	-1.45
1725	10/10/09 14:55	60.76	-1.45
1726	10/10/09 14:56	60.76	-1.45
1727	10/10/09 14:57	60.77	-1.44
1728	10/10/09 14:58	60.77	-1.44
1729	10/10/09 14:59	60.76	-1.45
1730	10/10/09 15:00	60.76	-1.45
1731	10/10/09 15:01	60.76	-1.45
1732	10/10/09 15:02	60.75	-1.46
1733	10/10/09 15:03	60.74	-1.47
1734	10/10/09 15:04	60.74	-1.47
1735	10/10/09 15:05	60.74	-1.47
1736	10/10/09 15:06	60.75	-1.46
1737	10/10/09 15:07	60.75	-1.46
1738	10/10/09 15:08	60.75	-1.46
1739	10/10/09 15:09	60.75	-1.46
1740	10/10/09 15:10	60.74	-1.47
1741	10/10/09 15:11	60.73	-1.48
1742	10/10/09 15:12	60.73	-1.48
1743	10/10/09 15:13	60.73	-1.48
1744	10/10/09 15:14	60.73	-1.48
1745	10/10/09 15:15	60.73	-1.48
1746	10/10/09 15:16	60.74	-1.47
1747	10/10/09 15:17	60.74	-1.47
1748	10/10/09 15:18	60.74	-1.47
1749	10/10/09 15:19	60.74	-1.47
1750	10/10/09 15:20	60.74	-1.47
1751	10/10/09 15:21	60.73	-1.48
1752	10/10/09 15:22	60.72	-1.49
1753	10/10/09 15:23	60.72	-1.49
1754	10/10/09 15:24	60.74	-1.47
1755	10/10/09 15:25	60.74	-1.47
1756	10/10/09 15:26	60.73	-1.48

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1757	10/10/09 15:27	60.72	-1.49
1758	10/10/09 15:28	60.72	-1.49
1759	10/10/09 15:29	60.72	-1.49
1760	10/10/09 15:30	60.73	-1.48
1761	10/10/09 15:31	60.73	-1.48
1762	10/10/09 15:32	60.73	-1.48
1763	10/10/09 15:33	60.74	-1.47
1764	10/10/09 15:34	60.73	-1.48
1765	10/10/09 15:35	60.73	-1.48
1766	10/10/09 15:36	60.73	-1.48
1767	10/10/09 15:37	60.73	-1.48
1768	10/10/09 15:38	60.73	-1.48
1769	10/10/09 15:39	60.72	-1.49
1770	10/10/09 15:40	60.71	-1.50
1771	10/10/09 15:41	60.72	-1.49
1772	10/10/09 15:42	60.72	-1.49
1773	10/10/09 15:43	60.72	-1.49
1774	10/10/09 15:44	60.72	-1.49
1775	10/10/09 15:45	60.72	-1.49
1776	10/10/09 15:46	60.72	-1.49
1777	10/10/09 15:47	60.72	-1.49
1778	10/10/09 15:48	60.72	-1.49
1779	10/10/09 15:49	60.72	-1.49
1780	10/10/09 15:50	60.72	-1.49
1781	10/10/09 15:51	60.72	-1.49
1782	10/10/09 15:52	60.72	-1.49
1783	10/10/09 15:53	60.71	-1.50
1784	10/10/09 15:54	60.71	-1.50
1785	10/10/09 15:55	60.71	-1.50
1786	10/10/09 15:56	60.72	-1.49
1787	10/10/09 15:57	60.72	-1.49
1788	10/10/09 15:58	60.72	-1.49
1789	10/10/09 15:59	60.73	-1.48
1790	10/10/09 16:00	60.72	-1.49
1791	10/10/09 16:01	60.72	-1.49
1792	10/10/09 16:02	60.72	-1.49
1793	10/10/09 16:03	60.72	-1.49
1794	10/10/09 16:04	60.72	-1.49
1795	10/10/09 16:05	60.71	-1.50
1796	10/10/09 16:06	60.71	-1.50
1797	10/10/09 16:07	60.70	-1.51
1798	10/10/09 16:08	60.69	-1.52
1799	10/10/09 16:09	60.69	-1.52
1800	10/10/09 16:10	60.70	-1.51
1801	10/10/09 16:11	60.70	-1.51
1802	10/10/09 16:12	60.71	-1.50
1803	10/10/09 16:13	60.71	-1.50
1804	10/10/09 16:14	60.71	-1.50
1805	10/10/09 16:15	60.71	-1.50
1806	10/10/09 16:16	60.71	-1.50
1807	10/10/09 16:17	60.71	-1.50
1808	10/10/09 16:18	60.71	-1.50
1809	10/10/09 16:19	60.70	-1.51

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
1810	10/10/09 16:20	60.70	-1.51
1811	10/10/09 16:21	60.70	-1.51
1812	10/10/09 16:22	60.70	-1.51
1813	10/10/09 16:23	60.71	-1.50
1814	10/10/09 16:24	60.71	-1.50
1815	10/10/09 16:25	60.72	-1.49
1816	10/10/09 16:26	60.72	-1.49
1817	10/10/09 16:27	60.72	-1.49
1818	10/10/09 16:28	60.72	-1.49
1819	10/10/09 16:29	60.71	-1.50
1820	10/10/09 16:30	60.71	-1.50
1821	10/10/09 16:31	60.71	-1.50
1822	10/10/09 16:32	60.70	-1.51
1823	10/10/09 16:33	60.69	-1.52
1824	10/10/09 16:34	60.69	-1.52
1825	10/10/09 16:35	60.69	-1.52
1826	10/10/09 16:36	60.69	-1.52
1827	10/10/09 16:37	60.69	-1.52
1828	10/10/09 16:38	60.69	-1.52
1829	10/10/09 16:39	60.70	-1.51
1830	10/10/09 16:40	60.71	-1.50
1831	10/10/09 16:41	60.70	-1.51
1832	10/10/09 16:42	60.70	-1.51
1833	10/10/09 16:43	60.69	-1.52
1838	10/10/09 16:48	60.68	-1.53
1839	10/10/09 16:49	60.68	-1.53
1840	10/10/09 16:50	60.67	-1.54
1841	10/10/09 16:51	60.67	-1.54
1842	10/10/09 16:52	60.67	-1.54
1843	10/10/09 16:53	60.67	-1.54
1844	10/10/09 16:54	60.67	-1.54
1845	10/10/09 16:55	60.67	-1.54
1846	10/10/09 16:56	60.68	-1.53
1847	10/10/09 16:57	60.69	-1.52
1848	10/10/09 16:58	60.69	-1.52
1849	10/10/09 16:59	60.68	-1.53
1850	10/10/09 17:00	60.68	-1.53
1851	10/10/09 17:01	60.68	-1.53
1852	10/10/09 17:02	60.68	-1.53
1853	10/10/09 17:03	60.68	-1.53
1854	10/10/09 17:04	60.68	-1.53
1855	10/10/09 17:05	60.67	-1.54
1856	10/10/09 17:06	60.67	-1.54
1857	10/10/09 17:07	60.67	-1.54
1858	10/10/09 17:08	60.68	-1.53
1859	10/10/09 17:09	60.69	-1.52
1860	10/10/09 17:10	60.69	-1.52
1861	10/10/09 17:11	60.69	-1.52
1862	10/10/09 17:12	60.69	-1.52
1863	10/10/09 17:13	60.70	-1.51
1864	10/10/09 17:14	60.70	-1.51
1865	10/10/09 17:15	60.70	-1.51
1866	10/10/09 17:16	60.69	-1.52

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1867	10/10/09 17:17	60.68	-1.53
1868	10/10/09 17:18	60.68	-1.53
1869	10/10/09 17:19	60.67	-1.54
1870	10/10/09 17:20	60.66	-1.55
1871	10/10/09 17:21	60.66	-1.55
1872	10/10/09 17:22	60.66	-1.55
1873	10/10/09 17:23	60.67	-1.54
1874	10/10/09 17:24	60.68	-1.53
1875	10/10/09 17:25	60.68	-1.53
1876	10/10/09 17:26	60.68	-1.53
1877	10/10/09 17:27	60.67	-1.54
1878	10/10/09 17:28	60.67	-1.54
1879	10/10/09 17:29	60.66	-1.55
1880	10/10/09 17:30	60.67	-1.54
1881	10/10/09 17:31	60.67	-1.54
1882	10/10/09 17:32	60.67	-1.54
1883	10/10/09 17:33	60.67	-1.54
1884	10/10/09 17:34	60.68	-1.53
1885	10/10/09 17:35	60.67	-1.54
1886	10/10/09 17:36	60.68	-1.53
1887	10/10/09 17:37	60.69	-1.52
1888	10/10/09 17:38	60.68	-1.53
1889	10/10/09 17:39	60.67	-1.54
1890	10/10/09 17:40	60.66	-1.55
1891	10/10/09 17:41	60.66	-1.55
1892	10/10/09 17:42	60.67	-1.54
1893	10/10/09 17:43	60.67	-1.54
1894	10/10/09 17:44	60.67	-1.54
1895	10/10/09 17:45	60.67	-1.54
1896	10/10/09 17:46	60.66	-1.55
1897	10/10/09 17:47	60.64	-1.57
1898	10/10/09 17:48	60.64	-1.57
1899	10/10/09 17:49	60.66	-1.55
1900	10/10/09 17:50	60.67	-1.54
1901	10/10/09 17:51	60.67	-1.54
1902	10/10/09 17:52	60.67	-1.54
1903	10/10/09 17:53	60.67	-1.54
1904	10/10/09 17:54	60.66	-1.55
1905	10/10/09 17:55	60.65	-1.56
1906	10/10/09 17:56	60.64	-1.57
1907	10/10/09 17:57	60.64	-1.57
1908	10/10/09 17:58	60.65	-1.56
1909	10/10/09 17:59	60.65	-1.56
1910	10/10/09 18:00	60.65	-1.56
1911	10/10/09 18:01	60.65	-1.56
1912	10/10/09 18:02	60.65	-1.56
1913	10/10/09 18:03	60.64	-1.57
1914	10/10/09 18:04	60.64	-1.57
1915	10/10/09 18:05	60.64	-1.57
1916	10/10/09 18:06	60.64	-1.57
1917	10/10/09 18:07	60.64	-1.57
1918	10/10/09 18:08	60.64	-1.57
1919	10/10/09 18:09	60.64	-1.57

W-VI :: Observation Well 72-hour Pump Test @153 gpm

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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1920	10/10/09 18:10	60.65	-1.56
1921	10/10/09 18:11	60.65	-1.56
1922	10/10/09 18:12	60.65	-1.56
1923	10/10/09 18:13	60.66	-1.55
1924	10/10/09 18:14	60.65	-1.56
1925	10/10/09 18:15	60.65	-1.56
1926	10/10/09 18:16	60.65	-1.56
1927	10/10/09 18:17	60.65	-1.56
1928	10/10/09 18:18	60.65	-1.56
1929	10/10/09 18:19	60.65	-1.56
1930	10/10/09 18:20	60.65	-1.56
1931	10/10/09 18:21	60.65	-1.56
1932	10/10/09 18:22	60.64	-1.57
1933	10/10/09 18:23	60.62	-1.59
1934	10/10/09 18:24	60.65	-1.56
1935	10/10/09 18:25	60.65	-1.56
1936	10/10/09 18:26	60.64	-1.57
1937	10/10/09 18:27	60.64	-1.57
1938	10/10/09 18:28	60.63	-1.58
1939	10/10/09 18:29	60.63	-1.58
1940	10/10/09 18:30	60.63	-1.58
1941	10/10/09 18:31	60.64	-1.57
1942	10/10/09 18:32	60.64	-1.57
1943	10/10/09 18:33	60.63	-1.58
1944	10/10/09 18:34	60.64	-1.57
1945	10/10/09 18:35	60.64	-1.57
1946	10/10/09 18:36	60.63	-1.58
1947	10/10/09 18:37	60.64	-1.57
1948	10/10/09 18:38	60.65	-1.56
1949	10/10/09 18:39	60.64	-1.57
1950	10/10/09 18:40	60.63	-1.58
1951	10/10/09 18:41	60.62	-1.59
1952	10/10/09 18:42	60.62	-1.59
1953	10/10/09 18:43	60.62	-1.59
1954	10/10/09 18:44	60.63	-1.58
1955	10/10/09 18:45	60.63	-1.58
1956	10/10/09 18:46	60.65	-1.56
1957	10/10/09 18:47	60.64	-1.57
1958	10/10/09 18:48	60.63	-1.58
1959	10/10/09 18:49	60.62	-1.59
1960	10/10/09 18:50	60.62	-1.59
1961	10/10/09 18:51	60.62	-1.59
1962	10/10/09 18:52	60.61	-1.60
1963	10/10/09 18:53	60.63	-1.58
1964	10/10/09 18:54	60.65	-1.56
1965	10/10/09 18:55	60.64	-1.57
1966	10/10/09 18:56	60.63	-1.58
1967	10/10/09 18:57	60.62	-1.59
1968	10/10/09 18:58	60.61	-1.60
1969	10/10/09 18:59	60.61	-1.60
1970	10/10/09 19:00	60.61	-1.60
1971	10/10/09 19:01	60.61	-1.60
1972	10/10/09 19:02	60.62	-1.59

W-VI :: Observation Well 72-hour Pump Test @153 gpm

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Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
1973	10/10/09 19:03	60.62	-1.59
1974	10/10/09 19:04	60.62	-1.59
1975	10/10/09 19:05	60.61	-1.60
1976	10/10/09 19:06	60.61	-1.60
1977	10/10/09 19:07	60.61	-1.60
1978	10/10/09 19:08	60.62	-1.59
1979	10/10/09 19:09	60.61	-1.60
1980	10/10/09 19:10	60.60	-1.61
1981	10/10/09 19:11	60.61	-1.60
1982	10/10/09 19:12	60.62	-1.59
1983	10/10/09 19:13	60.62	-1.59
1984	10/10/09 19:14	60.62	-1.59
1985	10/10/09 19:15	60.62	-1.59
1986	10/10/09 19:16	60.62	-1.59
1987	10/10/09 19:17	60.62	-1.59
1988	10/10/09 19:18	60.62	-1.59
1989	10/10/09 19:19	60.62	-1.59
1990	10/10/09 19:20	60.62	-1.59
1991	10/10/09 19:21	60.61	-1.60
1992	10/10/09 19:22	60.60	-1.61
1993	10/10/09 19:23	60.61	-1.60
1994	10/10/09 19:24	60.62	-1.59
1995	10/10/09 19:25	60.62	-1.59
1996	10/10/09 19:26	60.61	-1.60
1997	10/10/09 19:27	60.61	-1.60
1998	10/10/09 19:28	60.60	-1.61
1999	10/10/09 19:29	60.60	-1.61
2000	10/10/09 19:30	60.60	-1.61
2001	10/10/09 19:31	60.60	-1.61
2002	10/10/09 19:32	60.60	-1.61
2003	10/10/09 19:33	60.59	-1.62
2004	10/10/09 19:34	60.59	-1.62
2005	10/10/09 19:35	60.60	-1.61
2006	10/10/09 19:36	60.60	-1.61
2007	10/10/09 19:37	60.60	-1.61
2008	10/10/09 19:38	60.60	-1.61
2009	10/10/09 19:39	60.60	-1.61
2010	10/10/09 19:40	60.60	-1.61
2011	10/10/09 19:41	60.59	-1.62
2012	10/10/09 19:42	60.59	-1.62
2013	10/10/09 19:43	60.61	-1.60
2014	10/10/09 19:44	60.62	-1.59
2015	10/10/09 19:45	60.60	-1.61
2016	10/10/09 19:46	60.59	-1.62
2017	10/10/09 19:47	60.60	-1.61
2018	10/10/09 19:48	60.61	-1.60
2019	10/10/09 19:49	60.61	-1.60
2020	10/10/09 19:50	60.61	-1.60
2021	10/10/09 19:51	60.60	-1.61
2022	10/10/09 19:52	60.59	-1.62
2023	10/10/09 19:53	60.60	-1.61
2024	10/10/09 19:54	60.60	-1.61
2025	10/10/09 19:55	60.60	-1.61

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2026	10/10/09 19:56	60.60	-1.61
2027	10/10/09 19:57	60.59	-1.62
2028	10/10/09 19:58	60.59	-1.62
2029	10/10/09 19:59	60.59	-1.62
2030	10/10/09 20:00	60.59	-1.62
2031	10/10/09 20:01	60.61	-1.60
2032	10/10/09 20:02	60.61	-1.60
2033	10/10/09 20:03	60.61	-1.60
2034	10/10/09 20:04	60.61	-1.60
2035	10/10/09 20:05	60.61	-1.60
2036	10/10/09 20:06	60.60	-1.61
2037	10/10/09 20:07	60.59	-1.62
2038	10/10/09 20:08	60.58	-1.63
2039	10/10/09 20:09	60.58	-1.63
2040	10/10/09 20:10	60.58	-1.63
2041	10/10/09 20:11	60.58	-1.63
2042	10/10/09 20:12	60.58	-1.63
2043	10/10/09 20:13	60.57	-1.64
2044	10/10/09 20:14	60.57	-1.64
2045	10/10/09 20:15	60.58	-1.63
2046	10/10/09 20:16	60.59	-1.62
2047	10/10/09 20:17	60.59	-1.62
2048	10/10/09 20:18	60.58	-1.63
2049	10/10/09 20:19	60.58	-1.63
2050	10/10/09 20:20	60.58	-1.63
2051	10/10/09 20:21	60.57	-1.64
2052	10/10/09 20:22	60.57	-1.64
2053	10/10/09 20:23	60.57	-1.64
2054	10/10/09 20:24	60.57	-1.64
2055	10/10/09 20:25	60.58	-1.63
2056	10/10/09 20:26	60.58	-1.63
2057	10/10/09 20:27	60.58	-1.63
2058	10/10/09 20:28	60.58	-1.63
2059	10/10/09 20:29	60.58	-1.63
2060	10/10/09 20:30	60.58	-1.63
2061	10/10/09 20:31	60.59	-1.62
2062	10/10/09 20:32	60.59	-1.62
2063	10/10/09 20:33	60.59	-1.62
2064	10/10/09 20:34	60.59	-1.62
2065	10/10/09 20:35	60.58	-1.63
2066	10/10/09 20:36	60.57	-1.64
2067	10/10/09 20:37	60.57	-1.64
2068	10/10/09 20:38	60.57	-1.64
2069	10/10/09 20:39	60.56	-1.65
2070	10/10/09 20:40	60.56	-1.65
2071	10/10/09 20:41	60.59	-1.62
2072	10/10/09 20:42	60.60	-1.61
2073	10/10/09 20:43	60.59	-1.62
2074	10/10/09 20:44	60.58	-1.63
2075	10/10/09 20:45	60.57	-1.64
2076	10/10/09 20:46	60.56	-1.65
2077	10/10/09 20:47	60.57	-1.64
2078	10/10/09 20:48	60.57	-1.64

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2079	10/10/09 20:49	60.57	-1.64
2080	10/10/09 20:50	60.58	-1.63
2081	10/10/09 20:51	60.57	-1.64
2082	10/10/09 20:52	60.58	-1.63
2083	10/10/09 20:53	60.58	-1.63
2084	10/10/09 20:54	60.57	-1.64
2085	10/10/09 20:55	60.56	-1.65
2086	10/10/09 20:56	60.55	-1.66
2087	10/10/09 20:57	60.55	-1.66
2088	10/10/09 20:58	60.57	-1.64
2089	10/10/09 20:59	60.58	-1.63
2090	10/10/09 21:00	60.56	-1.65
2091	10/10/09 21:01	60.55	-1.66
2092	10/10/09 21:02	60.56	-1.65
2093	10/10/09 21:03	60.55	-1.66
2094	10/10/09 21:04	60.56	-1.65
2095	10/10/09 21:05	60.56	-1.65
2096	10/10/09 21:06	60.56	-1.65
2097	10/10/09 21:07	60.56	-1.65
2098	10/10/09 21:08	60.56	-1.65
2099	10/10/09 21:09	60.56	-1.65
2100	10/10/09 21:10	60.56	-1.65
2101	10/10/09 21:11	60.56	-1.65
2102	10/10/09 21:12	60.55	-1.66
2103	10/10/09 21:13	60.55	-1.66
2104	10/10/09 21:14	60.55	-1.66
2105	10/10/09 21:15	60.55	-1.66
2106	10/10/09 21:16	60.56	-1.65
2107	10/10/09 21:17	60.57	-1.64
2108	10/10/09 21:18	60.58	-1.63
2109	10/10/09 21:19	60.57	-1.64
2110	10/10/09 21:20	60.57	-1.64
2111	10/10/09 21:21	60.55	-1.66
2112	10/10/09 21:22	60.54	-1.67
2113	10/10/09 21:23	60.54	-1.67
2114	10/10/09 21:24	60.54	-1.67
2115	10/10/09 21:25	60.54	-1.67
2116	10/10/09 21:26	60.54	-1.67
2117	10/10/09 21:27	60.54	-1.67
2118	10/10/09 21:28	60.54	-1.67
2119	10/10/09 21:29	60.54	-1.67
2120	10/10/09 21:30	60.55	-1.66
2121	10/10/09 21:31	60.55	-1.66
2122	10/10/09 21:32	60.55	-1.66
2123	10/10/09 21:33	60.55	-1.66
2124	10/10/09 21:34	60.55	-1.66
2125	10/10/09 21:35	60.55	-1.66
2126	10/10/09 21:36	60.54	-1.67
2127	10/10/09 21:37	60.55	-1.66
2128	10/10/09 21:38	60.56	-1.65
2129	10/10/09 21:39	60.56	-1.65
2130	10/10/09 21:40	60.56	-1.65
2131	10/10/09 21:41	60.56	-1.65

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6486.200.503	**Geologist: Brooks Ramsdell**	
Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
2132	10/10/09 21:42	60.55	-1.66
2133	10/10/09 21:43	60.54	-1.67
2134	10/10/09 21:44	60.54	-1.67
2135	10/10/09 21:45	60.55	-1.66
2136	10/10/09 21:46	60.54	-1.67
2137	10/10/09 21:47	60.53	-1.68
2138	10/10/09 21:48	60.52	-1.69
2139	10/10/09 21:49	60.52	-1.69
2140	10/10/09 21:50	60.52	-1.69
2141	10/10/09 21:51	60.53	-1.68
2142	10/10/09 21:52	60.53	-1.68
2143	10/10/09 21:53	60.53	-1.68
2144	10/10/09 21:54	60.54	-1.67
2145	10/10/09 21:55	60.54	-1.67
2146	10/10/09 21:56	60.54	-1.67
2147	10/10/09 21:57	60.53	-1.68
2148	10/10/09 21:58	60.53	-1.68
2149	10/10/09 21:59	60.54	-1.67
2150	10/10/09 22:00	60.53	-1.68
2151	10/10/09 22:01	60.54	-1.67
2152	10/10/09 22:02	60.54	-1.67
2153	10/10/09 22:03	60.54	-1.67
2154	10/10/09 22:04	60.54	-1.67
2155	10/10/09 22:05	60.54	-1.67
2156	10/10/09 22:06	60.53	-1.68
2157	10/10/09 22:07	60.52	-1.69
2158	10/10/09 22:08	60.52	-1.69
2159	10/10/09 22:09	60.53	-1.68
2160	10/10/09 22:10	60.53	-1.68
2161	10/10/09 22:11	60.53	-1.68
2162	10/10/09 22:12	60.53	-1.68
2163	10/10/09 22:13	60.53	-1.68
2164	10/10/09 22:14	60.53	-1.68
2165	10/10/09 22:15	60.52	-1.69
2166	10/10/09 22:16	60.52	-1.69
2167	10/10/09 22:17	60.53	-1.68
2168	10/10/09 22:18	60.54	-1.67
2169	10/10/09 22:19	60.54	-1.67
2170	10/10/09 22:20	60.53	-1.68
2171	10/10/09 22:21	60.52	-1.69
2172	10/10/09 22:22	60.52	-1.69
2173	10/10/09 22:23	60.52	-1.69
2174	10/10/09 22:24	60.52	-1.69
2175	10/10/09 22:25	60.53	-1.68
2176	10/10/09 22:26	60.53	-1.68
2177	10/10/09 22:27	60.53	-1.68
2178	10/10/09 22:28	60.52	-1.69
2179	10/10/09 22:29	60.51	-1.70
2180	10/10/09 22:30	60.51	-1.70
2181	10/10/09 22:31	60.52	-1.69
2182	10/10/09 22:32	60.51	-1.70
2183	10/10/09 22:33	60.51	-1.70
2184	10/10/09 22:34	60.51	-1.70

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2185	10/10/09 22:35	60.51	-1.70
2186	10/10/09 22:36	60.52	-1.69
2187	10/10/09 22:37	60.52	-1.69
2188	10/10/09 22:38	60.52	-1.69
2189	10/10/09 22:39	60.52	-1.69
2190	10/10/09 22:40	60.51	-1.70
2191	10/10/09 22:41	60.52	-1.69
2192	10/10/09 22:42	60.53	-1.68
2193	10/10/09 22:43	60.54	-1.67
2194	10/10/09 22:44	60.54	-1.67
2195	10/10/09 22:45	60.54	-1.67
2196	10/10/09 22:46	60.53	-1.68
2197	10/10/09 22:47	60.53	-1.68
2198	10/10/09 22:48	60.52	-1.69
2199	10/10/09 22:49	60.51	-1.70
2200	10/10/09 22:50	60.51	-1.70
2201	10/10/09 22:51	60.51	-1.70
2202	10/10/09 22:52	60.51	-1.70
2203	10/10/09 22:53	60.51	-1.70
2204	10/10/09 22:54	60.50	-1.71
2205	10/10/09 22:55	60.50	-1.71
2206	10/10/09 22:56	60.50	-1.71
2207	10/10/09 22:57	60.50	-1.71
2208	10/10/09 22:58	60.51	-1.70
2209	10/10/09 22:59	60.51	-1.70
2210	10/10/09 23:00	60.51	-1.70
2211	10/10/09 23:01	60.51	-1.70
2212	10/10/09 23:02	60.50	-1.71
2213	10/10/09 23:03	60.51	-1.70
2214	10/10/09 23:04	60.51	-1.70
2215	10/10/09 23:05	60.52	-1.69
2216	10/10/09 23:06	60.52	-1.69
2217	10/10/09 23:07	60.51	-1.70
2218	10/10/09 23:08	60.51	-1.70
2219	10/10/09 23:09	60.51	-1.70
2220	10/10/09 23:10	60.51	-1.70
2221	10/10/09 23:11	60.51	-1.70
2222	10/10/09 23:12	60.52	-1.69
2223	10/10/09 23:13	60.53	-1.68
2224	10/10/09 23:14	60.53	-1.68
2225	10/10/09 23:15	60.53	-1.68
2226	10/10/09 23:16	60.53	-1.68
2227	10/10/09 23:17	60.53	-1.68
2228	10/10/09 23:18	60.52	-1.69
2229	10/10/09 23:19	60.52	-1.69
2230	10/10/09 23:20	60.52	-1.69
2231	10/10/09 23:21	60.52	-1.69
2232	10/10/09 23:22	60.52	-1.69
2233	10/10/09 23:23	60.52	-1.69
2234	10/10/09 23:24	60.51	-1.70
2235	10/10/09 23:25	60.50	-1.71
2236	10/10/09 23:26	60.49	-1.72
2237	10/10/09 23:27	60.49	-1.72

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
2238	10/10/09 23:28	60.50	-1.71
2239	10/10/09 23:29	60.51	-1.70
2240	10/10/09 23:30	60.52	-1.69
2241	10/10/09 23:31	60.51	-1.70
2242	10/10/09 23:32	60.50	-1.71
2243	10/10/09 23:33	60.49	-1.72
2244	10/10/09 23:34	60.49	-1.72
2245	10/10/09 23:35	60.49	-1.72
2246	10/10/09 23:36	60.49	-1.72
2247	10/10/09 23:37	60.49	-1.72
2248	10/10/09 23:38	60.49	-1.72
2249	10/10/09 23:39	60.50	-1.71
2250	10/10/09 23:40	60.50	-1.71
2251	10/10/09 23:41	60.49	-1.72
2252	10/10/09 23:42	60.49	-1.72
2253	10/10/09 23:43	60.50	-1.71
2254	10/10/09 23:44	60.52	-1.69
2255	10/10/09 23:45	60.51	-1.70
2256	10/10/09 23:46	60.52	-1.69
2257	10/10/09 23:47	60.52	-1.69
2258	10/10/09 23:48	60.52	-1.69
2259	10/10/09 23:49	60.50	-1.71
2260	10/10/09 23:50	60.49	-1.72
2261	10/10/09 23:51	60.48	-1.73
2262	10/10/09 23:52	60.49	-1.72
2263	10/10/09 23:53	60.49	-1.72
2264	10/10/09 23:54	60.49	-1.72
2265	10/10/09 23:55	60.50	-1.71
2266	10/10/09 23:56	60.51	-1.70
2267	10/10/09 23:57	60.50	-1.71
2268	10/10/09 23:58	60.50	-1.71
2269	10/10/09 23:59	60.49	-1.72
2270	10/11/09 0:00	60.50	-1.71
2271	10/11/09 0:01	60.51	-1.70
2272	10/11/09 0:02	60.51	-1.70
2273	10/11/09 0:03	60.50	-1.71
2274	10/11/09 0:04	60.49	-1.72
2275	10/11/09 0:05	60.49	-1.72
2276	10/11/09 0:06	60.49	-1.72
2277	10/11/09 0:07	60.50	-1.71
2278	10/11/09 0:08	60.50	-1.71
2279	10/11/09 0:09	60.50	-1.71
2280	10/11/09 0:10	60.50	-1.71
2281	10/11/09 0:11	60.49	-1.72
2282	10/11/09 0:12	60.49	-1.72
2283	10/11/09 0:13	60.49	-1.72
2284	10/11/09 0:14	60.49	-1.72
2285	10/11/09 0:15	60.50	-1.71
2286	10/11/09 0:16	60.49	-1.72
2287	10/11/09 0:17	60.49	-1.72
2288	10/11/09 0:18	60.50	-1.71
2289	10/11/09 0:19	60.50	-1.71
2290	10/11/09 0:20	60.50	-1.71

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
2291	10/11/09 0:21	60.50	-1.71
2292	10/11/09 0:22	60.51	-1.70
2293	10/11/09 0:23	60.51	-1.70
2294	10/11/09 0:24	60.52	-1.69
2295	10/11/09 0:25	60.52	-1.69
2296	10/11/09 0:26	60.52	-1.69
2297	10/11/09 0:27	60.52	-1.69
2298	10/11/09 0:28	60.52	-1.69
2299	10/11/09 0:29	60.51	-1.70
2300	10/11/09 0:30	60.50	-1.71
2301	10/11/09 0:31	60.50	-1.71
2302	10/11/09 0:32	60.51	-1.70
2303	10/11/09 0:33	60.52	-1.69
2304	10/11/09 0:34	60.51	-1.70
2305	10/11/09 0:35	60.51	-1.70
2306	10/11/09 0:36	60.51	-1.70
2307	10/11/09 0:37	60.51	-1.70
2308	10/11/09 0:38	60.50	-1.71
2309	10/11/09 0:39	60.49	-1.72
2310	10/11/09 0:40	60.48	-1.73
2311	10/11/09 0:41	60.49	-1.72
2312	10/11/09 0:42	60.49	-1.72
2313	10/11/09 0:43	60.49	-1.72
2314	10/11/09 0:44	60.50	-1.71
2315	10/11/09 0:45	60.50	-1.71
2316	10/11/09 0:46	60.50	-1.71
2317	10/11/09 0:47	60.50	-1.71
2318	10/11/09 0:48	60.49	-1.72
2319	10/11/09 0:49	60.49	-1.72
2320	10/11/09 0:50	60.49	-1.72
2321	10/11/09 0:51	60.49	-1.72
2322	10/11/09 0:52	60.50	-1.71
2323	10/11/09 0:53	60.50	-1.71
2324	10/11/09 0:54	60.50	-1.71
2325	10/11/09 0:55	60.50	-1.71
2326	10/11/09 0:56	60.50	-1.71
2327	10/11/09 0:57	60.50	-1.71
2328	10/11/09 0:58	60.50	-1.71
2329	10/11/09 0:59	60.51	-1.70
2330	10/11/09 1:00	60.51	-1.70
2331	10/11/09 1:01	60.50	-1.71
2332	10/11/09 1:02	60.50	-1.71
2333	10/11/09 1:03	60.51	-1.70
2334	10/11/09 1:04	60.50	-1.71
2335	10/11/09 1:05	60.51	-1.70
2336	10/11/09 1:06	60.52	-1.69
2337	10/11/09 1:07	60.51	-1.70
2338	10/11/09 1:08	60.51	-1.70
2339	10/11/09 1:09	60.50	-1.71
2340	10/11/09 1:10	60.49	-1.72
2341	10/11/09 1:11	60.50	-1.71
2342	10/11/09 1:12	60.49	-1.72
2343	10/11/09 1:13	60.50	-1.71

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
2344	10/11/09 1:14	60.49	-1.72
2345	10/11/09 1:15	60.49	-1.72
2346	10/11/09 1:16	60.50	-1.71
2347	10/11/09 1:17	60.50	-1.71
2348	10/11/09 1:18	60.51	-1.70
2349	10/11/09 1:19	60.52	-1.69
2350	10/11/09 1:20	60.53	-1.68
2351	10/11/09 1:21	60.50	-1.71
2352	10/11/09 1:22	60.49	-1.72
2353	10/11/09 1:23	60.49	-1.72
2354	10/11/09 1:24	60.49	-1.72
2355	10/11/09 1:25	60.49	-1.72
2356	10/11/09 1:26	60.48	-1.73
2357	10/11/09 1:27	60.49	-1.72
2358	10/11/09 1:28	60.51	-1.70
2359	10/11/09 1:29	60.51	-1.70
2360	10/11/09 1:30	60.51	-1.70
2361	10/11/09 1:31	60.50	-1.71
2362	10/11/09 1:32	60.49	-1.72
2363	10/11/09 1:33	60.48	-1.73
2364	10/11/09 1:34	60.48	-1.73
2365	10/11/09 1:35	60.49	-1.72
2366	10/11/09 1:36	60.50	-1.71
2367	10/11/09 1:37	60.51	-1.70
2368	10/11/09 1:38	60.50	-1.71
2369	10/11/09 1:39	60.49	-1.72
2370	10/11/09 1:40	60.48	-1.73
2371	10/11/09 1:41	60.48	-1.73
2372	10/11/09 1:42	60.49	-1.72
2373	10/11/09 1:43	60.50	-1.71
2374	10/11/09 1:44	60.49	-1.72
2375	10/11/09 1:45	60.48	-1.73
2376	10/11/09 1:46	60.49	-1.72
2377	10/11/09 1:47	60.49	-1.72
2378	10/11/09 1:48	60.48	-1.73
2379	10/11/09 1:49	60.48	-1.73
2380	10/11/09 1:50	60.48	-1.73
2381	10/11/09 1:51	60.49	-1.72
2382	10/11/09 1:52	60.49	-1.72
2383	10/11/09 1:53	60.49	-1.72
2384	10/11/09 1:54	60.49	-1.72
2385	10/11/09 1:55	60.50	-1.71
2386	10/11/09 1:56	60.51	-1.70
2387	10/11/09 1:57	60.50	-1.71
2388	10/11/09 1:58	60.49	-1.72
2389	10/11/09 1:59	60.49	-1.72
2390	10/11/09 2:00	60.49	-1.72
2391	10/11/09 2:01	60.49	-1.72
2392	10/11/09 2:02	60.49	-1.72
2393	10/11/09 2:03	60.48	-1.73
2394	10/11/09 2:04	60.48	-1.73
2395	10/11/09 2:05	60.48	-1.73
2396	10/11/09 2:06	60.48	-1.73

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2397	10/11/09 2:07	60.49	-1.72
2398	10/11/09 2:08	60.49	-1.72
2399	10/11/09 2:09	60.48	-1.73
2400	10/11/09 2:10	60.48	-1.73
2401	10/11/09 2:11	60.49	-1.72
2402	10/11/09 2:12	60.49	-1.72
2403	10/11/09 2:13	60.49	-1.72
2404	10/11/09 2:14	60.50	-1.71
2405	10/11/09 2:15	60.50	-1.71
2406	10/11/09 2:16	60.51	-1.70
2407	10/11/09 2:17	60.50	-1.71
2408	10/11/09 2:18	60.48	-1.73
2409	10/11/09 2:19	60.47	-1.74
2410	10/11/09 2:20	60.48	-1.73
2411	10/11/09 2:21	60.49	-1.72
2412	10/11/09 2:22	60.50	-1.71
2413	10/11/09 2:23	60.50	-1.71
2414	10/11/09 2:24	60.49	-1.72
2415	10/11/09 2:25	60.49	-1.72
2416	10/11/09 2:26	60.50	-1.71
2417	10/11/09 2:27	60.50	-1.71
2418	10/11/09 2:28	60.49	-1.72
2419	10/11/09 2:29	60.49	-1.72
2420	10/11/09 2:30	60.49	-1.72
2421	10/11/09 2:31	60.50	-1.71
2422	10/11/09 2:32	60.49	-1.72
2423	10/11/09 2:33	60.47	-1.74
2424	10/11/09 2:34	60.47	-1.74
2425	10/11/09 2:35	60.47	-1.74
2426	10/11/09 2:36	60.47	-1.74
2427	10/11/09 2:37	60.46	-1.75
2428	10/11/09 2:38	60.47	-1.74
2429	10/11/09 2:39	60.47	-1.74
2430	10/11/09 2:40	60.48	-1.73
2431	10/11/09 2:41	60.47	-1.74
2432	10/11/09 2:42	60.47	-1.74
2433	10/11/09 2:43	60.48	-1.73
2434	10/11/09 2:44	60.48	-1.73
2435	10/11/09 2:45	60.48	-1.73
2436	10/11/09 2:46	60.48	-1.73
2437	10/11/09 2:47	60.49	-1.72
2438	10/11/09 2:48	60.49	-1.72
2439	10/11/09 2:49	60.49	-1.72
2440	10/11/09 2:50	60.49	-1.72
2446	10/11/09 2:56	60.47	-1.74
2447	10/11/09 2:57	60.47	-1.74
2448	10/11/09 2:58	60.47	-1.74
2449	10/11/09 2:59	60.46	-1.75
2450	10/11/09 3:00	60.46	-1.75
2451	10/11/09 3:01	60.46	-1.75
2452	10/11/09 3:02	60.47	-1.74
2453	10/11/09 3:03	60.47	-1.74
2454	10/11/09 3:04	60.47	-1.74

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
2455	10/11/09 3:05	60.47	-1.74
2456	10/11/09 3:06	60.46	-1.75
2457	10/11/09 3:07	60.46	-1.75
2458	10/11/09 3:08	60.46	-1.75
2459	10/11/09 3:09	60.47	-1.74
2460	10/11/09 3:10	60.47	-1.74
2461	10/11/09 3:11	60.47	-1.74
2462	10/11/09 3:12	60.47	-1.74
2463	10/11/09 3:13	60.47	-1.74
2464	10/11/09 3:14	60.47	-1.74
2465	10/11/09 3:15	60.46	-1.75
2466	10/11/09 3:16	60.46	-1.75
2467	10/11/09 3:17	60.46	-1.75
2468	10/11/09 3:18	60.46	-1.75
2469	10/11/09 3:19	60.47	-1.74
2470	10/11/09 3:20	60.48	-1.73
2471	10/11/09 3:21	60.47	-1.74
2472	10/11/09 3:22	60.46	-1.75
2473	10/11/09 3:23	60.47	-1.74
2474	10/11/09 3:24	60.46	-1.75
2475	10/11/09 3:25	60.46	-1.75
2476	10/11/09 3:26	60.45	-1.76
2477	10/11/09 3:27	60.46	-1.75
2478	10/11/09 3:28	60.46	-1.75
2479	10/11/09 3:29	60.46	-1.75
2480	10/11/09 3:30	60.46	-1.75
2481	10/11/09 3:31	60.45	-1.76
2482	10/11/09 3:32	60.45	-1.76
2483	10/11/09 3:33	60.45	-1.76
2484	10/11/09 3:34	60.45	-1.76
2485	10/11/09 3:35	60.46	-1.75
2486	10/11/09 3:36	60.47	-1.74
2487	10/11/09 3:37	60.47	-1.74
2488	10/11/09 3:38	60.46	-1.75
2489	10/11/09 3:39	60.46	-1.75
2490	10/11/09 3:40	60.47	-1.74
2491	10/11/09 3:41	60.47	-1.74
2492	10/11/09 3:42	60.47	-1.74
2493	10/11/09 3:43	60.46	-1.75
2494	10/11/09 3:44	60.44	-1.77
2495	10/11/09 3:45	60.46	-1.75
2496	10/11/09 3:46	60.46	-1.75
2497	10/11/09 3:47	60.45	-1.76
2498	10/11/09 3:48	60.45	-1.76
2499	10/11/09 3:49	60.45	-1.76
2500	10/11/09 3:50	60.44	-1.77
2501	10/11/09 3:51	60.43	-1.78
2502	10/11/09 3:52	60.44	-1.77
2503	10/11/09 3:53	60.45	-1.76
2504	10/11/09 3:54	60.45	-1.76
2505	10/11/09 3:55	60.44	-1.77
2506	10/11/09 3:56	60.44	-1.77
2507	10/11/09 3:57	60.44	-1.77

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2508	10/11/09 3:58	60.45	-1.76
2509	10/11/09 3:59	60.45	-1.76
2510	10/11/09 4:00	60.45	-1.76
2511	10/11/09 4:01	60.44	-1.77
2512	10/11/09 4:02	60.45	-1.76
2513	10/11/09 4:03	60.45	-1.76
2514	10/11/09 4:04	60.46	-1.75
2515	10/11/09 4:05	60.46	-1.75
2516	10/11/09 4:06	60.46	-1.75
2517	10/11/09 4:07	60.45	-1.76
2518	10/11/09 4:08	60.45	-1.76
2519	10/11/09 4:09	60.46	-1.75
2520	10/11/09 4:10	60.46	-1.75
2521	10/11/09 4:11	60.44	-1.77
2522	10/11/09 4:12	60.45	-1.76
2523	10/11/09 4:13	60.45	-1.76
2524	10/11/09 4:14	60.45	-1.76
2525	10/11/09 4:15	60.46	-1.75
2526	10/11/09 4:16	60.46	-1.75
2527	10/11/09 4:17	60.45	-1.76
2528	10/11/09 4:18	60.45	-1.76
2529	10/11/09 4:19	60.46	-1.75
2530	10/11/09 4:20	60.45	-1.76
2531	10/11/09 4:21	60.45	-1.76
2532	10/11/09 4:22	60.44	-1.77
2533	10/11/09 4:23	60.45	-1.76
2534	10/11/09 4:24	60.45	-1.76
2535	10/11/09 4:25	60.46	-1.75
2536	10/11/09 4:26	60.46	-1.75
2537	10/11/09 4:27	60.45	-1.76
2538	10/11/09 4:28	60.45	-1.76
2539	10/11/09 4:29	60.45	-1.76
2540	10/11/09 4:30	60.44	-1.77
2541	10/11/09 4:31	60.44	-1.77
2542	10/11/09 4:32	60.44	-1.77
2543	10/11/09 4:33	60.44	-1.77
2544	10/11/09 4:34	60.44	-1.77
2545	10/11/09 4:35	60.44	-1.77
2546	10/11/09 4:36	60.44	-1.77
2547	10/11/09 4:37	60.45	-1.76
2548	10/11/09 4:38	60.45	-1.76
2549	10/11/09 4:39	60.44	-1.77
2550	10/11/09 4:40	60.44	-1.77
2551	10/11/09 4:41	60.45	-1.76
2552	10/11/09 4:42	60.45	-1.76
2553	10/11/09 4:43	60.44	-1.77
2554	10/11/09 4:44	60.45	-1.76
2555	10/11/09 4:45	60.46	-1.75
2556	10/11/09 4:46	60.44	-1.77
2557	10/11/09 4:47	60.45	-1.76
2558	10/11/09 4:48	60.46	-1.75
2559	10/11/09 4:49	60.46	-1.75
2560	10/11/09 4:50	60.46	-1.75

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2561	10/11/09 4:51	60.46	-1.75
2562	10/11/09 4:52	60.45	-1.76
2563	10/11/09 4:53	60.45	-1.76
2564	10/11/09 4:54	60.44	-1.77
2565	10/11/09 4:55	60.45	-1.76
2566	10/11/09 4:56	60.47	-1.74
2567	10/11/09 4:57	60.46	-1.75
2568	10/11/09 4:58	60.44	-1.77
2569	10/11/09 4:59	60.44	-1.77
2570	10/11/09 5:00	60.45	-1.76
2571	10/11/09 5:01	60.45	-1.76
2572	10/11/09 5:02	60.45	-1.76
2573	10/11/09 5:03	60.45	-1.76
2574	10/11/09 5:04	60.44	-1.77
2575	10/11/09 5:05	60.44	-1.77
2576	10/11/09 5:06	60.44	-1.77
2577	10/11/09 5:07	60.44	-1.77
2578	10/11/09 5:08	60.46	-1.75
2579	10/11/09 5:09	60.46	-1.75
2580	10/11/09 5:10	60.46	-1.75
2581	10/11/09 5:11	60.46	-1.75
2582	10/11/09 5:12	60.46	-1.75
2583	10/11/09 5:13	60.45	-1.76
2584	10/11/09 5:14	60.45	-1.76
2585	10/11/09 5:15	60.45	-1.76
2586	10/11/09 5:16	60.44	-1.77
2587	10/11/09 5:17	60.44	-1.77
2588	10/11/09 5:18	60.44	-1.77
2589	10/11/09 5:19	60.44	-1.77
2590	10/11/09 5:20	60.45	-1.76
2591	10/11/09 5:21	60.46	-1.75
2592	10/11/09 5:22	60.46	-1.75
2593	10/11/09 5:23	60.45	-1.76
2594	10/11/09 5:24	60.44	-1.77
2595	10/11/09 5:25	60.44	-1.77
2596	10/11/09 5:26	60.44	-1.77
2597	10/11/09 5:27	60.44	-1.77
2598	10/11/09 5:28	60.44	-1.77
2599	10/11/09 5:29	60.44	-1.77
2600	10/11/09 5:30	60.45	-1.76
2601	10/11/09 5:31	60.45	-1.76
2602	10/11/09 5:32	60.45	-1.76
2603	10/11/09 5:33	60.45	-1.76
2604	10/11/09 5:34	60.45	-1.76
2605	10/11/09 5:35	60.45	-1.76
2606	10/11/09 5:36	60.45	-1.76
2607	10/11/09 5:37	60.45	-1.76
2608	10/11/09 5:38	60.45	-1.76
2609	10/11/09 5:39	60.45	-1.76
2610	10/11/09 5:40	60.46	-1.75
2611	10/11/09 5:41	60.46	-1.75
2612	10/11/09 5:42	60.47	-1.74
2613	10/11/09 5:43	60.48	-1.73

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2614	10/11/09 5:44	60.46	-1.75
2615	10/11/09 5:45	60.44	-1.77
2616	10/11/09 5:46	60.45	-1.76
2617	10/11/09 5:47	60.45	-1.76
2618	10/11/09 5:48	60.46	-1.75
2619	10/11/09 5:49	60.46	-1.75
2620	10/11/09 5:50	60.45	-1.76
2621	10/11/09 5:51	60.46	-1.75
2622	10/11/09 5:52	60.45	-1.76
2623	10/11/09 5:53	60.45	-1.76
2624	10/11/09 5:54	60.44	-1.77
2625	10/11/09 5:55	60.44	-1.77
2626	10/11/09 5:56	60.45	-1.76
2627	10/11/09 5:57	60.45	-1.76
2628	10/11/09 5:58	60.45	-1.76
2629	10/11/09 5:59	60.46	-1.75
2630	10/11/09 6:00	60.46	-1.75
2631	10/11/09 6:01	60.47	-1.74
2632	10/11/09 6:02	60.47	-1.74
2633	10/11/09 6:03	60.46	-1.75
2634	10/11/09 6:04	60.46	-1.75
2635	10/11/09 6:05	60.45	-1.76
2636	10/11/09 6:06	60.44	-1.77
2637	10/11/09 6:07	60.44	-1.77
2638	10/11/09 6:08	60.46	-1.75
2639	10/11/09 6:09	60.47	-1.74
2640	10/11/09 6:10	60.45	-1.76
2641	10/11/09 6:11	60.45	-1.76
2642	10/11/09 6:12	60.45	-1.76
2643	10/11/09 6:13	60.46	-1.75
2644	10/11/09 6:14	60.46	-1.75
2645	10/11/09 6:15	60.45	-1.76
2646	10/11/09 6:16	60.46	-1.75
2647	10/11/09 6:17	60.46	-1.75
2648	10/11/09 6:18	60.46	-1.75
2649	10/11/09 6:19	60.46	-1.75
2650	10/11/09 6:20	60.45	-1.76
2651	10/11/09 6:21	60.45	-1.76
2652	10/11/09 6:22	60.45	-1.76
2653	10/11/09 6:23	60.46	-1.75
2654	10/11/09 6:24	60.47	-1.74
2655	10/11/09 6:25	60.46	-1.75
2656	10/11/09 6:26	60.46	-1.75
2657	10/11/09 6:27	60.46	-1.75
2658	10/11/09 6:28	60.45	-1.76
2659	10/11/09 6:29	60.45	-1.76
2660	10/11/09 6:30	60.45	-1.76
2661	10/11/09 6:31	60.46	-1.75
2662	10/11/09 6:32	60.46	-1.75
2663	10/11/09 6:33	60.45	-1.76
2664	10/11/09 6:34	60.46	-1.75
2665	10/11/09 6:35	60.46	-1.75
2666	10/11/09 6:36	60.45	-1.76

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
2667	10/11/09 6:37	60.46	-1.75
2668	10/11/09 6:38	60.45	-1.76
2669	10/11/09 6:39	60.45	-1.76
2670	10/11/09 6:40	60.45	-1.76
2671	10/11/09 6:41	60.45	-1.76
2672	10/11/09 6:42	60.45	-1.76
2673	10/11/09 6:43	60.45	-1.76
2674	10/11/09 6:44	60.45	-1.76
2675	10/11/09 6:45	60.45	-1.76
2676	10/11/09 6:46	60.45	-1.76
2677	10/11/09 6:47	60.45	-1.76
2678	10/11/09 6:48	60.45	-1.76
2679	10/11/09 6:49	60.46	-1.75
2680	10/11/09 6:50	60.47	-1.74
2681	10/11/09 6:51	60.46	-1.75
2682	10/11/09 6:52	60.46	-1.75
2683	10/11/09 6:53	60.47	-1.74
2684	10/11/09 6:54	60.48	-1.73
2685	10/11/09 6:55	60.45	-1.76
2686	10/11/09 6:56	60.44	-1.77
2687	10/11/09 6:57	60.43	-1.78
2688	10/11/09 6:58	60.44	-1.77
2689	10/11/09 6:59	60.45	-1.76
2690	10/11/09 7:00	60.46	-1.75
2691	10/11/09 7:01	60.46	-1.75
2692	10/11/09 7:02	60.46	-1.75
2693	10/11/09 7:03	60.48	-1.73
2694	10/11/09 7:04	60.49	-1.72
2695	10/11/09 7:05	60.50	-1.71
2696	10/11/09 7:06	60.47	-1.74
2697	10/11/09 7:07	60.46	-1.75
2698	10/11/09 7:08	60.47	-1.74
2699	10/11/09 7:09	60.46	-1.75
2700	10/11/09 7:10	60.46	-1.75
2701	10/11/09 7:11	60.45	-1.76
2702	10/11/09 7:12	60.44	-1.77
2703	10/11/09 7:13	60.44	-1.77
2704	10/11/09 7:14	60.44	-1.77
2705	10/11/09 7:15	60.45	-1.76
2706	10/11/09 7:16	60.45	-1.76
2707	10/11/09 7:17	60.44	-1.77
2708	10/11/09 7:18	60.46	-1.75
2709	10/11/09 7:19	60.48	-1.73
2710	10/11/09 7:20	60.48	-1.73
2711	10/11/09 7:21	60.47	-1.74
2712	10/11/09 7:22	60.44	-1.77
2713	10/11/09 7:23	60.43	-1.78
2714	10/11/09 7:24	60.43	-1.78
2715	10/11/09 7:25	60.43	-1.78
2716	10/11/09 7:26	60.43	-1.78
2717	10/11/09 7:27	60.44	-1.77
2718	10/11/09 7:28	60.45	-1.76
2719	10/11/09 7:29	60.45	-1.76

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2720	10/11/09 7:30	60.44	-1.77
2721	10/11/09 7:31	60.44	-1.77
2722	10/11/09 7:32	60.45	-1.76
2723	10/11/09 7:33	60.45	-1.76
2724	10/11/09 7:34	60.45	-1.76
2725	10/11/09 7:35	60.45	-1.76
2726	10/11/09 7:36	60.44	-1.77
2727	10/11/09 7:37	60.44	-1.77
2728	10/11/09 7:38	60.45	-1.76
2729	10/11/09 7:39	60.45	-1.76
2730	10/11/09 7:40	60.45	-1.76
2731	10/11/09 7:41	60.46	-1.75
2732	10/11/09 7:42	60.45	-1.76
2733	10/11/09 7:43	60.45	-1.76
2734	10/11/09 7:44	60.45	-1.76
2735	10/11/09 7:45	60.45	-1.76
2736	10/11/09 7:46	60.46	-1.75
2737	10/11/09 7:47	60.47	-1.74
2738	10/11/09 7:48	60.46	-1.75
2739	10/11/09 7:49	60.46	-1.75
2740	10/11/09 7:50	60.45	-1.76
2741	10/11/09 7:51	60.45	-1.76
2742	10/11/09 7:52	60.43	-1.78
2743	10/11/09 7:53	60.42	-1.79
2744	10/11/09 7:54	60.42	-1.79
2745	10/11/09 7:55	60.42	-1.79
2746	10/11/09 7:56	60.43	-1.78
2747	10/11/09 7:57	60.43	-1.78
2748	10/11/09 7:58	60.43	-1.78
2749	10/11/09 7:59	60.43	-1.78
2750	10/11/09 8:00	60.44	-1.77
2751	10/11/09 8:01	60.44	-1.77
2752	10/11/09 8:02	60.44	-1.77
2753	10/11/09 8:03	60.44	-1.77
2754	10/11/09 8:04	60.44	-1.77
2755	10/11/09 8:05	60.44	-1.77
2756	10/11/09 8:06	60.44	-1.77
2757	10/11/09 8:07	60.44	-1.77
2758	10/11/09 8:08	60.42	-1.79
2759	10/11/09 8:09	60.42	-1.79
2760	10/11/09 8:10	60.43	-1.78
2761	10/11/09 8:11	60.44	-1.77
2762	10/11/09 8:12	60.45	-1.76
2763	10/11/09 8:13	60.45	-1.76
2764	10/11/09 8:14	60.44	-1.77
2765	10/11/09 8:15	60.42	-1.79
2766	10/11/09 8:16	60.41	-1.80
2767	10/11/09 8:17	60.43	-1.78
2768	10/11/09 8:18	60.44	-1.77
2769	10/11/09 8:19	60.44	-1.77
2770	10/11/09 8:20	60.44	-1.77
2771	10/11/09 8:21	60.44	-1.77
2772	10/11/09 8:22	60.43	-1.78

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2773	10/11/09 8:23	60.44	-1.77
2774	10/11/09 8:24	60.44	-1.77
2775	10/11/09 8:25	60.42	-1.79
2776	10/11/09 8:26	60.43	-1.78
2777	10/11/09 8:27	60.44	-1.77
2778	10/11/09 8:28	60.43	-1.78
2779	10/11/09 8:29	60.41	-1.80
2780	10/11/09 8:30	60.41	-1.80
2781	10/11/09 8:31	60.41	-1.80
2782	10/11/09 8:32	60.43	-1.78
2783	10/11/09 8:33	60.44	-1.77
2784	10/11/09 8:34	60.43	-1.78
2785	10/11/09 8:35	60.43	-1.78
2786	10/11/09 8:36	60.43	-1.78
2787	10/11/09 8:37	60.42	-1.79
2788	10/11/09 8:38	60.41	-1.80
2789	10/11/09 8:39	60.41	-1.80
2790	10/11/09 8:40	60.41	-1.80
2791	10/11/09 8:41	60.41	-1.80
2792	10/11/09 8:42	60.41	-1.80
2793	10/11/09 8:43	60.41	-1.80
2794	10/11/09 8:44	60.42	-1.79
2795	10/11/09 8:45	60.42	-1.79
2796	10/11/09 8:46	60.42	-1.79
2797	10/11/09 8:47	60.42	-1.79
2798	10/11/09 8:48	60.41	-1.80
2799	10/11/09 8:49	60.41	-1.80
2800	10/11/09 8:50	60.41	-1.80
2801	10/11/09 8:51	60.41	-1.80
2802	10/11/09 8:52	60.41	-1.80
2803	10/11/09 8:53	60.40	-1.81
2804	10/11/09 8:54	60.40	-1.81
2805	10/11/09 8:55	60.41	-1.80
2806	10/11/09 8:56	60.42	-1.79
2807	10/11/09 8:57	60.42	-1.79
2808	10/11/09 8:58	60.43	-1.78
2809	10/11/09 8:59	60.43	-1.78
2810	10/11/09 9:00	60.44	-1.77
2811	10/11/09 9:01	60.44	-1.77
2812	10/11/09 9:02	60.42	-1.79
2813	10/11/09 9:03	60.40	-1.81
2814	10/11/09 9:04	60.40	-1.81
2815	10/11/09 9:05	60.40	-1.81
2816	10/11/09 9:06	60.40	-1.81
2817	10/11/09 9:07	60.41	-1.80
2818	10/11/09 9:08	60.40	-1.81
2819	10/11/09 9:09	60.39	-1.82
2820	10/11/09 9:10	60.39	-1.82
2821	10/11/09 9:11	60.39	-1.82
2822	10/11/09 9:12	60.40	-1.81
2823	10/11/09 9:13	60.40	-1.81
2824	10/11/09 9:14	60.39	-1.82
2825	10/11/09 9:15	60.39	-1.82

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2826	10/11/09 9:16	60.39	-1.82
2827	10/11/09 9:17	60.39	-1.82
2828	10/11/09 9:18	60.39	-1.82
2829	10/11/09 9:19	60.39	-1.82
2830	10/11/09 9:20	60.39	-1.82
2831	10/11/09 9:21	60.39	-1.82
2832	10/11/09 9:22	60.39	-1.82
2833	10/11/09 9:23	60.39	-1.82
2834	10/11/09 9:24	60.39	-1.82
2835	10/11/09 9:25	60.39	-1.82
2836	10/11/09 9:26	60.39	-1.82
2837	10/11/09 9:27	60.39	-1.82
2838	10/11/09 9:28	60.40	-1.81
2839	10/11/09 9:29	60.40	-1.81
2840	10/11/09 9:30	60.40	-1.81
2841	10/11/09 9:31	60.41	-1.80
2842	10/11/09 9:32	60.41	-1.80
2843	10/11/09 9:33	60.41	-1.80
2844	10/11/09 9:34	60.41	-1.80
2845	10/11/09 9:35	60.40	-1.81
2846	10/11/09 9:36	60.40	-1.81
2847	10/11/09 9:37	60.40	-1.81
2848	10/11/09 9:38	60.38	-1.83
2849	10/11/09 9:39	60.37	-1.84
2850	10/11/09 9:40	60.37	-1.84
2851	10/11/09 9:41	60.37	-1.84
2852	10/11/09 9:42	60.37	-1.84
2853	10/11/09 9:43	60.37	-1.84
2854	10/11/09 9:44	60.37	-1.84
2855	10/11/09 9:45	60.39	-1.82
2856	10/11/09 9:46	60.39	-1.82
2857	10/11/09 9:47	60.38	-1.83
2858	10/11/09 9:48	60.37	-1.84
2859	10/11/09 9:49	60.36	-1.85
2860	10/11/09 9:50	60.37	-1.84
2861	10/11/09 9:51	60.37	-1.84
2862	10/11/09 9:52	60.38	-1.83
2863	10/11/09 9:53	60.39	-1.82
2864	10/11/09 9:54	60.40	-1.81
2865	10/11/09 9:55	60.38	-1.83
2866	10/11/09 9:56	60.38	-1.83
2867	10/11/09 9:57	60.37	-1.84
2868	10/11/09 9:58	60.38	-1.83
2869	10/11/09 9:59	60.37	-1.84
2870	10/11/09 10:00	60.37	-1.84
2871	10/11/09 10:01	60.37	-1.84
2872	10/11/09 10:02	60.37	-1.84
2873	10/11/09 10:03	60.38	-1.83
2874	10/11/09 10:04	60.38	-1.83
2875	10/11/09 10:05	60.37	-1.84
2876	10/11/09 10:06	60.37	-1.84
2877	10/11/09 10:07	60.36	-1.85
2878	10/11/09 10:08	60.36	-1.85

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2879	10/11/09 10:09	60.36	-1.85
2880	10/11/09 10:10	60.36	-1.85
2881	10/11/09 10:11	60.37	-1.84
2882	10/11/09 10:12	60.38	-1.83
2883	10/11/09 10:13	60.38	-1.83
2884	10/11/09 10:14	60.38	-1.83
2885	10/11/09 10:15	60.37	-1.84
2886	10/11/09 10:16	60.37	-1.84
2887	10/11/09 10:17	60.38	-1.83
2888	10/11/09 10:18	60.37	-1.84
2889	10/11/09 10:19	60.38	-1.83
2890	10/11/09 10:20	60.38	-1.83
2891	10/11/09 10:21	60.38	-1.83
2892	10/11/09 10:22	60.37	-1.84
2893	10/11/09 10:23	60.38	-1.83
2894	10/11/09 10:24	60.39	-1.82
2895	10/11/09 10:25	60.40	-1.81
2896	10/11/09 10:26	60.39	-1.82
2897	10/11/09 10:27	60.38	-1.83
2898	10/11/09 10:28	60.37	-1.84
2899	10/11/09 10:29	60.36	-1.85
2900	10/11/09 10:30	60.35	-1.86
2901	10/11/09 10:31	60.35	-1.86
2902	10/11/09 10:32	60.35	-1.86
2903	10/11/09 10:33	60.36	-1.85
2904	10/11/09 10:34	60.36	-1.85
2905	10/11/09 10:35	60.37	-1.84
2906	10/11/09 10:36	60.37	-1.84
2907	10/11/09 10:37	60.37	-1.84
2908	10/11/09 10:38	60.37	-1.84
2909	10/11/09 10:39	60.37	-1.84
2910	10/11/09 10:40	60.37	-1.84
2911	10/11/09 10:41	60.37	-1.84
2912	10/11/09 10:42	60.35	-1.86
2913	10/11/09 10:43	60.34	-1.87
2914	10/11/09 10:44	60.35	-1.86
2915	10/11/09 10:45	60.36	-1.85
2916	10/11/09 10:46	60.36	-1.85
2917	10/11/09 10:47	60.36	-1.85
2918	10/11/09 10:48	60.37	-1.84
2919	10/11/09 10:49	60.37	-1.84
2920	10/11/09 10:50	60.37	-1.84
2921	10/11/09 10:51	60.37	-1.84
2922	10/11/09 10:52	60.37	-1.84
2923	10/11/09 10:53	60.36	-1.85
2924	10/11/09 10:54	60.34	-1.87
2925	10/11/09 10:55	60.34	-1.87
2926	10/11/09 10:56	60.34	-1.87
2927	10/11/09 10:57	60.34	-1.87
2928	10/11/09 10:58	60.35	-1.86
2929	10/11/09 10:59	60.35	-1.86
2930	10/11/09 11:00	60.35	-1.86
2931	10/11/09 11:01	60.34	-1.87

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
2932	10/11/09 11:02	60.35	-1.86
2933	10/11/09 11:03	60.35	-1.86
2934	10/11/09 11:04	60.35	-1.86
2935	10/11/09 11:05	60.35	-1.86
2936	10/11/09 11:06	60.35	-1.86
2937	10/11/09 11:07	60.35	-1.86
2938	10/11/09 11:08	60.35	-1.86
2939	10/11/09 11:09	60.34	-1.87
2940	10/11/09 11:10	60.34	-1.87
2941	10/11/09 11:11	60.34	-1.87
2942	10/11/09 11:12	60.35	-1.86
2943	10/11/09 11:13	60.36	-1.85
2944	10/11/09 11:14	60.36	-1.85
2945	10/11/09 11:15	60.36	-1.85
2946	10/11/09 11:16	60.35	-1.86
2947	10/11/09 11:17	60.34	-1.87
2948	10/11/09 11:18	60.34	-1.87
2949	10/11/09 11:19	60.35	-1.86
2950	10/11/09 11:20	60.35	-1.86
2951	10/11/09 11:21	60.35	-1.86
2952	10/11/09 11:22	60.34	-1.87
2953	10/11/09 11:23	60.35	-1.86
2954	10/11/09 11:24	60.34	-1.87
2955	10/11/09 11:25	60.34	-1.87
2956	10/11/09 11:26	60.33	-1.88
2957	10/11/09 11:27	60.33	-1.88
2958	10/11/09 11:28	60.33	-1.88
2959	10/11/09 11:29	60.33	-1.88
2960	10/11/09 11:30	60.33	-1.88
2961	10/11/09 11:31	60.34	-1.87
2962	10/11/09 11:32	60.35	-1.86
2963	10/11/09 11:33	60.35	-1.86
2964	10/11/09 11:34	60.34	-1.87
2965	10/11/09 11:35	60.32	-1.89
2966	10/11/09 11:36	60.33	-1.88
2967	10/11/09 11:37	60.34	-1.87
2968	10/11/09 11:38	60.34	-1.87
2969	10/11/09 11:39	60.33	-1.88
2970	10/11/09 11:40	60.33	-1.88
2971	10/11/09 11:41	60.33	-1.88
2972	10/11/09 11:42	60.33	-1.88
2973	10/11/09 11:43	60.33	-1.88
2974	10/11/09 11:44	60.33	-1.88
2975	10/11/09 11:45	60.34	-1.87
2976	10/11/09 11:46	60.34	-1.87
2977	10/11/09 11:47	60.34	-1.87
2978	10/11/09 11:48	60.34	-1.87
2979	10/11/09 11:49	60.34	-1.87
2980	10/11/09 11:50	60.33	-1.88
2981	10/11/09 11:51	60.33	-1.88
2982	10/11/09 11:52	60.32	-1.89
2983	10/11/09 11:53	60.32	-1.89
2984	10/11/09 11:54	60.32	-1.89

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
2985	10/11/09 11:55	60.32	-1.89
2986	10/11/09 11:56	60.32	-1.89
2987	10/11/09 11:57	60.33	-1.88
2988	10/11/09 11:58	60.34	-1.87
2989	10/11/09 11:59	60.34	-1.87
2990	10/11/09 12:00	60.34	-1.87
2991	10/11/09 12:01	60.34	-1.87
2992	10/11/09 12:02	60.34	-1.87
2993	10/11/09 12:03	60.34	-1.87
2994	10/11/09 12:04	60.35	-1.86
2995	10/11/09 12:05	60.33	-1.88
2996	10/11/09 12:06	60.32	-1.89
2997	10/11/09 12:07	60.31	-1.90
2998	10/11/09 12:08	60.31	-1.90
2999	10/11/09 12:09	60.31	-1.90
3000	10/11/09 12:10	60.31	-1.90
3001	10/11/09 12:11	60.31	-1.90
3002	10/11/09 12:12	60.32	-1.89
3003	10/11/09 12:13	60.31	-1.90
3004	10/11/09 12:14	60.31	-1.90
3005	10/11/09 12:15	60.30	-1.91
3006	10/11/09 12:16	60.30	-1.91
3007	10/11/09 12:17	60.30	-1.91
3008	10/11/09 12:18	60.30	-1.91
3009	10/11/09 12:19	60.31	-1.90
3016	10/11/09 12:26	60.31	-1.90
3017	10/11/09 12:27	60.31	-1.90
3018	10/11/09 12:28	60.31	-1.90
3019	10/11/09 12:29	60.31	-1.90
3020	10/11/09 12:30	60.31	-1.90
3021	10/11/09 12:31	60.32	-1.89
3022	10/11/09 12:32	60.32	-1.89
3023	10/11/09 12:33	60.32	-1.89
3024	10/11/09 12:34	60.32	-1.89
3025	10/11/09 12:35	60.30	-1.91
3026	10/11/09 12:36	60.30	-1.91
3027	10/11/09 12:37	60.30	-1.91
3028	10/11/09 12:38	60.31	-1.90
3029	10/11/09 12:39	60.31	-1.90
3030	10/11/09 12:40	60.31	-1.90
3031	10/11/09 12:41	60.30	-1.91
3032	10/11/09 12:42	60.29	-1.92
3033	10/11/09 12:43	60.31	-1.90
3034	10/11/09 12:44	60.31	-1.90
3035	10/11/09 12:45	60.30	-1.91
3036	10/11/09 12:46	60.29	-1.92
3037	10/11/09 12:47	60.29	-1.92
3038	10/11/09 12:48	60.29	-1.92
3039	10/11/09 12:49	60.29	-1.92
3040	10/11/09 12:50	60.29	-1.92
3041	10/11/09 12:51	60.29	-1.92
3042	10/11/09 12:52	60.30	-1.91
3043	10/11/09 12:53	60.30	-1.91

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
3044	10/11/09 12:54	60.29	-1.92
3045	10/11/09 12:55	60.29	-1.92
3046	10/11/09 12:56	60.29	-1.92
3047	10/11/09 12:57	60.31	-1.90
3048	10/11/09 12:58	60.32	-1.89
3049	10/11/09 12:59	60.31	-1.90
3050	10/11/09 13:00	60.29	-1.92
3051	10/11/09 13:01	60.29	-1.92
3052	10/11/09 13:02	60.30	-1.91
3053	10/11/09 13:03	60.29	-1.92
3054	10/11/09 13:04	60.28	-1.93
3055	10/11/09 13:05	60.29	-1.92
3056	10/11/09 13:06	60.29	-1.92
3057	10/11/09 13:07	60.29	-1.92
3058	10/11/09 13:08	60.29	-1.92
3059	10/11/09 13:09	60.29	-1.92
3060	10/11/09 13:10	60.29	-1.92
3061	10/11/09 13:11	60.29	-1.92
3062	10/11/09 13:12	60.30	-1.91
3063	10/11/09 13:13	60.30	-1.91
3064	10/11/09 13:14	60.30	-1.91
3065	10/11/09 13:15	60.30	-1.91
3066	10/11/09 13:16	60.30	-1.91
3067	10/11/09 13:17	60.30	-1.91
3068	10/11/09 13:18	60.30	-1.91
3069	10/11/09 13:19	60.29	-1.92
3070	10/11/09 13:20	60.29	-1.92
3071	10/11/09 13:21	60.29	-1.92
3072	10/11/09 13:22	60.30	-1.91
3073	10/11/09 13:23	60.31	-1.90
3074	10/11/09 13:24	60.31	-1.90
3075	10/11/09 13:25	60.29	-1.92
3076	10/11/09 13:26	60.29	-1.92
3077	10/11/09 13:27	60.29	-1.92
3078	10/11/09 13:28	60.29	-1.92
3079	10/11/09 13:29	60.29	-1.92
3080	10/11/09 13:30	60.30	-1.91
3081	10/11/09 13:31	60.28	-1.93
3082	10/11/09 13:32	60.27	-1.94
3083	10/11/09 13:33	60.27	-1.94
3084	10/11/09 13:34	60.27	-1.94
3085	10/11/09 13:35	60.26	-1.95
3086	10/11/09 13:36	60.27	-1.94
3087	10/11/09 13:37	60.26	-1.95
3088	10/11/09 13:38	60.26	-1.95
3089	10/11/09 13:39	60.27	-1.94
3090	10/11/09 13:40	60.27	-1.94
3091	10/11/09 13:41	60.28	-1.93
3092	10/11/09 13:42	60.28	-1.93
3093	10/11/09 13:43	60.28	-1.93
3094	10/11/09 13:44	60.28	-1.93
3095	10/11/09 13:45	60.28	-1.93
3096	10/11/09 13:46	60.28	-1.93

W-VI :: Observation Well 72-hour Pump Test @153 gpm

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Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3097	10/11/09 13:47	60.27	-1.94
3098	10/11/09 13:48	60.28	-1.93
3099	10/11/09 13:49	60.28	-1.93
3100	10/11/09 13:50	60.29	-1.92
3101	10/11/09 13:51	60.29	-1.92
3102	10/11/09 13:52	60.29	-1.92
3103	10/11/09 13:53	60.28	-1.93
3104	10/11/09 13:54	60.28	-1.93
3105	10/11/09 13:55	60.27	-1.94
3106	10/11/09 13:56	60.26	-1.95
3107	10/11/09 13:57	60.25	-1.96
3108	10/11/09 13:58	60.26	-1.95
3109	10/11/09 13:59	60.27	-1.94
3110	10/11/09 14:00	60.27	-1.94
3111	10/11/09 14:01	60.27	-1.94
3112	10/11/09 14:02	60.28	-1.93
3113	10/11/09 14:03	60.28	-1.93
3114	10/11/09 14:04	60.29	-1.92
3115	10/11/09 14:05	60.28	-1.93
3116	10/11/09 14:06	60.26	-1.95
3117	10/11/09 14:07	60.26	-1.95
3118	10/11/09 14:08	60.25	-1.96
3119	10/11/09 14:09	60.25	-1.96
3120	10/11/09 14:10	60.25	-1.96
3121	10/11/09 14:11	60.25	-1.96
3122	10/11/09 14:12	60.25	-1.96
3123	10/11/09 14:13	60.24	-1.97
3124	10/11/09 14:14	60.25	-1.96
3125	10/11/09 14:15	60.26	-1.95
3126	10/11/09 14:16	60.26	-1.95
3127	10/11/09 14:17	60.26	-1.95
3128	10/11/09 14:18	60.25	-1.96
3129	10/11/09 14:19	60.24	-1.97
3130	10/11/09 14:20	60.24	-1.97
3131	10/11/09 14:21	60.24	-1.97
3132	10/11/09 14:22	60.25	-1.96
3133	10/11/09 14:23	60.25	-1.96
3134	10/11/09 14:24	60.25	-1.96
3135	10/11/09 14:25	60.25	-1.96
3136	10/11/09 14:26	60.25	-1.96
3137	10/11/09 14:27	60.25	-1.96
3138	10/11/09 14:28	60.24	-1.97
3139	10/11/09 14:29	60.24	-1.97
3140	10/11/09 14:30	60.24	-1.97
3141	10/11/09 14:31	60.24	-1.97
3142	10/11/09 14:32	60.25	-1.96
3143	10/11/09 14:33	60.25	-1.96
3144	10/11/09 14:34	60.24	-1.97
3145	10/11/09 14:35	60.23	-1.98
3146	10/11/09 14:36	60.24	-1.97
3147	10/11/09 14:37	60.25	-1.96
3148	10/11/09 14:38	60.25	-1.96
3149	10/11/09 14:39	60.25	-1.96

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3150	10/11/09 14:40	60.26	-1.95
3151	10/11/09 14:41	60.26	-1.95
3152	10/11/09 14:42	60.26	-1.95
3153	10/11/09 14:43	60.26	-1.95
3154	10/11/09 14:44	60.25	-1.96
3155	10/11/09 14:45	60.25	-1.96
3156	10/11/09 14:46	60.25	-1.96
3157	10/11/09 14:47	60.25	-1.96
3158	10/11/09 14:48	60.25	-1.96
3159	10/11/09 14:49	60.25	-1.96
3160	10/11/09 14:50	60.24	-1.97
3161	10/11/09 14:51	60.23	-1.98
3162	10/11/09 14:52	60.23	-1.98
3163	10/11/09 14:53	60.23	-1.98
3164	10/11/09 14:54	60.23	-1.98
3165	10/11/09 14:55	60.23	-1.98
3166	10/11/09 14:56	60.23	-1.98
3167	10/11/09 14:57	60.23	-1.98
3168	10/11/09 14:58	60.24	-1.97
3169	10/11/09 14:59	60.25	-1.96
3170	10/11/09 15:00	60.25	-1.96
3171	10/11/09 15:01	60.25	-1.96
3172	10/11/09 15:02	60.25	-1.96
3173	10/11/09 15:03	60.25	-1.96
3174	10/11/09 15:04	60.26	-1.95
3175	10/11/09 15:05	60.27	-1.94
3176	10/11/09 15:06	60.24	-1.97
3177	10/11/09 15:07	60.23	-1.98
3178	10/11/09 15:08	60.23	-1.98
3179	10/11/09 15:09	60.24	-1.97
3180	10/11/09 15:10	60.24	-1.97
3181	10/11/09 15:11	60.23	-1.98
3182	10/11/09 15:12	60.23	-1.98
3183	10/11/09 15:13	60.23	-1.98
3184	10/11/09 15:14	60.22	-1.99
3185	10/11/09 15:15	60.22	-1.99
3186	10/11/09 15:16	60.23	-1.98
3187	10/11/09 15:17	60.23	-1.98
3188	10/11/09 15:18	60.22	-1.99
3189	10/11/09 15:19	60.22	-1.99
3190	10/11/09 15:20	60.22	-1.99
3191	10/11/09 15:21	60.23	-1.98
3192	10/11/09 15:22	60.22	-1.99
3193	10/11/09 15:23	60.21	-2.00
3194	10/11/09 15:24	60.21	-2.00
3195	10/11/09 15:25	60.22	-1.99
3196	10/11/09 15:26	60.22	-1.99
3197	10/11/09 15:27	60.22	-1.99
3198	10/11/09 15:28	60.22	-1.99
3199	10/11/09 15:29	60.22	-1.99
3200	10/11/09 15:30	60.22	-1.99
3201	10/11/09 15:31	60.22	-1.99
3202	10/11/09 15:32	60.22	-1.99

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3203	10/11/09 15:33	60.23	-1.98
3204	10/11/09 15:34	60.24	-1.97
3205	10/11/09 15:35	60.24	-1.97
3206	10/11/09 15:36	60.24	-1.97
3207	10/11/09 15:37	60.23	-1.98
3208	10/11/09 15:38	60.22	-1.99
3209	10/11/09 15:39	60.22	-1.99
3210	10/11/09 15:40	60.24	-1.97
3211	10/11/09 15:41	60.25	-1.96
3212	10/11/09 15:42	60.23	-1.98
3213	10/11/09 15:43	60.22	-1.99
3214	10/11/09 15:44	60.20	-2.01
3215	10/11/09 15:45	60.20	-2.01
3216	10/11/09 15:46	60.21	-2.00
3217	10/11/09 15:47	60.22	-1.99
3218	10/11/09 15:48	60.24	-1.97
3219	10/11/09 15:49	60.24	-1.97
3220	10/11/09 15:50	60.22	-1.99
3221	10/11/09 15:51	60.21	-2.00
3222	10/11/09 15:52	60.21	-2.00
3223	10/11/09 15:53	60.22	-1.99
3224	10/11/09 15:54	60.21	-2.00
3225	10/11/09 15:55	60.21	-2.00
3226	10/11/09 15:56	60.20	-2.01
3227	10/11/09 15:57	60.20	-2.01
3228	10/11/09 15:58	60.20	-2.01
3229	10/11/09 15:59	60.21	-2.00
3230	10/11/09 16:00	60.22	-1.99
3231	10/11/09 16:01	60.21	-2.00
3232	10/11/09 16:02	60.21	-2.00
3233	10/11/09 16:03	60.21	-2.00
3234	10/11/09 16:04	60.22	-1.99
3235	10/11/09 16:05	60.23	-1.98
3236	10/11/09 16:06	60.22	-1.99
3237	10/11/09 16:07	60.22	-1.99
3238	10/11/09 16:08	60.22	-1.99
3239	10/11/09 16:09	60.22	-1.99
3240	10/11/09 16:10	60.22	-1.99
3241	10/11/09 16:11	60.22	-1.99
3242	10/11/09 16:12	60.21	-2.00
3243	10/11/09 16:13	60.21	-2.00
3244	10/11/09 16:14	60.21	-2.00
3245	10/11/09 16:15	60.23	-1.98
3246	10/11/09 16:16	60.23	-1.98
3247	10/11/09 16:17	60.24	-1.97
3248	10/11/09 16:18	60.23	-1.98
3249	10/11/09 16:19	60.21	-2.00
3250	10/11/09 16:20	60.20	-2.01
3251	10/11/09 16:21	60.20	-2.01
3252	10/11/09 16:22	60.20	-2.01
3253	10/11/09 16:23	60.21	-2.00
3254	10/11/09 16:24	60.21	-2.00
3255	10/11/09 16:25	60.21	-2.00

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3256	10/11/09 16:26	60.22	-1.99
3257	10/11/09 16:27	60.20	-2.01
3258	10/11/09 16:28	60.19	-2.02
3259	10/11/09 16:29	60.20	-2.01
3260	10/11/09 16:30	60.21	-2.00
3261	10/11/09 16:31	60.21	-2.00
3262	10/11/09 16:32	60.22	-1.99
3263	10/11/09 16:33	60.21	-2.00
3264	10/11/09 16:34	60.20	-2.01
3265	10/11/09 16:35	60.19	-2.02
3266	10/11/09 16:36	60.20	-2.01
3267	10/11/09 16:37	60.20	-2.01
3268	10/11/09 16:38	60.20	-2.01
3269	10/11/09 16:39	60.19	-2.02
3270	10/11/09 16:40	60.20	-2.01
3271	10/11/09 16:41	60.20	-2.01
3272	10/11/09 16:42	60.21	-2.00
3273	10/11/09 16:43	60.21	-2.00
3274	10/11/09 16:44	60.20	-2.01
3275	10/11/09 16:45	60.20	-2.01
3276	10/11/09 16:46	60.19	-2.02
3277	10/11/09 16:47	60.19	-2.02
3278	10/11/09 16:48	60.20	-2.01
3279	10/11/09 16:49	60.21	-2.00
3280	10/11/09 16:50	60.20	-2.01
3281	10/11/09 16:51	60.19	-2.02
3282	10/11/09 16:52	60.19	-2.02
3283	10/11/09 16:53	60.19	-2.02
3284	10/11/09 16:54	60.20	-2.01
3285	10/11/09 16:55	60.19	-2.02
3286	10/11/09 16:56	60.19	-2.02
3287	10/11/09 16:57	60.19	-2.02
3288	10/11/09 16:58	60.19	-2.02
3289	10/11/09 16:59	60.19	-2.02
3290	10/11/09 17:00	60.19	-2.02
3291	10/11/09 17:01	60.19	-2.02
3292	10/11/09 17:02	60.20	-2.01
3293	10/11/09 17:03	60.20	-2.01
3294	10/11/09 17:04	60.19	-2.02
3295	10/11/09 17:05	60.19	-2.02
3296	10/11/09 17:06	60.19	-2.02
3297	10/11/09 17:07	60.19	-2.02
3298	10/11/09 17:08	60.20	-2.01
3299	10/11/09 17:09	60.20	-2.01
3300	10/11/09 17:10	60.20	-2.01
3301	10/11/09 17:11	60.20	-2.01
3302	10/11/09 17:12	60.19	-2.02
3303	10/11/09 17:13	60.20	-2.01
3304	10/11/09 17:14	60.20	-2.01
3305	10/11/09 17:15	60.19	-2.02
3306	10/11/09 17:16	60.19	-2.02
3307	10/11/09 17:17	60.18	-2.03
3308	10/11/09 17:18	60.18	-2.03

W-VI :: Observation Well 72-hour Pump Test @153 gpm

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Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
3309	10/11/09 17:19	60.19	-2.02
3310	10/11/09 17:20	60.19	-2.02
3311	10/11/09 17:21	60.19	-2.02
3312	10/11/09 17:22	60.19	-2.02
3313	10/11/09 17:23	60.19	-2.02
3314	10/11/09 17:24	60.18	-2.03
3315	10/11/09 17:25	60.19	-2.02
3316	10/11/09 17:26	60.20	-2.01
3317	10/11/09 17:27	60.20	-2.01
3318	10/11/09 17:28	60.20	-2.01
3319	10/11/09 17:29	60.20	-2.01
3320	10/11/09 17:30	60.19	-2.02
3321	10/11/09 17:31	60.19	-2.02
3322	10/11/09 17:32	60.18	-2.03
3323	10/11/09 17:33	60.19	-2.02
3324	10/11/09 17:34	60.19	-2.02
3325	10/11/09 17:35	60.19	-2.02
3326	10/11/09 17:36	60.18	-2.03
3327	10/11/09 17:37	60.18	-2.03
3328	10/11/09 17:38	60.19	-2.02
3329	10/11/09 17:39	60.20	-2.01
3330	10/11/09 17:40	60.20	-2.01
3331	10/11/09 17:41	60.18	-2.03
3332	10/11/09 17:42	60.18	-2.03
3333	10/11/09 17:43	60.18	-2.03
3334	10/11/09 17:44	60.17	-2.04
3335	10/11/09 17:45	60.18	-2.03
3336	10/11/09 17:46	60.18	-2.03
3337	10/11/09 17:47	60.19	-2.02
3338	10/11/09 17:48	60.18	-2.03
3339	10/11/09 17:49	60.18	-2.03
3340	10/11/09 17:50	60.18	-2.03
3341	10/11/09 17:51	60.17	-2.04
3342	10/11/09 17:52	60.17	-2.04
3343	10/11/09 17:53	60.19	-2.02
3344	10/11/09 17:54	60.20	-2.01
3345	10/11/09 17:55	60.19	-2.02
3346	10/11/09 17:56	60.19	-2.02
3347	10/11/09 17:57	60.18	-2.03
3348	10/11/09 17:58	60.17	-2.04
3349	10/11/09 17:59	60.17	-2.04
3350	10/11/09 18:00	60.17	-2.04
3351	10/11/09 18:01	60.17	-2.04
3352	10/11/09 18:02	60.18	-2.03
3353	10/11/09 18:03	60.18	-2.03
3354	10/11/09 18:04	60.18	-2.03
3355	10/11/09 18:05	60.18	-2.03
3356	10/11/09 18:06	60.18	-2.03
3357	10/11/09 18:07	60.17	-2.04
3358	10/11/09 18:08	60.17	-2.04
3359	10/11/09 18:09	60.18	-2.03
3360	10/11/09 18:10	60.18	-2.03
3361	10/11/09 18:11	60.18	-2.03

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3362	10/11/09 18:12	60.18	-2.03
3363	10/11/09 18:13	60.19	-2.02
3364	10/11/09 18:14	60.18	-2.03
3365	10/11/09 18:15	60.19	-2.02
3366	10/11/09 18:16	60.19	-2.02
3367	10/11/09 18:17	60.19	-2.02
3368	10/11/09 18:18	60.18	-2.03
3369	10/11/09 18:19	60.18	-2.03
3370	10/11/09 18:20	60.18	-2.03
3371	10/11/09 18:21	60.18	-2.03
3372	10/11/09 18:22	60.17	-2.04
3373	10/11/09 18:23	60.16	-2.05
3374	10/11/09 18:24	60.17	-2.04
3375	10/11/09 18:25	60.17	-2.04
3376	10/11/09 18:26	60.18	-2.03
3377	10/11/09 18:27	60.18	-2.03
3378	10/11/09 18:28	60.17	-2.04
3379	10/11/09 18:29	60.17	-2.04
3380	10/11/09 18:30	60.17	-2.04
3381	10/11/09 18:31	60.17	-2.04
3382	10/11/09 18:32	60.17	-2.04
3383	10/11/09 18:33	60.17	-2.04
3384	10/11/09 18:34	60.17	-2.04
3385	10/11/09 18:35	60.17	-2.04
3386	10/11/09 18:36	60.18	-2.03
3387	10/11/09 18:37	60.18	-2.03
3388	10/11/09 18:38	60.18	-2.03
3389	10/11/09 18:39	60.18	-2.03
3390	10/11/09 18:40	60.17	-2.04
3391	10/11/09 18:41	60.16	-2.05
3392	10/11/09 18:42	60.16	-2.05
3393	10/11/09 18:43	60.16	-2.05
3394	10/11/09 18:44	60.17	-2.04
3395	10/11/09 18:45	60.17	-2.04
3396	10/11/09 18:46	60.17	-2.04
3397	10/11/09 18:47	60.17	-2.04
3398	10/11/09 18:48	60.17	-2.04
3399	10/11/09 18:49	60.16	-2.05
3400	10/11/09 18:50	60.16	-2.05
3401	10/11/09 18:51	60.16	-2.05
3402	10/11/09 18:52	60.17	-2.04
3403	10/11/09 18:53	60.16	-2.05
3404	10/11/09 18:54	60.16	-2.05
3405	10/11/09 18:55	60.17	-2.04
3406	10/11/09 18:56	60.18	-2.03
3407	10/11/09 18:57	60.18	-2.03
3408	10/11/09 18:58	60.18	-2.03
3409	10/11/09 18:59	60.17	-2.04
3410	10/11/09 19:00	60.17	-2.04
3411	10/11/09 19:01	60.16	-2.05
3412	10/11/09 19:02	60.16	-2.05
3413	10/11/09 19:03	60.16	-2.05
3414	10/11/09 19:04	60.17	-2.04

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3415	10/11/09 19:05	60.18	-2.03
3416	10/11/09 19:06	60.18	-2.03
3417	10/11/09 19:07	60.17	-2.04
3418	10/11/09 19:08	60.16	-2.05
3419	10/11/09 19:09	60.15	-2.06
3420	10/11/09 19:10	60.15	-2.06
3421	10/11/09 19:11	60.16	-2.05
3422	10/11/09 19:12	60.16	-2.05
3423	10/11/09 19:13	60.16	-2.05
3424	10/11/09 19:14	60.16	-2.05
3425	10/11/09 19:15	60.16	-2.05
3426	10/11/09 19:16	60.17	-2.04
3427	10/11/09 19:17	60.19	-2.02
3428	10/11/09 19:18	60.19	-2.02
3429	10/11/09 19:19	60.19	-2.02
3430	10/11/09 19:20	60.18	-2.03
3431	10/11/09 19:21	60.17	-2.04
3432	10/11/09 19:22	60.16	-2.05
3433	10/11/09 19:23	60.16	-2.05
3434	10/11/09 19:24	60.15	-2.06
3435	10/11/09 19:25	60.15	-2.06
3436	10/11/09 19:26	60.15	-2.06
3437	10/11/09 19:27	60.16	-2.05
3438	10/11/09 19:28	60.16	-2.05
3439	10/11/09 19:29	60.18	-2.03
3440	10/11/09 19:30	60.18	-2.03
3441	10/11/09 19:31	60.18	-2.03
3442	10/11/09 19:32	60.18	-2.03
3443	10/11/09 19:33	60.17	-2.04
3444	10/11/09 19:34	60.16	-2.05
3445	10/11/09 19:35	60.16	-2.05
3446	10/11/09 19:36	60.15	-2.06
3447	10/11/09 19:37	60.14	-2.07
3448	10/11/09 19:38	60.14	-2.07
3449	10/11/09 19:39	60.15	-2.06
3450	10/11/09 19:40	60.15	-2.06
3451	10/11/09 19:41	60.16	-2.05
3452	10/11/09 19:42	60.16	-2.05
3453	10/11/09 19:43	60.17	-2.04
3454	10/11/09 19:44	60.16	-2.05
3455	10/11/09 19:45	60.16	-2.05
3456	10/11/09 19:46	60.16	-2.05
3457	10/11/09 19:47	60.16	-2.05
3458	10/11/09 19:48	60.18	-2.03
3459	10/11/09 19:49	60.17	-2.04
3460	10/11/09 19:50	60.16	-2.05
3461	10/11/09 19:51	60.15	-2.06
3462	10/11/09 19:52	60.16	-2.05
3463	10/11/09 19:53	60.17	-2.04
3464	10/11/09 19:54	60.15	-2.06
3465	10/11/09 19:55	60.15	-2.06
3466	10/11/09 19:56	60.15	-2.06
3467	10/11/09 19:57	60.15	-2.06

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3468	10/11/09 19:58	60.17	-2.04
3469	10/11/09 19:59	60.17	-2.04
3470	10/11/09 20:00	60.15	-2.06
3471	10/11/09 20:01	60.15	-2.06
3472	10/11/09 20:02	60.15	-2.06
3473	10/11/09 20:03	60.15	-2.06
3474	10/11/09 20:04	60.14	-2.07
3475	10/11/09 20:05	60.14	-2.07
3476	10/11/09 20:06	60.16	-2.05
3477	10/11/09 20:07	60.18	-2.03
3478	10/11/09 20:08	60.17	-2.04
3479	10/11/09 20:09	60.17	-2.04
3480	10/11/09 20:10	60.15	-2.06
3481	10/11/09 20:11	60.14	-2.07
3482	10/11/09 20:12	60.14	-2.07
3483	10/11/09 20:13	60.14	-2.07
3484	10/11/09 20:14	60.15	-2.06
3485	10/11/09 20:15	60.15	-2.06
3486	10/11/09 20:16	60.15	-2.06
3487	10/11/09 20:17	60.14	-2.07
3488	10/11/09 20:18	60.14	-2.07
3489	10/11/09 20:19	60.14	-2.07
3490	10/11/09 20:20	60.14	-2.07
3491	10/11/09 20:21	60.15	-2.06
3492	10/11/09 20:22	60.15	-2.06
3493	10/11/09 20:23	60.15	-2.06
3494	10/11/09 20:24	60.14	-2.07
3495	10/11/09 20:25	60.16	-2.05
3496	10/11/09 20:26	60.16	-2.05
3497	10/11/09 20:27	60.15	-2.06
3498	10/11/09 20:28	60.15	-2.06
3499	10/11/09 20:29	60.15	-2.06
3500	10/11/09 20:30	60.16	-2.05
3501	10/11/09 20:31	60.16	-2.05
3502	10/11/09 20:32	60.15	-2.06
3503	10/11/09 20:33	60.14	-2.07
3504	10/11/09 20:34	60.13	-2.08
3505	10/11/09 20:35	60.14	-2.07
3506	10/11/09 20:36	60.14	-2.07
3507	10/11/09 20:37	60.14	-2.07
3508	10/11/09 20:38	60.14	-2.07
3509	10/11/09 20:39	60.14	-2.07
3510	10/11/09 20:40	60.13	-2.08
3511	10/11/09 20:41	60.14	-2.07
3512	10/11/09 20:42	60.14	-2.07
3513	10/11/09 20:43	60.14	-2.07
3514	10/11/09 20:44	60.14	-2.07
3515	10/11/09 20:45	60.14	-2.07
3516	10/11/09 20:46	60.14	-2.07
3517	10/11/09 20:47	60.14	-2.07
3518	10/11/09 20:48	60.14	-2.07
3519	10/11/09 20:49	60.15	-2.06
3520	10/11/09 20:50	60.15	-2.06

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3521	10/11/09 20:51	60.14	-2.07
3522	10/11/09 20:52	60.14	-2.07
3523	10/11/09 20:53	60.14	-2.07
3524	10/11/09 20:54	60.14	-2.07
3525	10/11/09 20:55	60.15	-2.06
3526	10/11/09 20:56	60.15	-2.06
3527	10/11/09 20:57	60.15	-2.06
3528	10/11/09 20:58	60.14	-2.07
3529	10/11/09 20:59	60.14	-2.07
3530	10/11/09 21:00	60.14	-2.07
3531	10/11/09 21:01	60.14	-2.07
3532	10/11/09 21:02	60.13	-2.08
3533	10/11/09 21:03	60.14	-2.07
3534	10/11/09 21:04	60.14	-2.07
3535	10/11/09 21:05	60.13	-2.08
3536	10/11/09 21:06	60.13	-2.08
3537	10/11/09 21:07	60.14	-2.07
3538	10/11/09 21:08	60.14	-2.07
3539	10/11/09 21:09	60.14	-2.07
3540	10/11/09 21:10	60.14	-2.07
3541	10/11/09 21:11	60.15	-2.06
3542	10/11/09 21:12	60.14	-2.07
3543	10/11/09 21:13	60.14	-2.07
3544	10/11/09 21:14	60.12	-2.09
3545	10/11/09 21:15	60.12	-2.09
3546	10/11/09 21:16	60.13	-2.08
3547	10/11/09 21:17	60.13	-2.08
3548	10/11/09 21:18	60.14	-2.07
3549	10/11/09 21:19	60.15	-2.06
3550	10/11/09 21:20	60.16	-2.05
3551	10/11/09 21:21	60.16	-2.05
3552	10/11/09 21:22	60.17	-2.04
3553	10/11/09 21:23	60.15	-2.06
3554	10/11/09 21:24	60.13	-2.08
3555	10/11/09 21:25	60.13	-2.08
3556	10/11/09 21:26	60.13	-2.08
3557	10/11/09 21:27	60.13	-2.08
3558	10/11/09 21:28	60.13	-2.08
3559	10/11/09 21:29	60.13	-2.08
3560	10/11/09 21:30	60.14	-2.07
3561	10/11/09 21:31	60.15	-2.06
3562	10/11/09 21:32	60.13	-2.08
3563	10/11/09 21:33	60.12	-2.09
3564	10/11/09 21:34	60.12	-2.09
3565	10/11/09 21:35	60.14	-2.07
3566	10/11/09 21:36	60.13	-2.08
3567	10/11/09 21:37	60.12	-2.09
3568	10/11/09 21:38	60.13	-2.08
3569	10/11/09 21:39	60.13	-2.08
3570	10/11/09 21:40	60.14	-2.07
3571	10/11/09 21:41	60.12	-2.09
3572	10/11/09 21:42	60.12	-2.09
3573	10/11/09 21:43	60.12	-2.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
3574	10/11/09 21:44	60.12	-2.09
3575	10/11/09 21:45	60.12	-2.09
3576	10/11/09 21:46	60.12	-2.09
3577	10/11/09 21:47	60.12	-2.09
3578	10/11/09 21:48	60.13	-2.08
3579	10/11/09 21:49	60.13	-2.08
3580	10/11/09 21:50	60.13	-2.08
3581	10/11/09 21:51	60.13	-2.08
3582	10/11/09 21:52	60.13	-2.08
3583	10/11/09 21:53	60.13	-2.08
3584	10/11/09 21:54	60.13	-2.08
3585	10/11/09 21:55	60.13	-2.08
3586	10/11/09 21:56	60.12	-2.09
3587	10/11/09 21:57	60.11	-2.10
3588	10/11/09 21:58	60.11	-2.10
3589	10/11/09 21:59	60.11	-2.10
3590	10/11/09 22:00	60.11	-2.10
3591	10/11/09 22:01	60.12	-2.09
3592	10/11/09 22:02	60.12	-2.09
3593	10/11/09 22:03	60.12	-2.09
3594	10/11/09 22:04	60.11	-2.10
3595	10/11/09 22:05	60.11	-2.10
3596	10/11/09 22:06	60.12	-2.09
3597	10/11/09 22:07	60.13	-2.08
3598	10/11/09 22:08	60.13	-2.08
3599	10/11/09 22:09	60.13	-2.08
3600	10/11/09 22:10	60.13	-2.08
3601	10/11/09 22:11	60.13	-2.08
3602	10/11/09 22:12	60.12	-2.09
3603	10/11/09 22:13	60.11	-2.10
3604	10/11/09 22:14	60.11	-2.10
3605	10/11/09 22:15	60.11	-2.10
3606	10/11/09 22:16	60.12	-2.09
3607	10/11/09 22:17	60.12	-2.09
3608	10/11/09 22:18	60.13	-2.08
3609	10/11/09 22:19	60.13	-2.08
3610	10/11/09 22:20	60.14	-2.07
3611	10/11/09 22:21	60.14	-2.07
3612	10/11/09 22:22	60.15	-2.06
3613	10/11/09 22:23	60.14	-2.07
3614	10/11/09 22:24	60.12	-2.09
3615	10/11/09 22:25	60.11	-2.10
3616	10/11/09 22:26	60.11	-2.10
3617	10/11/09 22:27	60.10	-2.11
3618	10/11/09 22:28	60.10	-2.11
3619	10/11/09 22:29	60.10	-2.11
3620	10/11/09 22:30	60.11	-2.10
3621	10/11/09 22:31	60.11	-2.10
3622	10/11/09 22:32	60.11	-2.10
3623	10/11/09 22:33	60.12	-2.09
3624	10/11/09 22:34	60.12	-2.09
3625	10/11/09 22:35	60.12	-2.09
3626	10/11/09 22:36	60.11	-2.10

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
3627	10/11/09 22:37	60.11	-2.10
3628	10/11/09 22:38	60.10	-2.11
3629	10/11/09 22:39	60.11	-2.10
3630	10/11/09 22:40	60.12	-2.09
3631	10/11/09 22:41	60.13	-2.08
3632	10/11/09 22:42	60.13	-2.08
3633	10/11/09 22:43	60.14	-2.07
3634	10/11/09 22:44	60.13	-2.08
3635	10/11/09 22:45	60.10	-2.11
3636	10/11/09 22:46	60.10	-2.11
3637	10/11/09 22:47	60.11	-2.10
3638	10/11/09 22:48	60.11	-2.10
3639	10/11/09 22:49	60.12	-2.09
3640	10/11/09 22:50	60.12	-2.09
3641	10/11/09 22:51	60.11	-2.10
3642	10/11/09 22:52	60.10	-2.11
3643	10/11/09 22:53	60.09	-2.12
3644	10/11/09 22:54	60.09	-2.12
3645	10/11/09 22:55	60.10	-2.11
3646	10/11/09 22:56	60.11	-2.10
3647	10/11/09 22:57	60.10	-2.11
3648	10/11/09 22:58	60.10	-2.11
3649	10/11/09 22:59	60.09	-2.12
3650	10/11/09 23:00	60.10	-2.11
3651	10/11/09 23:01	60.09	-2.12
3652	10/11/09 23:02	60.09	-2.12
3653	10/11/09 23:03	60.09	-2.12
3654	10/11/09 23:04	60.09	-2.12
3655	10/11/09 23:05	60.09	-2.12
3656	10/11/09 23:06	60.09	-2.12
3657	10/11/09 23:07	60.10	-2.11
3658	10/11/09 23:08	60.10	-2.11
3659	10/11/09 23:09	60.11	-2.10
3660	10/11/09 23:10	60.12	-2.09
3661	10/11/09 23:11	60.11	-2.10
3662	10/11/09 23:12	60.10	-2.11
3663	10/11/09 23:13	60.10	-2.11
3664	10/11/09 23:14	60.10	-2.11
3665	10/11/09 23:15	60.10	-2.11
3666	10/11/09 23:16	60.10	-2.11
3667	10/11/09 23:17	60.10	-2.11
3668	10/11/09 23:18	60.11	-2.10
3669	10/11/09 23:19	60.12	-2.09
3670	10/11/09 23:20	60.10	-2.11
3671	10/11/09 23:21	60.11	-2.10
3672	10/11/09 23:22	60.12	-2.09
3673	10/11/09 23:23	60.12	-2.09
3674	10/11/09 23:24	60.11	-2.10
3675	10/11/09 23:25	60.10	-2.11
3676	10/11/09 23:26	60.10	-2.11
3677	10/11/09 23:27	60.11	-2.10
3678	10/11/09 23:28	60.10	-2.11
3679	10/11/09 23:29	60.09	-2.12

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
3680	10/11/09 23:30	60.09	-2.12
3681	10/11/09 23:31	60.11	-2.10
3682	10/11/09 23:32	60.12	-2.09
3683	10/11/09 23:33	60.11	-2.10
3684	10/11/09 23:34	60.10	-2.11
3685	10/11/09 23:35	60.09	-2.12
3686	10/11/09 23:36	60.10	-2.11
3687	10/11/09 23:37	60.11	-2.10
3688	10/11/09 23:38	60.11	-2.10
3689	10/11/09 23:39	60.11	-2.10
3690	10/11/09 23:40	60.11	-2.10
3691	10/11/09 23:41	60.11	-2.10
3692	10/11/09 23:42	60.11	-2.10
3693	10/11/09 23:43	60.11	-2.10
3694	10/11/09 23:44	60.11	-2.10
3695	10/11/09 23:45	60.10	-2.11
3696	10/11/09 23:46	60.09	-2.12
3697	10/11/09 23:47	60.09	-2.12
3698	10/11/09 23:48	60.09	-2.12
3699	10/11/09 23:49	60.09	-2.12
3700	10/11/09 23:50	60.09	-2.12
3701	10/11/09 23:51	60.09	-2.12
3702	10/11/09 23:52	60.10	-2.11
3703	10/11/09 23:53	60.11	-2.10
3704	10/11/09 23:54	60.10	-2.11
3705	10/11/09 23:55	60.10	-2.11
3706	10/11/09 23:56	60.10	-2.11
3707	10/11/09 23:57	60.10	-2.11
3708	10/11/09 23:58	60.11	-2.10
3709	10/11/09 23:59	60.11	-2.10
3710	10/12/09 0:00	60.11	-2.10
3711	10/12/09 0:01	60.10	-2.11
3712	10/12/09 0:02	60.10	-2.11
3713	10/12/09 0:03	60.09	-2.12
3714	10/12/09 0:04	60.10	-2.11
3715	10/12/09 0:05	60.10	-2.11
3716	10/12/09 0:06	60.11	-2.10
3717	10/12/09 0:07	60.11	-2.10
3718	10/12/09 0:08	60.11	-2.10
3719	10/12/09 0:09	60.11	-2.10
3720	10/12/09 0:10	60.11	-2.10
3721	10/12/09 0:11	60.11	-2.10
3722	10/12/09 0:12	60.10	-2.11
3723	10/12/09 0:13	60.10	-2.11
3724	10/12/09 0:14	60.11	-2.10
3725	10/12/09 0:15	60.12	-2.09
3726	10/12/09 0:16	60.12	-2.09
3727	10/12/09 0:17	60.12	-2.09
3728	10/12/09 0:18	60.11	-2.10
3729	10/12/09 0:19	60.11	-2.10
3730	10/12/09 0:20	60.11	-2.10
3731	10/12/09 0:21	60.10	-2.11
3732	10/12/09 0:22	60.11	-2.10

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3733	10/12/09 0:23	60.11	-2.10
3734	10/12/09 0:24	60.11	-2.10
3735	10/12/09 0:25	60.11	-2.10
3736	10/12/09 0:26	60.11	-2.10
3737	10/12/09 0:27	60.12	-2.09
3738	10/12/09 0:28	60.11	-2.10
3739	10/12/09 0:29	60.10	-2.11
3740	10/12/09 0:30	60.10	-2.11
3741	10/12/09 0:31	60.11	-2.10
3742	10/12/09 0:32	60.10	-2.11
3743	10/12/09 0:33	60.11	-2.10
3744	10/12/09 0:34	60.11	-2.10
3745	10/12/09 0:35	60.11	-2.10
3746	10/12/09 0:36	60.11	-2.10
3747	10/12/09 0:37	60.10	-2.11
3748	10/12/09 0:38	60.10	-2.11
3749	10/12/09 0:39	60.11	-2.10
3750	10/12/09 0:40	60.11	-2.10
3751	10/12/09 0:41	60.11	-2.10
3752	10/12/09 0:42	60.11	-2.10
3753	10/12/09 0:43	60.11	-2.10
3754	10/12/09 0:44	60.12	-2.09
3755	10/12/09 0:45	60.11	-2.10
3756	10/12/09 0:46	60.11	-2.10
3757	10/12/09 0:47	60.11	-2.10
3758	10/12/09 0:48	60.12	-2.09
3759	10/12/09 0:49	60.12	-2.09
3760	10/12/09 0:50	60.11	-2.10
3761	10/12/09 0:51	60.10	-2.11
3762	10/12/09 0:52	60.11	-2.10
3763	10/12/09 0:53	60.11	-2.10
3764	10/12/09 0:54	60.11	-2.10
3765	10/12/09 0:55	60.11	-2.10
3766	10/12/09 0:56	60.11	-2.10
3767	10/12/09 0:57	60.11	-2.10
3768	10/12/09 0:58	60.11	-2.10
3769	10/12/09 0:59	60.12	-2.09
3770	10/12/09 1:00	60.13	-2.08
3771	10/12/09 1:01	60.13	-2.08
3772	10/12/09 1:02	60.13	-2.08
3773	10/12/09 1:03	60.11	-2.10
3774	10/12/09 1:04	60.11	-2.10
3775	10/12/09 1:05	60.11	-2.10
3776	10/12/09 1:06	60.10	-2.11
3777	10/12/09 1:07	60.11	-2.10
3778	10/12/09 1:08	60.11	-2.10
3779	10/12/09 1:09	60.12	-2.09
3780	10/12/09 1:10	60.12	-2.09
3781	10/12/09 1:11	60.13	-2.08
3782	10/12/09 1:12	60.14	-2.07
3783	10/12/09 1:13	60.12	-2.09
3784	10/12/09 1:14	60.11	-2.10
3785	10/12/09 1:15	60.12	-2.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3786	10/12/09 1:16	60.12	-2.09
3787	10/12/09 1:17	60.12	-2.09
3788	10/12/09 1:18	60.12	-2.09
3789	10/12/09 1:19	60.13	-2.08
3790	10/12/09 1:20	60.13	-2.08
3791	10/12/09 1:21	60.12	-2.09
3792	10/12/09 1:22	60.12	-2.09
3793	10/12/09 1:23	60.12	-2.09
3794	10/12/09 1:24	60.14	-2.07
3795	10/12/09 1:25	60.14	-2.07
3796	10/12/09 1:26	60.14	-2.07
3797	10/12/09 1:27	60.14	-2.07
3798	10/12/09 1:28	60.13	-2.08
3799	10/12/09 1:29	60.12	-2.09
3800	10/12/09 1:30	60.12	-2.09
3801	10/12/09 1:31	60.11	-2.10
3802	10/12/09 1:32	60.11	-2.10
3803	10/12/09 1:33	60.11	-2.10
3804	10/12/09 1:34	60.10	-2.11
3805	10/12/09 1:35	60.10	-2.11
3806	10/12/09 1:36	60.10	-2.11
3807	10/12/09 1:37	60.11	-2.10
3808	10/12/09 1:38	60.12	-2.09
3809	10/12/09 1:39	60.13	-2.08
3810	10/12/09 1:40	60.13	-2.08
3811	10/12/09 1:41	60.11	-2.10
3812	10/12/09 1:42	60.11	-2.10
3813	10/12/09 1:43	60.11	-2.10
3814	10/12/09 1:44	60.11	-2.10
3815	10/12/09 1:45	60.12	-2.09
3816	10/12/09 1:46	60.11	-2.10
3817	10/12/09 1:47	60.11	-2.10
3818	10/12/09 1:48	60.12	-2.09
3819	10/12/09 1:49	60.12	-2.09
3820	10/12/09 1:50	60.12	-2.09
3821	10/12/09 1:51	60.12	-2.09
3822	10/12/09 1:52	60.11	-2.10
3823	10/12/09 1:53	60.10	-2.11
3824	10/12/09 1:54	60.11	-2.10
3825	10/12/09 1:55	60.12	-2.09
3826	10/12/09 1:56	60.12	-2.09
3827	10/12/09 1:57	60.11	-2.10
3828	10/12/09 1:58	60.12	-2.09
3829	10/12/09 1:59	60.12	-2.09
3830	10/12/09 2:00	60.12	-2.09
3831	10/12/09 2:01	60.11	-2.10
3832	10/12/09 2:02	60.11	-2.10
3833	10/12/09 2:03	60.11	-2.10
3834	10/12/09 2:04	60.11	-2.10
3835	10/12/09 2:05	60.11	-2.10
3836	10/12/09 2:06	60.12	-2.09
3837	10/12/09 2:07	60.12	-2.09
3838	10/12/09 2:08	60.11	-2.10

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3839	10/12/09 2:09	60.11	-2.10
3840	10/12/09 2:10	60.11	-2.10
3841	10/12/09 2:11	60.10	-2.11
3842	10/12/09 2:12	60.11	-2.10
3843	10/12/09 2:13	60.11	-2.10
3844	10/12/09 2:14	60.12	-2.09
3845	10/12/09 2:15	60.13	-2.08
3846	10/12/09 2:16	60.13	-2.08
3847	10/12/09 2:17	60.13	-2.08
3848	10/12/09 2:18	60.13	-2.08
3849	10/12/09 2:19	60.12	-2.09
3850	10/12/09 2:20	60.11	-2.10
3851	10/12/09 2:21	60.10	-2.11
3852	10/12/09 2:22	60.10	-2.11
3853	10/12/09 2:23	60.10	-2.11
3854	10/12/09 2:24	60.11	-2.10
3855	10/12/09 2:25	60.11	-2.10
3856	10/12/09 2:26	60.11	-2.10
3857	10/12/09 2:27	60.10	-2.11
3858	10/12/09 2:28	60.10	-2.11
3859	10/12/09 2:29	60.10	-2.11
3860	10/12/09 2:30	60.11	-2.10
3861	10/12/09 2:31	60.11	-2.10
3862	10/12/09 2:32	60.12	-2.09
3863	10/12/09 2:33	60.13	-2.08
3864	10/12/09 2:34	60.12	-2.09
3865	10/12/09 2:35	60.12	-2.09
3866	10/12/09 2:36	60.10	-2.11
3867	10/12/09 2:37	60.10	-2.11
3868	10/12/09 2:38	60.10	-2.11
3869	10/12/09 2:39	60.11	-2.10
3870	10/12/09 2:40	60.11	-2.10
3871	10/12/09 2:41	60.10	-2.11
3872	10/12/09 2:42	60.11	-2.10
3873	10/12/09 2:43	60.12	-2.09
3874	10/12/09 2:44	60.12	-2.09
3875	10/12/09 2:45	60.11	-2.10
3876	10/12/09 2:46	60.10	-2.11
3877	10/12/09 2:47	60.10	-2.11
3878	10/12/09 2:48	60.11	-2.10
3879	10/12/09 2:49	60.11	-2.10
3880	10/12/09 2:50	60.11	-2.10
3881	10/12/09 2:51	60.11	-2.10
3882	10/12/09 2:52	60.11	-2.10
3883	10/12/09 2:53	60.11	-2.10
3884	10/12/09 2:54	60.11	-2.10
3885	10/12/09 2:55	60.11	-2.10
3886	10/12/09 2:56	60.10	-2.11
3887	10/12/09 2:57	60.10	-2.11
3888	10/12/09 2:58	60.10	-2.11
3889	10/12/09 2:59	60.10	-2.11
3890	10/12/09 3:00	60.10	-2.11
3891	10/12/09 3:01	60.10	-2.11

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3892	10/12/09 3:02	60.11	-2.10
3893	10/12/09 3:03	60.11	-2.10
3894	10/12/09 3:04	60.10	-2.11
3895	10/12/09 3:05	60.10	-2.11
3896	10/12/09 3:06	60.10	-2.11
3897	10/12/09 3:07	60.11	-2.10
3898	10/12/09 3:08	60.10	-2.11
3899	10/12/09 3:09	60.10	-2.11
3900	10/12/09 3:10	60.10	-2.11
3901	10/12/09 3:11	60.09	-2.12
3902	10/12/09 3:12	60.09	-2.12
3903	10/12/09 3:13	60.10	-2.11
3904	10/12/09 3:14	60.11	-2.10
3905	10/12/09 3:15	60.12	-2.09
3906	10/12/09 3:16	60.11	-2.10
3907	10/12/09 3:17	60.10	-2.11
3908	10/12/09 3:18	60.10	-2.11
3909	10/12/09 3:19	60.09	-2.12
3910	10/12/09 3:20	60.10	-2.11
3911	10/12/09 3:21	60.10	-2.11
3912	10/12/09 3:22	60.09	-2.12
3913	10/12/09 3:23	60.10	-2.11
3914	10/12/09 3:24	60.12	-2.09
3915	10/12/09 3:25	60.12	-2.09
3916	10/12/09 3:26	60.11	-2.10
3917	10/12/09 3:27	60.10	-2.11
3918	10/12/09 3:28	60.09	-2.12
3919	10/12/09 3:29	60.09	-2.12
3920	10/12/09 3:30	60.09	-2.12
3921	10/12/09 3:31	60.09	-2.12
3922	10/12/09 3:32	60.10	-2.11
3923	10/12/09 3:33	60.10	-2.11
3924	10/12/09 3:34	60.10	-2.11
3925	10/12/09 3:35	60.10	-2.11
3926	10/12/09 3:36	60.10	-2.11
3927	10/12/09 3:37	60.09	-2.12
3928	10/12/09 3:38	60.08	-2.13
3929	10/12/09 3:39	60.09	-2.12
3930	10/12/09 3:40	60.09	-2.12
3931	10/12/09 3:41	60.09	-2.12
3932	10/12/09 3:42	60.09	-2.12
3933	10/12/09 3:43	60.09	-2.12
3934	10/12/09 3:44	60.10	-2.11
3935	10/12/09 3:45	60.10	-2.11
3936	10/12/09 3:46	60.09	-2.12
3937	10/12/09 3:47	60.09	-2.12
3938	10/12/09 3:48	60.09	-2.12
3939	10/12/09 3:49	60.09	-2.12
3940	10/12/09 3:50	60.10	-2.11
3941	10/12/09 3:51	60.09	-2.12
3942	10/12/09 3:52	60.09	-2.12
3943	10/12/09 3:53	60.09	-2.12
3944	10/12/09 3:54	60.09	-2.12

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
3945	10/12/09 3:55	60.09	-2.12
3946	10/12/09 3:56	60.09	-2.12
3947	10/12/09 3:57	60.10	-2.11
3948	10/12/09 3:58	60.11	-2.10
3949	10/12/09 3:59	60.11	-2.10
3950	10/12/09 4:00	60.10	-2.11
3951	10/12/09 4:01	60.09	-2.12
3952	10/12/09 4:02	60.09	-2.12
3953	10/12/09 4:03	60.09	-2.12
3954	10/12/09 4:04	60.09	-2.12
3955	10/12/09 4:05	60.10	-2.11
3956	10/12/09 4:06	60.10	-2.11
3957	10/12/09 4:07	60.09	-2.12
3958	10/12/09 4:08	60.09	-2.12
3959	10/12/09 4:09	60.09	-2.12
3960	10/12/09 4:10	60.09	-2.12
3961	10/12/09 4:11	60.09	-2.12
3962	10/12/09 4:12	60.09	-2.12
3963	10/12/09 4:13	60.09	-2.12
3964	10/12/09 4:14	60.08	-2.13
3965	10/12/09 4:15	60.08	-2.13
3966	10/12/09 4:16	60.09	-2.12
3967	10/12/09 4:17	60.09	-2.12
3968	10/12/09 4:18	60.09	-2.12
3969	10/12/09 4:19	60.09	-2.12
3970	10/12/09 4:20	60.09	-2.12
3971	10/12/09 4:21	60.09	-2.12
3972	10/12/09 4:22	60.09	-2.12
3973	10/12/09 4:23	60.09	-2.12
3974	10/12/09 4:24	60.10	-2.11
3975	10/12/09 4:25	60.11	-2.10
3976	10/12/09 4:26	60.12	-2.09
3977	10/12/09 4:27	60.12	-2.09
3978	10/12/09 4:28	60.11	-2.10
3979	10/12/09 4:29	60.11	-2.10
3980	10/12/09 4:30	60.11	-2.10
3981	10/12/09 4:31	60.11	-2.10
3982	10/12/09 4:32	60.10	-2.11
3983	10/12/09 4:33	60.09	-2.12
3984	10/12/09 4:34	60.08	-2.13
3985	10/12/09 4:35	60.08	-2.13
3986	10/12/09 4:36	60.09	-2.12
3987	10/12/09 4:37	60.09	-2.12
3988	10/12/09 4:38	60.09	-2.12
3989	10/12/09 4:39	60.09	-2.12
3990	10/12/09 4:40	60.10	-2.11
3991	10/12/09 4:41	60.11	-2.10
3992	10/12/09 4:42	60.10	-2.11
3993	10/12/09 4:43	60.09	-2.12
3994	10/12/09 4:44	60.09	-2.12
3995	10/12/09 4:45	60.10	-2.11
3996	10/12/09 4:46	60.10	-2.11
3997	10/12/09 4:47	60.10	-2.11

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
3998	10/12/09 4:48	60.10	-2.11
3999	10/12/09 4:49	60.11	-2.10
4000	10/12/09 4:50	60.10	-2.11
4001	10/12/09 4:51	60.10	-2.11
4002	10/12/09 4:52	60.10	-2.11
4003	10/12/09 4:53	60.10	-2.11
4004	10/12/09 4:54	60.10	-2.11
4005	10/12/09 4:55	60.09	-2.12
4006	10/12/09 4:56	60.09	-2.12
4007	10/12/09 4:57	60.09	-2.12
4008	10/12/09 4:58	60.10	-2.11
4009	10/12/09 4:59	60.11	-2.10
4010	10/12/09 5:00	60.11	-2.10
4011	10/12/09 5:01	60.10	-2.11
4012	10/12/09 5:02	60.10	-2.11
4013	10/12/09 5:03	60.10	-2.11
4014	10/12/09 5:04	60.11	-2.10
4015	10/12/09 5:05	60.12	-2.09
4016	10/12/09 5:06	60.12	-2.09
4017	10/12/09 5:07	60.11	-2.10
4018	10/12/09 5:08	60.11	-2.10
4019	10/12/09 5:09	60.11	-2.10
4020	10/12/09 5:10	60.10	-2.11
4021	10/12/09 5:11	60.10	-2.11
4022	10/12/09 5:12	60.09	-2.12
4023	10/12/09 5:13	60.09	-2.12
4024	10/12/09 5:14	60.10	-2.11
4025	10/12/09 5:15	60.10	-2.11
4026	10/12/09 5:16	60.10	-2.11
4027	10/12/09 5:17	60.11	-2.10
4028	10/12/09 5:18	60.11	-2.10
4029	10/12/09 5:19	60.10	-2.11
4030	10/12/09 5:20	60.10	-2.11
4031	10/12/09 5:21	60.10	-2.11
4032	10/12/09 5:22	60.11	-2.10
4033	10/12/09 5:23	60.12	-2.09
4034	10/12/09 5:24	60.11	-2.10
4035	10/12/09 5:25	60.10	-2.11
4036	10/12/09 5:26	60.10	-2.11
4037	10/12/09 5:27	60.11	-2.10
4038	10/12/09 5:28	60.11	-2.10
4039	10/12/09 5:29	60.11	-2.10
4040	10/12/09 5:30	60.10	-2.11
4041	10/12/09 5:31	60.11	-2.10
4042	10/12/09 5:32	60.11	-2.10
4043	10/12/09 5:33	60.11	-2.10
4044	10/12/09 5:34	60.11	-2.10
4045	10/12/09 5:35	60.11	-2.10
4046	10/12/09 5:36	60.11	-2.10
4047	10/12/09 5:37	60.12	-2.09
4048	10/12/09 5:38	60.12	-2.09
4049	10/12/09 5:39	60.12	-2.09
4050	10/12/09 5:40	60.11	-2.10

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4051	10/12/09 5:41	60.11	-2.10
4052	10/12/09 5:42	60.10	-2.11
4053	10/12/09 5:43	60.11	-2.10
4054	10/12/09 5:44	60.11	-2.10
4055	10/12/09 5:45	60.11	-2.10
4056	10/12/09 5:46	60.10	-2.11
4057	10/12/09 5:47	60.10	-2.11
4058	10/12/09 5:48	60.10	-2.11
4059	10/12/09 5:49	60.12	-2.09
4060	10/12/09 5:50	60.12	-2.09
4061	10/12/09 5:51	60.11	-2.10
4062	10/12/09 5:52	60.11	-2.10
4063	10/12/09 5:53	60.11	-2.10
4064	10/12/09 5:54	60.11	-2.10
4065	10/12/09 5:55	60.11	-2.10
4066	10/12/09 5:56	60.11	-2.10
4067	10/12/09 5:57	60.12	-2.09
4068	10/12/09 5:58	60.11	-2.10
4069	10/12/09 5:59	60.11	-2.10
4070	10/12/09 6:00	60.11	-2.10
4071	10/12/09 6:01	60.11	-2.10
4072	10/12/09 6:02	60.11	-2.10
4073	10/12/09 6:03	60.11	-2.10
4074	10/12/09 6:04	60.11	-2.10
4075	10/12/09 6:05	60.11	-2.10
4076	10/12/09 6:06	60.11	-2.10
4077	10/12/09 6:07	60.11	-2.10
4078	10/12/09 6:08	60.11	-2.10
4079	10/12/09 6:09	60.11	-2.10
4080	10/12/09 6:10	60.11	-2.10
4081	10/12/09 6:11	60.11	-2.10
4082	10/12/09 6:12	60.11	-2.10
4083	10/12/09 6:13	60.11	-2.10
4084	10/12/09 6:14	60.12	-2.09
4085	10/12/09 6:15	60.13	-2.08
4086	10/12/09 6:16	60.13	-2.08
4087	10/12/09 6:17	60.14	-2.07
4088	10/12/09 6:18	60.15	-2.06
4089	10/12/09 6:19	60.13	-2.08
4090	10/12/09 6:20	60.13	-2.08
4091	10/12/09 6:21	60.14	-2.07
4092	10/12/09 6:22	60.13	-2.08
4093	10/12/09 6:23	60.12	-2.09
4094	10/12/09 6:24	60.12	-2.09
4095	10/12/09 6:25	60.13	-2.08
4096	10/12/09 6:26	60.13	-2.08
4097	10/12/09 6:27	60.12	-2.09
4098	10/12/09 6:28	60.12	-2.09
4099	10/12/09 6:29	60.13	-2.08
4100	10/12/09 6:30	60.13	-2.08
4101	10/12/09 6:31	60.13	-2.08
4102	10/12/09 6:32	60.12	-2.09
4103	10/12/09 6:33	60.12	-2.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4104	10/12/09 6:34	60.12	-2.09
4105	10/12/09 6:35	60.12	-2.09
4106	10/12/09 6:36	60.11	-2.10
4107	10/12/09 6:37	60.12	-2.09
4108	10/12/09 6:38	60.11	-2.10
4109	10/12/09 6:39	60.11	-2.10
4110	10/12/09 6:40	60.11	-2.10
4111	10/12/09 6:41	60.11	-2.10
4112	10/12/09 6:42	60.11	-2.10
4113	10/12/09 6:43	60.12	-2.09
4114	10/12/09 6:44	60.13	-2.08
4115	10/12/09 6:45	60.13	-2.08
4116	10/12/09 6:46	60.13	-2.08
4117	10/12/09 6:47	60.13	-2.08
4118	10/12/09 6:48	60.13	-2.08
4119	10/12/09 6:49	60.13	-2.08
4120	10/12/09 6:50	60.13	-2.08
4121	10/12/09 6:51	60.12	-2.09
4122	10/12/09 6:52	60.11	-2.10
4123	10/12/09 6:53	60.11	-2.10
4124	10/12/09 6:54	60.12	-2.09
4125	10/12/09 6:55	60.13	-2.08
4126	10/12/09 6:56	60.13	-2.08
4127	10/12/09 6:57	60.13	-2.08
4128	10/12/09 6:58	60.12	-2.09
4129	10/12/09 6:59	60.11	-2.10
4130	10/12/09 7:00	60.11	-2.10
4131	10/12/09 7:01	60.11	-2.10
4132	10/12/09 7:02	60.11	-2.10
4133	10/12/09 7:03	60.11	-2.10
4134	10/12/09 7:04	60.12	-2.09
4135	10/12/09 7:05	60.12	-2.09
4136	10/12/09 7:06	60.12	-2.09
4137	10/12/09 7:07	60.12	-2.09
4138	10/12/09 7:08	60.12	-2.09
4139	10/12/09 7:09	60.12	-2.09
4140	10/12/09 7:10	60.12	-2.09
4141	10/12/09 7:11	60.13	-2.08
4142	10/12/09 7:12	60.13	-2.08
4143	10/12/09 7:13	60.12	-2.09
4144	10/12/09 7:14	60.12	-2.09
4145	10/12/09 7:15	60.13	-2.08
4146	10/12/09 7:16	60.14	-2.07
4147	10/12/09 7:17	60.15	-2.06
4148	10/12/09 7:18	60.14	-2.07
4149	10/12/09 7:19	60.14	-2.07
4150	10/12/09 7:20	60.14	-2.07
4151	10/12/09 7:21	60.14	-2.07
4152	10/12/09 7:22	60.14	-2.07
4153	10/12/09 7:23	60.13	-2.08
4154	10/12/09 7:24	60.13	-2.08
4155	10/12/09 7:25	60.12	-2.09
4156	10/12/09 7:26	60.12	-2.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4157	10/12/09 7:27	60.12	-2.09
4158	10/12/09 7:28	60.12	-2.09
4159	10/12/09 7:29	60.11	-2.10
4160	10/12/09 7:30	60.11	-2.10
4161	10/12/09 7:31	60.12	-2.09
4162	10/12/09 7:32	60.13	-2.08
4163	10/12/09 7:33	60.15	-2.06
4164	10/12/09 7:34	60.14	-2.07
4165	10/12/09 7:35	60.14	-2.07
4166	10/12/09 7:36	60.13	-2.08
4167	10/12/09 7:37	60.13	-2.08
4168	10/12/09 7:38	60.12	-2.09
4169	10/12/09 7:39	60.11	-2.10
4170	10/12/09 7:40	60.10	-2.11
4171	10/12/09 7:41	60.11	-2.10
4172	10/12/09 7:42	60.11	-2.10
4173	10/12/09 7:43	60.12	-2.09
4174	10/12/09 7:44	60.12	-2.09
4175	10/12/09 7:45	60.13	-2.08
4176	10/12/09 7:46	60.13	-2.08
4177	10/12/09 7:47	60.13	-2.08
4178	10/12/09 7:48	60.14	-2.07
4179	10/12/09 7:49	60.16	-2.05
4180	10/12/09 7:50	60.13	-2.08
4181	10/12/09 7:51	60.10	-2.11
4182	10/12/09 7:52	60.10	-2.11
4183	10/12/09 7:53	60.10	-2.11
4184	10/12/09 7:54	60.11	-2.10
4185	10/12/09 7:55	60.13	-2.08
4186	10/12/09 7:56	60.13	-2.08
4187	10/12/09 7:57	60.13	-2.08
4188	10/12/09 7:58	60.12	-2.09
4189	10/12/09 7:59	60.11	-2.10
4190	10/12/09 8:00	60.11	-2.10
4191	10/12/09 8:01	60.11	-2.10
4192	10/12/09 8:02	60.11	-2.10
4193	10/12/09 8:03	60.10	-2.11
4194	10/12/09 8:04	60.10	-2.11
4195	10/12/09 8:05	60.11	-2.10
4196	10/12/09 8:06	60.11	-2.10
4197	10/12/09 8:07	60.12	-2.09
4198	10/12/09 8:08	60.11	-2.10
4199	10/12/09 8:09	60.10	-2.11
4200	10/12/09 8:10	60.11	-2.10
4201	10/12/09 8:11	60.11	-2.10
4202	10/12/09 8:12	60.11	-2.10
4203	10/12/09 8:13	60.11	-2.10
4204	10/12/09 8:14	60.11	-2.10
4205	10/12/09 8:15	60.11	-2.10
4206	10/12/09 8:16	60.11	-2.10
4207	10/12/09 8:17	60.12	-2.09
4208	10/12/09 8:18	60.12	-2.09
4209	10/12/09 8:19	60.12	-2.09

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4210	10/12/09 8:20	60.12	-2.09
4211	10/12/09 8:21	60.12	-2.09
4212	10/12/09 8:22	60.12	-2.09
4213	10/12/09 8:23	60.12	-2.09
4214	10/12/09 8:24	60.10	-2.11
4215	10/12/09 8:25	60.10	-2.11
4216	10/12/09 8:26	60.10	-2.11
4217	10/12/09 8:27	60.12	-2.09
4218	10/12/09 8:28	60.13	-2.08
4219	10/12/09 8:29	60.12	-2.09
4220	10/12/09 8:30	60.12	-2.09
4221	10/12/09 8:31	60.11	-2.10
4222	10/12/09 8:32	60.11	-2.10
4223	10/12/09 8:33	60.11	-2.10
4224	10/12/09 8:34	60.10	-2.11
4225	10/12/09 8:35	60.10	-2.11
4226	10/12/09 8:36	60.10	-2.11
4227	10/12/09 8:37	60.11	-2.10
4228	10/12/09 8:38	60.11	-2.10
4229	10/12/09 8:39	60.10	-2.11
4230	10/12/09 8:40	60.11	-2.10
4231	10/12/09 8:41	60.11	-2.10
4232	10/12/09 8:42	60.10	-2.11
4233	10/12/09 8:43	60.10	-2.11
4234	10/12/09 8:44	60.10	-2.11
4235	10/12/09 8:45	60.10	-2.11
4236	10/12/09 8:46	60.10	-2.11
4237	10/12/09 8:47	60.10	-2.11
4238	10/12/09 8:48	60.10	-2.11
4239	10/12/09 8:49	60.10	-2.11
4240	10/12/09 8:50	60.10	-2.11
4241	10/12/09 8:51	60.10	-2.11
4242	10/12/09 8:52	60.09	-2.12
4243	10/12/09 8:53	60.09	-2.12
4244	10/12/09 8:54	60.09	-2.12
4245	10/12/09 8:55	60.11	-2.10
4246	10/12/09 8:56	60.11	-2.10
4247	10/12/09 8:57	60.10	-2.11
4248	10/12/09 8:58	60.10	-2.11
4249	10/12/09 8:59	60.10	-2.11
4250	10/12/09 9:00	60.10	-2.11
4251	10/12/09 9:01	60.11	-2.10
4252	10/12/09 9:02	60.12	-2.09
4253	10/12/09 9:03	60.11	-2.10
4254	10/12/09 9:04	60.11	-2.10
4255	10/12/09 9:05	60.10	-2.11
4256	10/12/09 9:06	60.10	-2.11
4257	10/12/09 9:07	60.09	-2.12
4258	10/12/09 9:08	60.09	-2.12
4259	10/12/09 9:09	60.09	-2.12
4260	10/12/09 9:10	60.10	-2.11
4261	10/12/09 9:11	60.10	-2.11
4262	10/12/09 9:12	60.09	-2.12

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4263	10/12/09 9:13	60.10	-2.11
4264	10/12/09 9:14	60.10	-2.11
4265	10/12/09 9:15	60.10	-2.11
4266	10/12/09 9:16	60.10	-2.11
4267	10/12/09 9:17	60.11	-2.10
4268	10/12/09 9:18	60.11	-2.10
4269	10/12/09 9:19	60.10	-2.11
4270	10/12/09 9:20	60.09	-2.12
4271	10/12/09 9:21	60.10	-2.11
4272	10/12/09 9:22	60.10	-2.11
4287	10/12/09 9:37	60.11	-2.10
4288	10/12/09 9:38	60.11	-2.10
4289	10/12/09 9:39	60.11	-2.10
4290	10/12/09 9:40	60.10	-2.11
4291	10/12/09 9:41	60.08	-2.13
4292	10/12/09 9:42	60.07	-2.14
4293	10/12/09 9:43	60.08	-2.13
4294	10/12/09 9:44	60.09	-2.12
4295	10/12/09 9:45	60.10	-2.11
4296	10/12/09 9:46	60.09	-2.12
4297	10/12/09 9:47	60.09	-2.12
4298	10/12/09 9:48	60.09	-2.12
4299	10/12/09 9:49	60.09	-2.12
4300	10/12/09 9:50	60.08	-2.13
4301	10/12/09 9:51	60.09	-2.12
4302	10/12/09 9:52	60.09	-2.12
4303	10/12/09 9:53	60.09	-2.12
4304	10/12/09 9:54	60.09	-2.12
4305	10/12/09 9:55	60.09	-2.12
4306	10/12/09 9:56	60.09	-2.12
4307	10/12/09 9:57	60.09	-2.12
4308	10/12/09 9:58	60.09	-2.12
4309	10/12/09 9:59	60.10	-2.11
4310	10/12/09 10:00	60.10	-2.11
4311	10/12/09 10:01	60.11	-2.10
4312	10/12/09 10:02	60.10	-2.11
4313	10/12/09 10:03	60.09	-2.12
4314	10/12/09 10:04	60.09	-2.12
4315	10/12/09 10:05	60.09	-2.12
4316	10/12/09 10:06	60.09	-2.12
4317	10/12/09 10:07	60.08	-2.13
4318	10/12/09 10:08	60.08	-2.13
4319	10/12/09 10:09	60.08	-2.13
4320	10/12/09 10:10	60.07	-2.14
4321	10/12/09 10:11	60.07	-2.14
4322	10/12/09 10:12	60.07	-2.14
4323	10/12/09 10:13	60.08	-2.13
4324	10/12/09 10:14	60.08	-2.13
4325	10/12/09 10:15	60.07	-2.14
4326	10/12/09 10:16	60.07	-2.14
4327	10/12/09 10:17	60.07	-2.14
4328	10/12/09 10:18	60.08	-2.13
4329	10/12/09 10:19	60.09	-2.12

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4330	10/12/09 10:20	60.10	-2.11
4331	10/12/09 10:21	60.09	-2.12
4332	10/12/09 10:22	60.07	-2.14
4333	10/12/09 10:23	60.07	-2.14
4334	10/12/09 10:24	60.07	-2.14
4335	10/12/09 10:25	60.07	-2.14
4336	10/12/09 10:26	60.07	-2.14
4337	10/12/09 10:27	60.07	-2.14
4338	10/12/09 10:28	60.07	-2.14
4339	10/12/09 10:29	60.08	-2.13
4340	10/12/09 10:30	60.07	-2.14
4341	10/12/09 10:31	60.07	-2.14
4342	10/12/09 10:32	60.07	-2.14
4343	10/12/09 10:33	60.07	-2.14
4344	10/12/09 10:34	60.07	-2.14
4345	10/12/09 10:35	60.07	-2.14
4346	10/12/09 10:36	60.08	-2.13
4347	10/12/09 10:37	60.09	-2.12
4348	10/12/09 10:38	60.09	-2.12
4349	10/12/09 10:39	60.06	-2.15
4350	10/12/09 10:40	60.06	-2.15
4351	10/12/09 10:41	60.06	-2.15
4352	10/12/09 10:42	60.06	-2.15
4353	10/12/09 10:43	60.06	-2.15
4354	10/12/09 10:44	60.06	-2.15
4355	10/12/09 10:45	60.06	-2.15
4356	10/12/09 10:46	60.06	-2.15
4357	10/12/09 10:47	60.06	-2.15
4358	10/12/09 10:48	60.06	-2.15
4359	10/12/09 10:49	60.06	-2.15
4360	10/12/09 10:50	60.06	-2.15
4361	10/12/09 10:51	60.07	-2.14
4362	10/12/09 10:52	60.07	-2.14
4363	10/12/09 10:53	60.07	-2.14
4364	10/12/09 10:54	60.07	-2.14
4365	10/12/09 10:55	60.05	-2.16
4366	10/12/09 10:56	60.04	-2.17
4367	10/12/09 10:57	60.05	-2.16
4368	10/12/09 10:58	60.06	-2.15
4369	10/12/09 10:59	60.05	-2.16
4370	10/12/09 11:00	60.04	-2.17
4371	10/12/09 11:01	60.05	-2.16
4372	10/12/09 11:02	60.05	-2.16
4373	10/12/09 11:03	60.04	-2.17
4374	10/12/09 11:04	60.04	-2.17
4375	10/12/09 11:05	60.04	-2.17
4376	10/12/09 11:06	60.04	-2.17
4377	10/12/09 11:07	60.04	-2.17
4378	10/12/09 11:08	60.04	-2.17
4379	10/12/09 11:09	60.04	-2.17
4380	10/12/09 11:10	60.03	-2.18
4381	10/12/09 11:11	60.02	-2.19
4382	10/12/09 11:12	60.02	-2.19

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4383	10/12/09 11:13	60.02	-2.19
4384	10/12/09 11:14	60.02	-2.19
4385	10/12/09 11:15	60.02	-2.19
4386	10/12/09 11:16	60.02	-2.19
4387	10/12/09 11:17	60.02	-2.19
4388	10/12/09 11:18	60.02	-2.19
4389	10/12/09 11:19	60.01	-2.20
4390	10/12/09 11:20	60.01	-2.20
4391	10/12/09 11:21	60.01	-2.20
4392	10/12/09 11:22	60.01	-2.20
4393	10/12/09 11:23	60.02	-2.19
4394	10/12/09 11:24	60.02	-2.19
4395	10/12/09 11:25	60.01	-2.20
4396	10/12/09 11:26	60.01	-2.20
4397	10/12/09 11:27	60.01	-2.20
4398	10/12/09 11:28	60.01	-2.20
4399	10/12/09 11:29	60.00	-2.21
4400	10/12/09 11:30	60.00	-2.21
4401	10/12/09 11:31	60.00	-2.21
4402	10/12/09 11:32	60.00	-2.21
4403	10/12/09 11:33	60.01	-2.20
4404	10/12/09 11:34	60.01	-2.20
4405	10/12/09 11:35	60.00	-2.21
4406	10/12/09 11:36	59.99	-2.22
4407	10/12/09 11:37	59.99	-2.22
4408	10/12/09 11:38	59.98	-2.23
4409	10/12/09 11:39	59.97	-2.24
4410	10/12/09 11:40	59.97	-2.24
4411	10/12/09 11:41	59.97	-2.24
4412	10/12/09 11:42	59.98	-2.23
4413	10/12/09 11:43	59.97	-2.24
4414	10/12/09 11:44	59.97	-2.24
4415	10/12/09 11:45	59.97	-2.24
4416	10/12/09 11:46	59.97	-2.24
4417	10/12/09 11:47	59.97	-2.24
4418	10/12/09 11:48	59.96	-2.25
4419	10/12/09 11:49	59.96	-2.25
4420	10/12/09 11:50	59.96	-2.25
4421	10/12/09 11:51	59.96	-2.25
4422	10/12/09 11:52	59.97	-2.24
4423	10/12/09 11:53	59.98	-2.23
4424	10/12/09 11:54	59.97	-2.24
4425	10/12/09 11:55	59.98	-2.23
4426	10/12/09 11:56	59.97	-2.24
4427	10/12/09 11:57	59.97	-2.24
4428	10/12/09 11:58	59.96	-2.25
4429	10/12/09 11:59	59.95	-2.26
4430	10/12/09 12:00	59.94	-2.27
4431	10/12/09 12:01	59.94	-2.27
4432	10/12/09 12:02	59.95	-2.26
4433	10/12/09 12:03	59.95	-2.26
4434	10/12/09 12:04	59.95	-2.26
4435	10/12/09 12:05	59.94	-2.27

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4436	10/12/09 12:06	59.94	-2.27
4437	10/12/09 12:07	59.94	-2.27
4438	10/12/09 12:08	59.94	-2.27
4439	10/12/09 12:09	59.95	-2.26
4440	10/12/09 12:10	59.94	-2.27
4441	10/12/09 12:11	59.93	-2.28
4442	10/12/09 12:12	59.93	-2.28
4443	10/12/09 12:13	59.93	-2.28
4444	10/12/09 12:14	59.93	-2.28
4445	10/12/09 12:15	59.93	-2.28
4446	10/12/09 12:16	59.92	-2.29
4447	10/12/09 12:17	59.91	-2.30
4448	10/12/09 12:18	59.91	-2.30
4449	10/12/09 12:19	59.91	-2.30
4450	10/12/09 12:20	59.91	-2.30
4451	10/12/09 12:21	59.90	-2.31
4452	10/12/09 12:22	59.91	-2.30
4453	10/12/09 12:23	59.91	-2.30
4454	10/12/09 12:24	59.91	-2.30
4455	10/12/09 12:25	59.91	-2.30
4456	10/12/09 12:26	59.92	-2.29
4457	10/12/09 12:27	59.92	-2.29
4458	10/12/09 12:28	59.92	-2.29
4459	10/12/09 12:29	59.92	-2.29
4460	10/12/09 12:30	59.91	-2.30
4461	10/12/09 12:31	59.89	-2.32
4462	10/12/09 12:32	59.89	-2.32
4463	10/12/09 12:33	59.89	-2.32
4464	10/12/09 12:34	59.89	-2.32
4465	10/12/09 12:35	59.89	-2.32
4466	10/12/09 12:36	59.88	-2.33
4467	10/12/09 12:37	59.88	-2.33
4468	10/12/09 12:38	59.88	-2.33
4469	10/12/09 12:39	59.87	-2.34
4470	10/12/09 12:40	59.86	-2.35
4471	10/12/09 12:41	59.87	-2.34
4472	10/12/09 12:42	59.87	-2.34
4473	10/12/09 12:43	59.86	-2.35
4474	10/12/09 12:44	59.86	-2.35
4475	10/12/09 12:45	59.85	-2.36
4476	10/12/09 12:46	59.85	-2.36
4477	10/12/09 12:47	59.85	-2.36
4478	10/12/09 12:48	59.86	-2.35
4479	10/12/09 12:49	59.86	-2.35
4480	10/12/09 12:50	59.86	-2.35
4481	10/12/09 12:51	59.86	-2.35
4482	10/12/09 12:52	59.86	-2.35
4483	10/12/09 12:53	59.85	-2.36
4484	10/12/09 12:54	59.84	-2.37
4485	10/12/09 12:55	59.84	-2.37
4486	10/12/09 12:56	59.84	-2.37
4487	10/12/09 12:57	59.84	-2.37
4488	10/12/09 12:58	59.84	-2.37

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4489	10/12/09 12:59	59.84	-2.37
4490	10/12/09 13:00	59.84	-2.37
4491	10/12/09 13:01	59.83	-2.38
4492	10/12/09 13:02	59.82	-2.39
4493	10/12/09 13:03	59.81	-2.40
4494	10/12/09 13:04	59.81	-2.40
4495	10/12/09 13:05	59.82	-2.39
4496	10/12/09 13:06	59.83	-2.38
4497	10/12/09 13:07	59.84	-2.37
4498	10/12/09 13:08	59.84	-2.37
4499	10/12/09 13:09	59.84	-2.37
4500	10/12/09 13:10	59.82	-2.39
4501	10/12/09 13:11	59.81	-2.40
4502	10/12/09 13:12	59.80	-2.41
4503	10/12/09 13:13	59.79	-2.42
4504	10/12/09 13:14	59.78	-2.43
4505	10/12/09 13:15	59.78	-2.43
4506	10/12/09 13:16	59.78	-2.43
4507	10/12/09 13:17	59.79	-2.42
4508	10/12/09 13:18	59.79	-2.42
4509	10/12/09 13:19	59.79	-2.42
4510	10/12/09 13:20	59.79	-2.42
4511	10/12/09 13:21	59.79	-2.42
4512	10/12/09 13:22	59.78	-2.43
4513	10/12/09 13:23	59.79	-2.42
4514	10/12/09 13:24	59.79	-2.42
4515	10/12/09 13:25	59.79	-2.42
4516	10/12/09 13:26	59.78	-2.43
4517	10/12/09 13:27	59.78	-2.43
4518	10/12/09 13:28	59.77	-2.44
4519	10/12/09 13:29	59.76	-2.45
4520	10/12/09 13:30	59.75	-2.46
4521	10/12/09 13:31	59.75	-2.46
4522	10/12/09 13:32	59.75	-2.46
4523	10/12/09 13:33	59.75	-2.46
4524	10/12/09 13:34	59.75	-2.46
4525	10/12/09 13:35	59.75	-2.46
4526	10/12/09 13:36	59.75	-2.46
4527	10/12/09 13:37	59.76	-2.45
4528	10/12/09 13:38	59.76	-2.45
4529	10/12/09 13:39	59.75	-2.46
4530	10/12/09 13:40	59.74	-2.47
4531	10/12/09 13:41	59.73	-2.48
4532	10/12/09 13:42	59.73	-2.48
4533	10/12/09 13:43	59.73	-2.48
4534	10/12/09 13:44	59.73	-2.48
4535	10/12/09 13:45	59.73	-2.48
4536	10/12/09 13:46	59.73	-2.48
4537	10/12/09 13:47	59.73	-2.48
4538	10/12/09 13:48	59.73	-2.48
4539	10/12/09 13:49	59.72	-2.49
4540	10/12/09 13:50	59.72	-2.49
4541	10/12/09 13:51	59.71	-2.50

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4542	10/12/09 13:52	59.71	-2.50
4543	10/12/09 13:53	59.71	-2.50
4544	10/12/09 13:54	59.71	-2.50
4545	10/12/09 13:55	59.72	-2.49
4546	10/12/09 13:56	59.72	-2.49
4547	10/12/09 13:57	59.70	-2.51
4548	10/12/09 13:58	59.69	-2.52
4549	10/12/09 13:59	59.69	-2.52
4550	10/12/09 14:00	59.68	-2.53
4551	10/12/09 14:01	59.68	-2.53
4552	10/12/09 14:02	59.69	-2.52
4553	10/12/09 14:03	59.69	-2.52
4554	10/12/09 14:04	59.69	-2.52
4555	10/12/09 14:05	59.68	-2.53
4556	10/12/09 14:06	59.67	-2.54
4557	10/12/09 14:07	59.68	-2.53
4558	10/12/09 14:08	59.67	-2.54
4559	10/12/09 14:09	59.66	-2.55
4560	10/12/09 14:10	59.67	-2.54
4561	10/12/09 14:11	59.68	-2.53
4562	10/12/09 14:12	59.67	-2.54
4563	10/12/09 14:13	59.66	-2.55
4564	10/12/09 14:14	59.66	-2.55
4565	10/12/09 14:15	59.66	-2.55
4566	10/12/09 14:16	59.66	-2.55
4567	10/12/09 14:17	59.66	-2.55
4568	10/12/09 14:18	59.66	-2.55
4569	10/12/09 14:19	59.66	-2.55
4570	10/12/09 14:20	59.65	-2.56
4571	10/12/09 14:21	59.65	-2.56
4572	10/12/09 14:22	59.63	-2.58
4573	10/12/09 14:23	59.62	-2.59
4574	10/12/09 14:24	59.62	-2.59
4575	10/12/09 14:25	59.62	-2.59
4576	10/12/09 14:26	59.62	-2.59
4577	10/12/09 14:27	59.63	-2.58
4578	10/12/09 14:28	59.63	-2.58
4579	10/12/09 14:29	59.62	-2.59
4580	10/12/09 14:30	59.62	-2.59
4581	10/12/09 14:31	59.62	-2.59
4582	10/12/09 14:32	59.61	-2.60
4583	10/12/09 14:33	59.61	-2.60
4584	10/12/09 14:34	59.60	-2.61
4585	10/12/09 14:35	59.60	-2.61
4586	10/12/09 14:36	59.60	-2.61
4587	10/12/09 14:37	59.59	-2.62
4588	10/12/09 14:38	59.59	-2.62
4589	10/12/09 14:39	59.60	-2.61
4590	10/12/09 14:40	59.59	-2.62
4591	10/12/09 14:41	59.59	-2.62
4592	10/12/09 14:42	59.58	-2.63
4593	10/12/09 14:43	59.58	-2.63
4594	10/12/09 14:44	59.58	-2.63

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
4595	10/12/09 14:45	59.58	-2.63
4596	10/12/09 14:46	59.59	-2.62
4597	10/12/09 14:47	59.59	-2.62
4598	10/12/09 14:48	59.59	-2.62
4599	10/12/09 14:49	59.58	-2.63
4600	10/12/09 14:50	59.57	-2.64
4601	10/12/09 14:51	59.57	-2.64
4602	10/12/09 14:52	59.56	-2.65
4603	10/12/09 14:53	59.56	-2.65
4604	10/12/09 14:54	59.56	-2.65
4605	10/12/09 14:55	59.56	-2.65
4606	10/12/09 14:56	59.55	-2.66
4607	10/12/09 14:57	59.54	-2.67
4608	10/12/09 14:58	59.54	-2.67
4609	10/12/09 14:59	59.54	-2.67
4610	10/12/09 15:00	59.55	-2.66
4611	10/12/09 15:01	59.55	-2.66
4612	10/12/09 15:02	59.55	-2.66
4613	10/12/09 15:03	59.54	-2.67
4614	10/12/09 15:04	59.54	-2.67
4615	10/12/09 15:05	59.53	-2.68
4616	10/12/09 15:06	59.52	-2.69
4617	10/12/09 15:07	59.51	-2.70
4618	10/12/09 15:08	59.51	-2.70
4619	10/12/09 15:09	59.51	-2.70
4620	10/12/09 15:10	59.51	-2.70
4621	10/12/09 15:11	59.51	-2.70
4622	10/12/09 15:12	59.51	-2.70
4623	10/12/09 15:13	59.51	-2.70
4624	10/12/09 15:14	59.52	-2.69
4625	10/12/09 15:15	59.53	-2.68
4626	10/12/09 15:16	59.51	-2.70
4627	10/12/09 15:17	59.49	-2.72
4628	10/12/09 15:18	59.49	-2.72
4629	10/12/09 15:19	59.49	-2.72
4630	10/12/09 15:20	59.49	-2.72
4631	10/12/09 15:21	59.49	-2.72
4632	10/12/09 15:22	59.48	-2.73
4633	10/12/09 15:23	59.48	-2.73
4634	10/12/09 15:24	59.48	-2.73
4635	10/12/09 15:25	59.48	-2.73
4636	10/12/09 15:26	59.49	-2.72
4637	10/12/09 15:27	59.50	-2.71
4638	10/12/09 15:28	59.48	-2.73
4639	10/12/09 15:29	59.46	-2.75
4640	10/12/09 15:30	59.46	-2.75
4641	10/12/09 15:31	59.46	-2.75
4642	10/12/09 15:32	59.45	-2.76
4643	10/12/09 15:33	59.45	-2.76
4644	10/12/09 15:34	59.46	-2.75
4645	10/12/09 15:35	59.46	-2.75
4646	10/12/09 15:36	59.45	-2.76
4647	10/12/09 15:37	59.45	-2.76

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4648	10/12/09 15:38	59.44	-2.77
4649	10/12/09 15:39	59.44	-2.77
4650	10/12/09 15:40	59.44	-2.77
4651	10/12/09 15:41	59.44	-2.77
4652	10/12/09 15:42	59.44	-2.77
4653	10/12/09 15:43	59.44	-2.77
4654	10/12/09 15:44	59.43	-2.78
4655	10/12/09 15:45	59.42	-2.79
4656	10/12/09 15:46	59.43	-2.78
4657	10/12/09 15:47	59.44	-2.77
4658	10/12/09 15:48	59.44	-2.77
4659	10/12/09 15:49	59.44	-2.77
4660	10/12/09 15:50	59.42	-2.79
4661	10/12/09 15:51	59.41	-2.80
4662	10/12/09 15:52	59.41	-2.80
4663	10/12/09 15:53	59.41	-2.80
4664	10/12/09 15:54	59.42	-2.79
4665	10/12/09 15:55	59.41	-2.80
4666	10/12/09 15:56	59.39	-2.82
4667	10/12/09 15:57	59.39	-2.82
4668	10/12/09 15:58	59.39	-2.82
4669	10/12/09 15:59	59.40	-2.81
4670	10/12/09 16:00	59.41	-2.80
4671	10/12/09 16:01	59.40	-2.81
4672	10/12/09 16:02	59.40	-2.81
4673	10/12/09 16:03	59.40	-2.81
4674	10/12/09 16:04	59.39	-2.82
4675	10/12/09 16:05	59.39	-2.82
4676	10/12/09 16:06	59.39	-2.82
4677	10/12/09 16:07	59.37	-2.84
4678	10/12/09 16:08	59.38	-2.83
4679	10/12/09 16:09	59.38	-2.83
4680	10/12/09 16:10	59.38	-2.83
4681	10/12/09 16:11	59.37	-2.84
4682	10/12/09 16:12	59.37	-2.84
4683	10/12/09 16:13	59.36	-2.85
4684	10/12/09 16:14	59.36	-2.85
4685	10/12/09 16:15	59.36	-2.85
4686	10/12/09 16:16	59.36	-2.85
4687	10/12/09 16:17	59.35	-2.86
4688	10/12/09 16:18	59.35	-2.86
4689	10/12/09 16:19	59.34	-2.87
4690	10/12/09 16:20	59.34	-2.87
4691	10/12/09 16:21	59.34	-2.87
4692	10/12/09 16:22	59.33	-2.88
4693	10/12/09 16:23	59.33	-2.88
4694	10/12/09 16:24	59.32	-2.89
4695	10/12/09 16:25	59.32	-2.89
4696	10/12/09 16:26	59.30	-2.91
4697	10/12/09 16:27	59.30	-2.91
4700	10/12/09 16:30	59.30	-2.91
4701	10/12/09 16:31	59.29	-2.92
4702	10/12/09 16:32	59.29	-2.92

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4703	10/12/09 16:33	59.29	-2.92
4704	10/12/09 16:34	59.28	-2.93
4705	10/12/09 16:35	59.28	-2.93
4706	10/12/09 16:36	59.28	-2.93
4707	10/12/09 16:37	59.27	-2.94
4708	10/12/09 16:38	59.27	-2.94
4709	10/12/09 16:39	59.27	-2.94
4710	10/12/09 16:40	59.28	-2.93
4711	10/12/09 16:41	59.27	-2.94
4712	10/12/09 16:42	59.26	-2.95
4713	10/12/09 16:43	59.25	-2.96
4714	10/12/09 16:44	59.25	-2.96
4715	10/12/09 16:45	59.26	-2.95
4716	10/12/09 16:46	59.27	-2.94
4717	10/12/09 16:47	59.27	-2.94
4718	10/12/09 16:48	59.25	-2.96
4719	10/12/09 16:49	59.25	-2.96
4720	10/12/09 16:50	59.26	-2.95
4721	10/12/09 16:51	59.25	-2.96
4722	10/12/09 16:52	59.24	-2.97
4723	10/12/09 16:53	59.24	-2.97
4724	10/12/09 16:54	59.25	-2.96
4725	10/12/09 16:55	59.24	-2.97
4726	10/12/09 16:56	59.24	-2.97
4727	10/12/09 16:57	59.23	-2.98
4728	10/12/09 16:58	59.23	-2.98
4729	10/12/09 16:59	59.23	-2.98
4730	10/12/09 17:00	59.23	-2.98
4731	10/12/09 17:01	59.23	-2.98
4732	10/12/09 17:02	59.22	-2.99
4733	10/12/09 17:03	59.20	-3.01
4734	10/12/09 17:04	59.19	-3.02
4735	10/12/09 17:05	59.18	-3.03
4736	10/12/09 17:06	59.18	-3.03
4737	10/12/09 17:07	59.19	-3.02
4738	10/12/09 17:08	59.19	-3.02
4739	10/12/09 17:09	59.18	-3.03
4740	10/12/09 17:10	59.18	-3.03
4741	10/12/09 17:11	59.17	-3.04
4742	10/12/09 17:12	59.18	-3.03
4743	10/12/09 17:13	59.18	-3.03
4744	10/12/09 17:14	59.18	-3.03
4745	10/12/09 17:15	59.17	-3.04
4746	10/12/09 17:16	59.16	-3.05
4747	10/12/09 17:17	59.16	-3.05
4748	10/12/09 17:18	59.16	-3.05
4749	10/12/09 17:19	59.15	-3.06
4750	10/12/09 17:20	59.15	-3.06
4751	10/12/09 17:21	59.15	-3.06
4752	10/12/09 17:22	59.14	-3.07
4753	10/12/09 17:23	59.14	-3.07
4754	10/12/09 17:24	59.14	-3.07
4755	10/12/09 17:25	59.14	-3.07

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4756	10/12/09 17:26	59.13	-3.08
4757	10/12/09 17:27	59.13	-3.08
4758	10/12/09 17:28	59.13	-3.08
4759	10/12/09 17:29	59.16	-3.05
4760	10/12/09 17:30	59.17	-3.04
4761	10/12/09 17:31	59.15	-3.06
4762	10/12/09 17:32	59.13	-3.08
4763	10/12/09 17:33	59.12	-3.09
4764	10/12/09 17:34	59.10	-3.11
4765	10/12/09 17:35	59.09	-3.12
4766	10/12/09 17:36	59.10	-3.11
4767	10/12/09 17:37	59.10	-3.11
4768	10/12/09 17:38	59.10	-3.11
4769	10/12/09 17:39	59.10	-3.11
4770	10/12/09 17:40	59.09	-3.12
4771	10/12/09 17:41	59.09	-3.12
4772	10/12/09 17:42	59.09	-3.12
4773	10/12/09 17:43	59.08	-3.13
4774	10/12/09 17:44	59.07	-3.14
4775	10/12/09 17:45	59.07	-3.14
4776	10/12/09 17:46	59.07	-3.14
4777	10/12/09 17:47	59.09	-3.12
4778	10/12/09 17:48	59.09	-3.12
4779	10/12/09 17:49	59.08	-3.13
4780	10/12/09 17:50	59.07	-3.14
4781	10/12/09 17:51	59.07	-3.14
4782	10/12/09 17:52	59.07	-3.14
4783	10/12/09 17:53	59.07	-3.14
4784	10/12/09 17:54	59.06	-3.15
4785	10/12/09 17:55	59.06	-3.15
4786	10/12/09 17:56	59.05	-3.16
4787	10/12/09 17:57	59.05	-3.16
4788	10/12/09 17:58	59.06	-3.15
4789	10/12/09 17:59	59.07	-3.14
4790	10/12/09 18:00	59.05	-3.16
4791	10/12/09 18:01	59.05	-3.16
4792	10/12/09 18:02	59.05	-3.16
4793	10/12/09 18:03	59.04	-3.17
4794	10/12/09 18:04	59.04	-3.17
4795	10/12/09 18:05	59.03	-3.18
4796	10/12/09 18:06	59.02	-3.19
4797	10/12/09 18:07	59.02	-3.19
4798	10/12/09 18:08	59.01	-3.20
4799	10/12/09 18:09	59.01	-3.20
4800	10/12/09 18:10	59.00	-3.21
4801	10/12/09 18:11	59.00	-3.21
4802	10/12/09 18:12	59.00	-3.21
4803	10/12/09 18:13	59.00	-3.21
4804	10/12/09 18:14	59.03	-3.18
4805	10/12/09 18:15	59.04	-3.17
4806	10/12/09 18:16	59.03	-3.18
4807	10/12/09 18:17	59.02	-3.19
4808	10/12/09 18:18	59.02	-3.19

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4809	10/12/09 18:19	58.99	-3.22
4810	10/12/09 18:20	58.98	-3.23
4811	10/12/09 18:21	58.98	-3.23
4812	10/12/09 18:22	58.97	-3.24
4813	10/12/09 18:23	58.96	-3.25
4814	10/12/09 18:24	58.96	-3.25
4815	10/12/09 18:25	58.97	-3.24
4816	10/12/09 18:26	58.97	-3.24
4817	10/12/09 18:27	58.96	-3.25
4818	10/12/09 18:28	58.96	-3.25
4819	10/12/09 18:29	58.96	-3.25
4820	10/12/09 18:30	58.96	-3.25
4821	10/12/09 18:31	58.96	-3.25
4822	10/12/09 18:32	58.95	-3.26
4823	10/12/09 18:33	58.95	-3.26
4824	10/12/09 18:34	58.96	-3.25
4825	10/12/09 18:35	58.96	-3.25
4826	10/12/09 18:36	58.96	-3.25
4827	10/12/09 18:37	58.95	-3.26
4828	10/12/09 18:38	58.94	-3.27
4829	10/12/09 18:39	58.94	-3.27
4830	10/12/09 18:40	58.94	-3.27
4831	10/12/09 18:41	58.94	-3.27
4832	10/12/09 18:42	58.94	-3.27
4833	10/12/09 18:43	58.93	-3.28
4834	10/12/09 18:44	58.93	-3.28
4835	10/12/09 18:45	58.92	-3.29
4836	10/12/09 18:46	58.94	-3.27
4837	10/12/09 18:47	58.93	-3.28
4838	10/12/09 18:48	58.92	-3.29
4839	10/12/09 18:49	58.91	-3.30
4840	10/12/09 18:50	58.91	-3.30
4841	10/12/09 18:51	58.91	-3.30
4842	10/12/09 18:52	58.90	-3.31
4843	10/12/09 18:53	58.90	-3.31
4844	10/12/09 18:54	58.90	-3.31
4845	10/12/09 18:55	58.90	-3.31
4846	10/12/09 18:56	58.89	-3.32
4847	10/12/09 18:57	58.89	-3.32
4848	10/12/09 18:58	58.90	-3.31
4849	10/12/09 18:59	58.91	-3.30
4850	10/12/09 19:00	58.91	-3.30
4851	10/12/09 19:01	58.90	-3.31
4852	10/12/09 19:02	58.88	-3.33
4853	10/12/09 19:03	58.87	-3.34
4854	10/12/09 19:04	58.87	-3.34
4855	10/12/09 19:05	58.87	-3.34
4856	10/12/09 19:06	58.87	-3.34
4857	10/12/09 19:07	58.87	-3.34
4858	10/12/09 19:08	58.88	-3.33
4859	10/12/09 19:09	58.90	-3.31
4860	10/12/09 19:10	58.89	-3.32
4861	10/12/09 19:11	58.87	-3.34

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4862	10/12/09 19:12	58.86	-3.35
4863	10/12/09 19:13	58.85	-3.36
4864	10/12/09 19:14	58.86	-3.35
4865	10/12/09 19:15	58.86	-3.35
4866	10/12/09 19:16	58.85	-3.36
4867	10/12/09 19:17	58.84	-3.37
4868	10/12/09 19:18	58.84	-3.37
4869	10/12/09 19:19	58.85	-3.36
4870	10/12/09 19:20	58.85	-3.36
4871	10/12/09 19:21	58.84	-3.37
4872	10/12/09 19:22	58.86	-3.35
4873	10/12/09 19:23	58.86	-3.35
4874	10/12/09 19:24	58.85	-3.36
4875	10/12/09 19:25	58.84	-3.37
4876	10/12/09 19:26	58.84	-3.37
4877	10/12/09 19:27	58.84	-3.37
4878	10/12/09 19:28	58.83	-3.38
4879	10/12/09 19:29	58.83	-3.38
4880	10/12/09 19:30	58.82	-3.39
4881	10/12/09 19:31	58.81	-3.40
4882	10/12/09 19:32	58.81	-3.40
4883	10/12/09 19:33	58.82	-3.39
4884	10/12/09 19:34	58.83	-3.38
4885	10/12/09 19:35	58.82	-3.39
4886	10/12/09 19:36	58.82	-3.39
4887	10/12/09 19:37	58.81	-3.40
4888	10/12/09 19:38	58.80	-3.41
4889	10/12/09 19:39	58.80	-3.41
4890	10/12/09 19:40	58.80	-3.41
4891	10/12/09 19:41	58.80	-3.41
4892	10/12/09 19:42	58.80	-3.41
4893	10/12/09 19:43	58.79	-3.42
4894	10/12/09 19:44	58.79	-3.42
4895	10/12/09 19:45	58.79	-3.42
4896	10/12/09 19:46	58.79	-3.42
4897	10/12/09 19:47	58.79	-3.42
4898	10/12/09 19:48	58.80	-3.41
4899	10/12/09 19:49	58.80	-3.41
4900	10/12/09 19:50	58.81	-3.40
4901	10/12/09 19:51	58.80	-3.41
4902	10/12/09 19:52	58.79	-3.42
4903	10/12/09 19:53	58.78	-3.43
4904	10/12/09 19:54	58.77	-3.44
4907	10/12/09 19:57	58.76	-3.45
4908	10/12/09 19:58	58.76	-3.45
4910	10/12/09 20:00	58.76	-3.45
4911	10/12/09 20:01	58.76	-3.45
4912	10/12/09 20:02	58.76	-3.45
4913	10/12/09 20:03	58.75	-3.46
4914	10/12/09 20:04	58.75	-3.46
4915	10/12/09 20:05	58.74	-3.47
4916	10/12/09 20:06	58.73	-3.48
4917	10/12/09 20:07	58.73	-3.48

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
4918	10/12/09 20:08	58.73	-3.48
4919	10/12/09 20:09	58.74	-3.47
4920	10/12/09 20:10	58.74	-3.47
4921	10/12/09 20:11	58.74	-3.47
4922	10/12/09 20:12	58.74	-3.47
4923	10/12/09 20:13	58.73	-3.48
4924	10/12/09 20:14	58.72	-3.49
4925	10/12/09 20:15	58.72	-3.49
4926	10/12/09 20:16	58.71	-3.50
4927	10/12/09 20:17	58.71	-3.50
4928	10/12/09 20:18	58.71	-3.50
4929	10/12/09 20:19	58.71	-3.50
4930	10/12/09 20:20	58.71	-3.50
4931	10/12/09 20:21	58.71	-3.50
4932	10/12/09 20:22	58.71	-3.50
4933	10/12/09 20:23	58.71	-3.50
4934	10/12/09 20:24	58.71	-3.50
4935	10/12/09 20:25	58.71	-3.50
4936	10/12/09 20:26	58.71	-3.50
4937	10/12/09 20:27	58.71	-3.50
4938	10/12/09 20:28	58.72	-3.49
4939	10/12/09 20:29	58.72	-3.49
4940	10/12/09 20:30	58.71	-3.50
4941	10/12/09 20:31	58.71	-3.50
4942	10/12/09 20:32	58.71	-3.50
4943	10/12/09 20:33	58.70	-3.51
4944	10/12/09 20:34	58.70	-3.51
4945	10/12/09 20:35	58.69	-3.52
4946	10/12/09 20:36	58.68	-3.53
4947	10/12/09 20:37	58.68	-3.53
4948	10/12/09 20:38	58.67	-3.54
4949	10/12/09 20:39	58.67	-3.54
4950	10/12/09 20:40	58.67	-3.54
4951	10/12/09 20:41	58.68	-3.53
4952	10/12/09 20:42	58.67	-3.54
4953	10/12/09 20:43	58.67	-3.54
4954	10/12/09 20:44	58.66	-3.55
4955	10/12/09 20:45	58.66	-3.55
4956	10/12/09 20:46	58.65	-3.56
4957	10/12/09 20:47	58.65	-3.56
4958	10/12/09 20:48	58.65	-3.56
4959	10/12/09 20:49	58.65	-3.56
4960	10/12/09 20:50	58.66	-3.55
4961	10/12/09 20:51	58.66	-3.55
4962	10/12/09 20:52	58.65	-3.56
4963	10/12/09 20:53	58.64	-3.57
4964	10/12/09 20:54	58.64	-3.57
4965	10/12/09 20:55	58.64	-3.57
4966	10/12/09 20:56	58.64	-3.57
4967	10/12/09 20:57	58.64	-3.57
4968	10/12/09 20:58	58.64	-3.57
4969	10/12/09 20:59	58.64	-3.57
4970	10/12/09 21:00	58.64	-3.57

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
4971	10/12/09 21:01	58.64	-3.57
4972	10/12/09 21:02	58.64	-3.57
4973	10/12/09 21:03	58.63	-3.58
4974	10/12/09 21:04	58.62	-3.59
4975	10/12/09 21:05	58.62	-3.59
4976	10/12/09 21:06	58.61	-3.60
4977	10/12/09 21:07	58.61	-3.60
4978	10/12/09 21:08	58.61	-3.60
4979	10/12/09 21:09	58.62	-3.59
4980	10/12/09 21:10	58.62	-3.59
4981	10/12/09 21:11	58.62	-3.59
4982	10/12/09 21:12	58.63	-3.58
4983	10/12/09 21:13	58.62	-3.59
4984	10/12/09 21:14	58.62	-3.59
4985	10/12/09 21:15	58.61	-3.60
4986	10/12/09 21:16	58.60	-3.61
4987	10/12/09 21:17	58.60	-3.61
4988	10/12/09 21:18	58.60	-3.61
4989	10/12/09 21:19	58.60	-3.61
4990	10/12/09 21:20	58.61	-3.60
4991	10/12/09 21:21	58.60	-3.61
4992	10/12/09 21:22	58.59	-3.62
4993	10/12/09 21:23	58.59	-3.62
4994	10/12/09 21:24	58.59	-3.62
4995	10/12/09 21:25	58.59	-3.62
4996	10/12/09 21:26	58.59	-3.62
4997	10/12/09 21:27	58.59	-3.62
4998	10/12/09 21:28	58.59	-3.62
4999	10/12/09 21:29	58.59	-3.62
5000	10/12/09 21:30	58.60	-3.61
5001	10/12/09 21:31	58.60	-3.61
5002	10/12/09 21:32	58.60	-3.61
5003	10/12/09 21:33	58.59	-3.62
5004	10/12/09 21:34	58.58	-3.63
5005	10/12/09 21:35	58.58	-3.63
5006	10/12/09 21:36	58.58	-3.63
5007	10/12/09 21:37	58.58	-3.63
5008	10/12/09 21:38	58.57	-3.64
5009	10/12/09 21:39	58.56	-3.65
5010	10/12/09 21:40	58.55	-3.66
5011	10/12/09 21:41	58.55	-3.66
5012	10/12/09 21:42	58.56	-3.65
5013	10/12/09 21:43	58.55	-3.66
5014	10/12/09 21:44	58.55	-3.66
5015	10/12/09 21:45	58.54	-3.67
5016	10/12/09 21:46	58.54	-3.67
5017	10/12/09 21:47	58.54	-3.67
5018	10/12/09 21:48	58.55	-3.66
5019	10/12/09 21:49	58.55	-3.66
5020	10/12/09 21:50	58.54	-3.67
5021	10/12/09 21:51	58.53	-3.68
5022	10/12/09 21:52	58.53	-3.68
5023	10/12/09 21:53	58.53	-3.68

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5024	10/12/09 21:54	58.53	-3.68
5025	10/12/09 21:55	58.53	-3.68
5026	10/12/09 21:56	58.53	-3.68
5027	10/12/09 21:57	58.53	-3.68
5028	10/12/09 21:58	58.53	-3.68
5029	10/12/09 21:59	58.52	-3.69
5030	10/12/09 22:00	58.52	-3.69
5031	10/12/09 22:01	58.52	-3.69
5032	10/12/09 22:02	58.52	-3.69
5033	10/12/09 22:03	58.52	-3.69
5034	10/12/09 22:04	58.51	-3.70
5035	10/12/09 22:05	58.51	-3.70
5036	10/12/09 22:06	58.51	-3.70
5037	10/12/09 22:07	58.52	-3.69
5038	10/12/09 22:08	58.52	-3.69
5039	10/12/09 22:09	58.51	-3.70
5040	10/12/09 22:10	58.51	-3.70
5041	10/12/09 22:11	58.50	-3.71
5042	10/12/09 22:12	58.50	-3.71
5043	10/12/09 22:13	58.51	-3.70
5044	10/12/09 22:14	58.52	-3.69
5045	10/12/09 22:15	58.51	-3.70
5046	10/12/09 22:16	58.50	-3.71
5047	10/12/09 22:17	58.49	-3.72
5048	10/12/09 22:18	58.49	-3.72
5049	10/12/09 22:19	58.49	-3.72
5050	10/12/09 22:20	58.49	-3.72
5051	10/12/09 22:21	58.48	-3.73
5052	10/12/09 22:22	58.49	-3.72
5053	10/12/09 22:23	58.51	-3.70
5054	10/12/09 22:24	58.51	-3.70
5055	10/12/09 22:25	58.49	-3.72
5056	10/12/09 22:26	58.49	-3.72
5057	10/12/09 22:27	58.48	-3.73
5058	10/12/09 22:28	58.47	-3.74
5059	10/12/09 22:29	58.47	-3.74
5060	10/12/09 22:30	58.48	-3.73
5061	10/12/09 22:31	58.48	-3.73
5062	10/12/09 22:32	58.47	-3.74
5063	10/12/09 22:33	58.47	-3.74
5064	10/12/09 22:34	58.47	-3.74
5065	10/12/09 22:35	58.46	-3.75
5066	10/12/09 22:36	58.46	-3.75
5067	10/12/09 22:37	58.46	-3.75
5068	10/12/09 22:38	58.46	-3.75
5069	10/12/09 22:39	58.46	-3.75
5070	10/12/09 22:40	58.45	-3.76
5071	10/12/09 22:41	58.45	-3.76
5072	10/12/09 22:42	58.45	-3.76
5073	10/12/09 22:43	58.46	-3.75
5074	10/12/09 22:44	58.46	-3.75
5075	10/12/09 22:45	58.45	-3.76
5076	10/12/09 22:46	58.44	-3.77

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5077	10/12/09 22:47	58.43	-3.78
5078	10/12/09 22:48	58.44	-3.77
5079	10/12/09 22:49	58.45	-3.76
5080	10/12/09 22:50	58.44	-3.77
5081	10/12/09 22:51	58.45	-3.76
5082	10/12/09 22:52	58.45	-3.76
5083	10/12/09 22:53	58.45	-3.76
5084	10/12/09 22:54	58.44	-3.77
5085	10/12/09 22:55	58.44	-3.77
5086	10/12/09 22:56	58.43	-3.78
5087	10/12/09 22:57	58.42	-3.79
5088	10/12/09 22:58	58.42	-3.79
5089	10/12/09 22:59	58.42	-3.79
5090	10/12/09 23:00	58.42	-3.79
5091	10/12/09 23:01	58.41	-3.80
5092	10/12/09 23:02	58.42	-3.79
5093	10/12/09 23:03	58.42	-3.79
5094	10/12/09 23:04	58.42	-3.79
5095	10/12/09 23:05	58.41	-3.80
5096	10/12/09 23:06	58.41	-3.80
5097	10/12/09 23:07	58.42	-3.79
5098	10/12/09 23:08	58.43	-3.78
5099	10/12/09 23:09	58.42	-3.79
5100	10/12/09 23:10	58.40	-3.81
5101	10/12/09 23:11	58.40	-3.81
5102	10/12/09 23:12	58.41	-3.80
5103	10/12/09 23:13	58.41	-3.80
5104	10/12/09 23:14	58.40	-3.81
5105	10/12/09 23:15	58.40	-3.81
5106	10/12/09 23:16	58.39	-3.82
5107	10/12/09 23:17	58.39	-3.82
5108	10/12/09 23:18	58.39	-3.82
5109	10/12/09 23:19	58.40	-3.81
5110	10/12/09 23:20	58.40	-3.81
5111	10/12/09 23:21	58.40	-3.81
5112	10/12/09 23:22	58.39	-3.82
5113	10/12/09 23:23	58.39	-3.82
5114	10/12/09 23:24	58.39	-3.82
5115	10/12/09 23:25	58.39	-3.82
5116	10/12/09 23:26	58.39	-3.82
5117	10/12/09 23:27	58.39	-3.82
5118	10/12/09 23:28	58.38	-3.83
5119	10/12/09 23:29	58.39	-3.82
5120	10/12/09 23:30	58.39	-3.82
5121	10/12/09 23:31	58.39	-3.82
5122	10/12/09 23:32	58.39	-3.82
5123	10/12/09 23:33	58.38	-3.83
5124	10/12/09 23:34	58.37	-3.84
5125	10/12/09 23:35	58.37	-3.84
5126	10/12/09 23:36	58.37	-3.84
5127	10/12/09 23:37	58.37	-3.84
5128	10/12/09 23:38	58.37	-3.84
5129	10/12/09 23:39	58.36	-3.85

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
5130	10/12/09 23:40	58.37	-3.84
5131	10/12/09 23:41	58.37	-3.84
5132	10/12/09 23:42	58.36	-3.85
5133	10/12/09 23:43	58.36	-3.85
5134	10/12/09 23:44	58.36	-3.85
5135	10/12/09 23:45	58.36	-3.85
5136	10/12/09 23:46	58.38	-3.83
5137	10/12/09 23:47	58.38	-3.83
5138	10/12/09 23:48	58.38	-3.83
5139	10/12/09 23:49	58.37	-3.84
5140	10/12/09 23:50	58.36	-3.85
5141	10/12/09 23:51	58.36	-3.85
5142	10/12/09 23:52	58.36	-3.85
5143	10/12/09 23:53	58.36	-3.85
5144	10/12/09 23:54	58.35	-3.86
5145	10/12/09 23:55	58.35	-3.86
5146	10/12/09 23:56	58.34	-3.87
5147	10/12/09 23:57	58.34	-3.87
5148	10/12/09 23:58	58.34	-3.87
5149	10/12/09 23:59	58.34	-3.87
5150	10/13/09 0:00	58.34	-3.87
5151	10/13/09 0:01	58.35	-3.86
5152	10/13/09 0:02	58.34	-3.87
5153	10/13/09 0:03	58.34	-3.87
5154	10/13/09 0:04	58.34	-3.87
5155	10/13/09 0:05	58.33	-3.88
5156	10/13/09 0:06	58.33	-3.88
5157	10/13/09 0:07	58.33	-3.88
5158	10/13/09 0:08	58.33	-3.88
5159	10/13/09 0:09	58.33	-3.88
5160	10/13/09 0:10	58.33	-3.88
5161	10/13/09 0:11	58.33	-3.88
5162	10/13/09 0:12	58.34	-3.87
5163	10/13/09 0:13	58.34	-3.87
5164	10/13/09 0:14	58.34	-3.87
5165	10/13/09 0:15	58.34	-3.87
5166	10/13/09 0:16	58.32	-3.89
5167	10/13/09 0:17	58.32	-3.89
5168	10/13/09 0:18	58.32	-3.89
5169	10/13/09 0:19	58.32	-3.89
5170	10/13/09 0:20	58.32	-3.89
5171	10/13/09 0:21	58.31	-3.90
5172	10/13/09 0:22	58.31	-3.90
5173	10/13/09 0:23	58.32	-3.89
5174	10/13/09 0:24	58.32	-3.89
5175	10/13/09 0:25	58.31	-3.90
5176	10/13/09 0:26	58.31	-3.90
5177	10/13/09 0:27	58.31	-3.90
5178	10/13/09 0:28	58.32	-3.89
5179	10/13/09 0:29	58.32	-3.89
5180	10/13/09 0:30	58.32	-3.89
5181	10/13/09 0:31	58.31	-3.90
5182	10/13/09 0:32	58.30	-3.91

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5183	10/13/09 0:33	58.30	-3.91
5184	10/13/09 0:34	58.30	-3.91
5185	10/13/09 0:35	58.30	-3.91
5186	10/13/09 0:36	58.30	-3.91
5187	10/13/09 0:37	58.29	-3.92
5188	10/13/09 0:38	58.29	-3.92
5189	10/13/09 0:39	58.29	-3.92
5190	10/13/09 0:40	58.29	-3.92
5191	10/13/09 0:41	58.29	-3.92
5192	10/13/09 0:42	58.29	-3.92
5193	10/13/09 0:43	58.29	-3.92
5194	10/13/09 0:44	58.29	-3.92
5195	10/13/09 0:45	58.29	-3.92
5196	10/13/09 0:46	58.29	-3.92
5197	10/13/09 0:47	58.29	-3.92
5198	10/13/09 0:48	58.29	-3.92
5199	10/13/09 0:49	58.29	-3.92
5200	10/13/09 0:50	58.29	-3.92
5201	10/13/09 0:51	58.28	-3.93
5202	10/13/09 0:52	58.28	-3.93
5203	10/13/09 0:53	58.27	-3.94
5204	10/13/09 0:54	58.27	-3.94
5205	10/13/09 0:55	58.27	-3.94
5206	10/13/09 0:56	58.28	-3.93
5207	10/13/09 0:57	58.28	-3.93
5208	10/13/09 0:58	58.27	-3.94
5209	10/13/09 0:59	58.27	-3.94
5210	10/13/09 1:00	58.27	-3.94
5211	10/13/09 1:01	58.26	-3.95
5212	10/13/09 1:02	58.26	-3.95
5213	10/13/09 1:03	58.27	-3.94
5214	10/13/09 1:04	58.28	-3.93
5215	10/13/09 1:05	58.28	-3.93
5216	10/13/09 1:06	58.27	-3.94
5217	10/13/09 1:07	58.26	-3.95
5218	10/13/09 1:08	58.25	-3.96
5219	10/13/09 1:09	58.25	-3.96
5220	10/13/09 1:10	58.25	-3.96
5221	10/13/09 1:11	58.25	-3.96
5222	10/13/09 1:12	58.25	-3.96
5223	10/13/09 1:13	58.24	-3.97
5224	10/13/09 1:14	58.24	-3.97
5225	10/13/09 1:15	58.24	-3.97
5226	10/13/09 1:16	58.25	-3.96
5227	10/13/09 1:17	58.24	-3.97
5228	10/13/09 1:18	58.24	-3.97
5229	10/13/09 1:19	58.24	-3.97
5230	10/13/09 1:20	58.24	-3.97
5231	10/13/09 1:21	58.24	-3.97
5232	10/13/09 1:22	58.24	-3.97
5233	10/13/09 1:23	58.23	-3.98
5234	10/13/09 1:24	58.24	-3.97
5235	10/13/09 1:25	58.23	-3.98

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
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Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5236	10/13/09 1:26	58.23	-3.98
5237	10/13/09 1:27	58.23	-3.98
5238	10/13/09 1:28	58.22	-3.99
5239	10/13/09 1:29	58.22	-3.99
5240	10/13/09 1:30	58.23	-3.98
5241	10/13/09 1:31	58.23	-3.98
5242	10/13/09 1:32	58.22	-3.99
5243	10/13/09 1:33	58.21	-4.00
5244	10/13/09 1:34	58.21	-4.00
5245	10/13/09 1:35	58.21	-4.00
5246	10/13/09 1:36	58.21	-4.00
5247	10/13/09 1:37	58.21	-4.00
5248	10/13/09 1:38	58.21	-4.00
5249	10/13/09 1:39	58.21	-4.00
5250	10/13/09 1:40	58.22	-3.99
5251	10/13/09 1:41	58.23	-3.98
5252	10/13/09 1:42	58.24	-3.97
5253	10/13/09 1:43	58.22	-3.99
5254	10/13/09 1:44	58.20	-4.01
5255	10/13/09 1:45	58.20	-4.01
5256	10/13/09 1:46	58.20	-4.01
5257	10/13/09 1:47	58.20	-4.01
5258	10/13/09 1:48	58.20	-4.01
5259	10/13/09 1:49	58.19	-4.02
5260	10/13/09 1:50	58.19	-4.02
5261	10/13/09 1:51	58.19	-4.02
5262	10/13/09 1:52	58.19	-4.02
5263	10/13/09 1:53	58.18	-4.03
5264	10/13/09 1:54	58.18	-4.03
5265	10/13/09 1:55	58.18	-4.03
5266	10/13/09 1:56	58.19	-4.02
5267	10/13/09 1:57	58.19	-4.02
5268	10/13/09 1:58	58.19	-4.02
5269	10/13/09 1:59	58.19	-4.02
5270	10/13/09 2:00	58.20	-4.01
5271	10/13/09 2:01	58.19	-4.02
5272	10/13/09 2:02	58.19	-4.02
5273	10/13/09 2:03	58.19	-4.02
5274	10/13/09 2:04	58.19	-4.02
5275	10/13/09 2:05	58.19	-4.02
5276	10/13/09 2:06	58.19	-4.02
5277	10/13/09 2:07	58.19	-4.02
5278	10/13/09 2:08	58.19	-4.02
5279	10/13/09 2:09	58.17	-4.04
5280	10/13/09 2:10	58.17	-4.04
5281	10/13/09 2:11	58.17	-4.04
5282	10/13/09 2:12	58.16	-4.05
5283	10/13/09 2:13	58.16	-4.05
5284	10/13/09 2:14	58.16	-4.05
5285	10/13/09 2:15	58.15	-4.06
5286	10/13/09 2:16	58.15	-4.06
5287	10/13/09 2:17	58.14	-4.07
5288	10/13/09 2:18	58.14	-4.07

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
5289	10/13/09 2:19	58.15	-4.06
5290	10/13/09 2:20	58.16	-4.05
5291	10/13/09 2:21	58.16	-4.05
5292	10/13/09 2:22	58.16	-4.05
5293	10/13/09 2:23	58.15	-4.06
5294	10/13/09 2:24	58.15	-4.06
5295	10/13/09 2:25	58.15	-4.06
5296	10/13/09 2:26	58.15	-4.06
5297	10/13/09 2:27	58.14	-4.07
5298	10/13/09 2:28	58.14	-4.07
5299	10/13/09 2:29	58.14	-4.07
5300	10/13/09 2:30	58.14	-4.07
5301	10/13/09 2:31	58.14	-4.07
5302	10/13/09 2:32	58.13	-4.08
5303	10/13/09 2:33	58.12	-4.09
5304	10/13/09 2:34	58.13	-4.08
5305	10/13/09 2:35	58.13	-4.08
5306	10/13/09 2:36	58.12	-4.09
5307	10/13/09 2:37	58.12	-4.09
5308	10/13/09 2:38	58.11	-4.10
5309	10/13/09 2:39	58.11	-4.10
5310	10/13/09 2:40	58.10	-4.11
5311	10/13/09 2:41	58.10	-4.11
5312	10/13/09 2:42	58.09	-4.12
5313	10/13/09 2:43	58.09	-4.12
5314	10/13/09 2:44	58.10	-4.11
5315	10/13/09 2:45	58.10	-4.11
5316	10/13/09 2:46	58.10	-4.11
5317	10/13/09 2:47	58.10	-4.11
5318	10/13/09 2:48	58.10	-4.11
5319	10/13/09 2:49	58.10	-4.11
5320	10/13/09 2:50	58.10	-4.11
5321	10/13/09 2:51	58.09	-4.12
5322	10/13/09 2:52	58.08	-4.13
5323	10/13/09 2:53	58.08	-4.13
5324	10/13/09 2:54	58.09	-4.12
5325	10/13/09 2:55	58.09	-4.12
5326	10/13/09 2:56	58.09	-4.12
5327	10/13/09 2:57	58.08	-4.13
5328	10/13/09 2:58	58.08	-4.13
5329	10/13/09 2:59	58.08	-4.13
5330	10/13/09 3:00	58.08	-4.13
5331	10/13/09 3:01	58.07	-4.14
5332	10/13/09 3:02	58.06	-4.15
5333	10/13/09 3:03	58.06	-4.15
5334	10/13/09 3:04	58.05	-4.16
5335	10/13/09 3:05	58.06	-4.15
5336	10/13/09 3:06	58.07	-4.14
5337	10/13/09 3:07	58.08	-4.13
5338	10/13/09 3:08	58.07	-4.14
5339	10/13/09 3:09	58.06	-4.15
5340	10/13/09 3:10	58.05	-4.16
5341	10/13/09 3:11	58.04	-4.17

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
5342	10/13/09 3:12	58.04	-4.17
5343	10/13/09 3:13	58.05	-4.16
5344	10/13/09 3:14	58.05	-4.16
5345	10/13/09 3:15	58.05	-4.16
5346	10/13/09 3:16	58.06	-4.15
5347	10/13/09 3:17	58.06	-4.15
5348	10/13/09 3:18	58.05	-4.16
5349	10/13/09 3:19	58.04	-4.17
5350	10/13/09 3:20	58.03	-4.18
5351	10/13/09 3:21	58.03	-4.18
5352	10/13/09 3:22	58.04	-4.17
5353	10/13/09 3:23	58.05	-4.16
5354	10/13/09 3:24	58.05	-4.16
5355	10/13/09 3:25	58.05	-4.16
5356	10/13/09 3:26	58.04	-4.17
5357	10/13/09 3:27	58.04	-4.17
5358	10/13/09 3:28	58.03	-4.18
5359	10/13/09 3:29	58.02	-4.19
5360	10/13/09 3:30	58.02	-4.19
5361	10/13/09 3:31	58.01	-4.20
5362	10/13/09 3:32	58.01	-4.20
5363	10/13/09 3:33	58.01	-4.20
5364	10/13/09 3:34	58.01	-4.20
5365	10/13/09 3:35	58.01	-4.20
5366	10/13/09 3:36	58.02	-4.19
5367	10/13/09 3:37	58.00	-4.21
5368	10/13/09 3:38	58.00	-4.21
5369	10/13/09 3:39	57.99	-4.22
5370	10/13/09 3:40	57.99	-4.22
5371	10/13/09 3:41	57.99	-4.22
5372	10/13/09 3:42	57.99	-4.22
5373	10/13/09 3:43	57.99	-4.22
5374	10/13/09 3:44	57.98	-4.23
5375	10/13/09 3:45	57.97	-4.24
5376	10/13/09 3:46	57.98	-4.23
5377	10/13/09 3:47	57.98	-4.23
5378	10/13/09 3:48	57.98	-4.23
5379	10/13/09 3:49	57.98	-4.23
5380	10/13/09 3:50	57.97	-4.24
5381	10/13/09 3:51	57.97	-4.24
5382	10/13/09 3:52	57.96	-4.25
5383	10/13/09 3:53	57.96	-4.25
5384	10/13/09 3:54	57.96	-4.25
5385	10/13/09 3:55	57.97	-4.24
5386	10/13/09 3:56	57.98	-4.23
5387	10/13/09 3:57	57.98	-4.23
5388	10/13/09 3:58	57.99	-4.22
5389	10/13/09 3:59	57.99	-4.22
5390	10/13/09 4:00	57.98	-4.23
5391	10/13/09 4:01	57.96	-4.25
5392	10/13/09 4:02	57.95	-4.26
5393	10/13/09 4:03	57.94	-4.27
5394	10/13/09 4:04	57.93	-4.28

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5395	10/13/09 4:05	57.94	-4.27
5396	10/13/09 4:06	57.94	-4.27
5397	10/13/09 4:07	57.93	-4.28
5398	10/13/09 4:08	57.92	-4.29
5399	10/13/09 4:09	57.93	-4.28
5400	10/13/09 4:10	57.93	-4.28
5401	10/13/09 4:11	57.93	-4.28
5402	10/13/09 4:12	57.93	-4.28
5403	10/13/09 4:13	57.93	-4.28
5404	10/13/09 4:14	57.92	-4.29
5405	10/13/09 4:15	57.92	-4.29
5406	10/13/09 4:16	57.94	-4.27
5407	10/13/09 4:17	57.93	-4.28
5408	10/13/09 4:18	57.93	-4.28
5409	10/13/09 4:19	57.92	-4.29
5410	10/13/09 4:20	57.92	-4.29
5411	10/13/09 4:21	57.91	-4.30
5412	10/13/09 4:22	57.92	-4.29
5413	10/13/09 4:23	57.92	-4.29
5414	10/13/09 4:24	57.91	-4.30
5415	10/13/09 4:25	57.90	-4.31
5416	10/13/09 4:26	57.91	-4.30
5417	10/13/09 4:27	57.90	-4.31
5418	10/13/09 4:28	57.89	-4.32
5419	10/13/09 4:29	57.88	-4.33
5420	10/13/09 4:30	57.88	-4.33
5421	10/13/09 4:31	57.89	-4.32
5422	10/13/09 4:32	57.89	-4.32
5423	10/13/09 4:33	57.89	-4.32
5424	10/13/09 4:34	57.87	-4.34
5425	10/13/09 4:35	57.87	-4.34
5426	10/13/09 4:36	57.87	-4.34
5427	10/13/09 4:37	57.89	-4.32
5428	10/13/09 4:38	57.89	-4.32
5429	10/13/09 4:39	57.89	-4.32
5430	10/13/09 4:40	57.88	-4.33
5431	10/13/09 4:41	57.87	-4.34
5432	10/13/09 4:42	57.87	-4.34
5433	10/13/09 4:43	57.87	-4.34
5434	10/13/09 4:44	57.87	-4.34
5435	10/13/09 4:45	57.86	-4.35
5436	10/13/09 4:46	57.86	-4.35
5437	10/13/09 4:47	57.85	-4.36
5438	10/13/09 4:48	57.85	-4.36
5439	10/13/09 4:49	57.86	-4.35
5440	10/13/09 4:50	57.87	-4.34
5441	10/13/09 4:51	57.86	-4.35
5442	10/13/09 4:52	57.85	-4.36
5443	10/13/09 4:53	57.84	-4.37
5444	10/13/09 4:54	57.84	-4.37
5445	10/13/09 4:55	57.85	-4.36
5446	10/13/09 4:56	57.84	-4.37
5447	10/13/09 4:57	57.84	-4.37

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5448	10/13/09 4:58	57.83	-4.38
5449	10/13/09 4:59	57.82	-4.39
5450	10/13/09 5:00	57.82	-4.39
5451	10/13/09 5:01	57.82	-4.39
5452	10/13/09 5:02	57.83	-4.38
5453	10/13/09 5:03	57.84	-4.37
5454	10/13/09 5:04	57.85	-4.36
5455	10/13/09 5:05	57.85	-4.36
5456	10/13/09 5:06	57.84	-4.37
5457	10/13/09 5:07	57.85	-4.36
5458	10/13/09 5:08	57.85	-4.36
5459	10/13/09 5:09	57.85	-4.36
5460	10/13/09 5:10	57.84	-4.37
5461	10/13/09 5:11	57.84	-4.37
5462	10/13/09 5:12	57.82	-4.39
5463	10/13/09 5:13	57.81	-4.40
5464	10/13/09 5:14	57.80	-4.41
5465	10/13/09 5:15	57.80	-4.41
5466	10/13/09 5:16	57.80	-4.41
5467	10/13/09 5:17	57.81	-4.40
5468	10/13/09 5:18	57.80	-4.41
5469	10/13/09 5:19	57.80	-4.41
5470	10/13/09 5:20	57.79	-4.42
5471	10/13/09 5:21	57.78	-4.43
5472	10/13/09 5:22	57.79	-4.42
5473	10/13/09 5:23	57.79	-4.42
5474	10/13/09 5:24	57.79	-4.42
5475	10/13/09 5:25	57.79	-4.42
5476	10/13/09 5:26	57.77	-4.44
5477	10/13/09 5:27	57.76	-4.45
5478	10/13/09 5:28	57.76	-4.45
5479	10/13/09 5:29	57.76	-4.45
5480	10/13/09 5:30	57.76	-4.45
5481	10/13/09 5:31	57.76	-4.45
5482	10/13/09 5:32	57.75	-4.46
5483	10/13/09 5:33	57.76	-4.45
5484	10/13/09 5:34	57.76	-4.45
5485	10/13/09 5:35	57.75	-4.46
5486	10/13/09 5:36	57.75	-4.46
5487	10/13/09 5:37	57.75	-4.46
5488	10/13/09 5:38	57.75	-4.46
5489	10/13/09 5:39	57.76	-4.45
5490	10/13/09 5:40	57.78	-4.43
5491	10/13/09 5:41	57.78	-4.43
5492	10/13/09 5:42	57.75	-4.46
5493	10/13/09 5:43	57.75	-4.46
5494	10/13/09 5:44	57.75	-4.46
5495	10/13/09 5:45	57.74	-4.47
5496	10/13/09 5:46	57.74	-4.47
5497	10/13/09 5:47	57.74	-4.47
5498	10/13/09 5:48	57.74	-4.47
5499	10/13/09 5:49	57.73	-4.48
5500	10/13/09 5:50	57.73	-4.48

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5501	10/13/09 5:51	57.73	-4.48
5502	10/13/09 5:52	57.73	-4.48
5503	10/13/09 5:53	57.73	-4.48
5504	10/13/09 5:54	57.73	-4.48
5505	10/13/09 5:55	57.74	-4.47
5506	10/13/09 5:56	57.75	-4.46
5507	10/13/09 5:57	57.74	-4.47
5508	10/13/09 5:58	57.73	-4.48
5509	10/13/09 5:59	57.74	-4.47
5510	10/13/09 6:00	57.73	-4.48
5511	10/13/09 6:01	57.72	-4.49
5512	10/13/09 6:02	57.71	-4.50
5513	10/13/09 6:03	57.70	-4.51
5514	10/13/09 6:04	57.71	-4.50
5515	10/13/09 6:05	57.71	-4.50
5516	10/13/09 6:06	57.72	-4.49
5517	10/13/09 6:07	57.72	-4.49
5518	10/13/09 6:08	57.71	-4.50
5519	10/13/09 6:09	57.70	-4.51
5520	10/13/09 6:10	57.71	-4.50
5521	10/13/09 6:11	57.70	-4.51
5522	10/13/09 6:12	57.70	-4.51
5523	10/13/09 6:13	57.70	-4.51
5524	10/13/09 6:14	57.70	-4.51
5525	10/13/09 6:15	57.70	-4.51
5526	10/13/09 6:16	57.71	-4.50
5527	10/13/09 6:17	57.70	-4.51
5528	10/13/09 6:18	57.69	-4.52
5529	10/13/09 6:19	57.68	-4.53
5530	10/13/09 6:20	57.69	-4.52
5531	10/13/09 6:21	57.69	-4.52
5532	10/13/09 6:22	57.68	-4.53
5533	10/13/09 6:23	57.68	-4.53
5534	10/13/09 6:24	57.68	-4.53
5535	10/13/09 6:25	57.68	-4.53
5536	10/13/09 6:26	57.66	-4.55
5537	10/13/09 6:27	57.66	-4.55
5538	10/13/09 6:28	57.66	-4.55
5539	10/13/09 6:29	57.66	-4.55
5540	10/13/09 6:30	57.67	-4.54
5541	10/13/09 6:31	57.66	-4.55
5542	10/13/09 6:32	57.65	-4.56
5543	10/13/09 6:33	57.65	-4.56
5544	10/13/09 6:34	57.65	-4.56
5545	10/13/09 6:35	57.65	-4.56
5546	10/13/09 6:36	57.65	-4.56
5547	10/13/09 6:37	57.64	-4.57
5548	10/13/09 6:38	57.65	-4.56
5549	10/13/09 6:39	57.66	-4.55
5550	10/13/09 6:40	57.65	-4.56
5551	10/13/09 6:41	57.65	-4.56
5552	10/13/09 6:42	57.65	-4.56
5553	10/13/09 6:43	57.64	-4.57

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5554	10/13/09 6:44	57.64	-4.57
5555	10/13/09 6:45	57.63	-4.58
5556	10/13/09 6:46	57.63	-4.58
5557	10/13/09 6:47	57.63	-4.58
5558	10/13/09 6:48	57.63	-4.58
5559	10/13/09 6:49	57.63	-4.58
5560	10/13/09 6:50	57.63	-4.58
5561	10/13/09 6:51	57.62	-4.59
5562	10/13/09 6:52	57.62	-4.59
5563	10/13/09 6:53	57.63	-4.58
5564	10/13/09 6:54	57.64	-4.57
5565	10/13/09 6:55	57.63	-4.58
5566	10/13/09 6:56	57.63	-4.58
5567	10/13/09 6:57	57.62	-4.59
5568	10/13/09 6:58	57.61	-4.60
5569	10/13/09 6:59	57.61	-4.60
5570	10/13/09 7:00	57.61	-4.60
5571	10/13/09 7:01	57.60	-4.61
5572	10/13/09 7:02	57.61	-4.60
5573	10/13/09 7:03	57.62	-4.59
5574	10/13/09 7:04	57.61	-4.60
5575	10/13/09 7:05	57.61	-4.60
5576	10/13/09 7:06	57.60	-4.61
5577	10/13/09 7:07	57.59	-4.62
5578	10/13/09 7:08	57.59	-4.62
5579	10/13/09 7:09	57.59	-4.62
5580	10/13/09 7:10	57.59	-4.62
5581	10/13/09 7:11	57.59	-4.62
5582	10/13/09 7:12	57.59	-4.62
5583	10/13/09 7:13	57.58	-4.63
5584	10/13/09 7:14	57.58	-4.63
5585	10/13/09 7:15	57.58	-4.63
5586	10/13/09 7:16	57.57	-4.64
5587	10/13/09 7:17	57.57	-4.64
5588	10/13/09 7:18	57.57	-4.64
5589	10/13/09 7:19	57.56	-4.65
5590	10/13/09 7:20	57.56	-4.65
5591	10/13/09 7:21	57.57	-4.64
5592	10/13/09 7:22	57.57	-4.64
5593	10/13/09 7:23	57.56	-4.65
5594	10/13/09 7:24	57.56	-4.65
5595	10/13/09 7:25	57.56	-4.65
5596	10/13/09 7:26	57.55	-4.66
5597	10/13/09 7:27	57.55	-4.66
5598	10/13/09 7:28	57.55	-4.66
5599	10/13/09 7:29	57.55	-4.66
5600	10/13/09 7:30	57.54	-4.67
5601	10/13/09 7:31	57.55	-4.66
5602	10/13/09 7:32	57.54	-4.67
5603	10/13/09 7:33	57.54	-4.67
5604	10/13/09 7:34	57.54	-4.67
5605	10/13/09 7:35	57.55	-4.66
5606	10/13/09 7:36	57.54	-4.67

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
5607	10/13/09 7:37	57.54	-4.67
5608	10/13/09 7:38	57.54	-4.67
5609	10/13/09 7:39	57.54	-4.67
5610	10/13/09 7:40	57.54	-4.67
5611	10/13/09 7:41	57.54	-4.67
5612	10/13/09 7:42	57.54	-4.67
5613	10/13/09 7:43	57.53	-4.68
5614	10/13/09 7:44	57.52	-4.69
5615	10/13/09 7:45	57.53	-4.68
5616	10/13/09 7:46	57.54	-4.67
5617	10/13/09 7:47	57.53	-4.68
5618	10/13/09 7:48	57.52	-4.69
5619	10/13/09 7:49	57.51	-4.70
5620	10/13/09 7:50	57.51	-4.70
5621	10/13/09 7:51	57.51	-4.70
5622	10/13/09 7:52	57.51	-4.70
5623	10/13/09 7:53	57.51	-4.70
5624	10/13/09 7:54	57.51	-4.70
5625	10/13/09 7:55	57.51	-4.70
5626	10/13/09 7:56	57.52	-4.69
5627	10/13/09 7:57	57.51	-4.70
5628	10/13/09 7:58	57.50	-4.71
5629	10/13/09 7:59	57.51	-4.70
5630	10/13/09 8:00	57.50	-4.71
5631	10/13/09 8:01	57.48	-4.73
5632	10/13/09 8:02	57.48	-4.73
5633	10/13/09 8:03	57.48	-4.73
5634	10/13/09 8:04	57.49	-4.72
5635	10/13/09 8:05	57.49	-4.72
5636	10/13/09 8:06	57.49	-4.72
5637	10/13/09 8:07	57.49	-4.72
5638	10/13/09 8:08	57.48	-4.73
5639	10/13/09 8:09	57.47	-4.74
5640	10/13/09 8:10	57.47	-4.74
5641	10/13/09 8:11	57.47	-4.74
5642	10/13/09 8:12	57.48	-4.73
5643	10/13/09 8:13	57.49	-4.72
5644	10/13/09 8:14	57.49	-4.72
5645	10/13/09 8:15	57.48	-4.73
5646	10/13/09 8:16	57.46	-4.75
5647	10/13/09 8:17	57.45	-4.76
5648	10/13/09 8:18	57.46	-4.75
5649	10/13/09 8:19	57.46	-4.75
5650	10/13/09 8:20	57.45	-4.76
5651	10/13/09 8:21	57.45	-4.76
5652	10/13/09 8:22	57.44	-4.77
5653	10/13/09 8:23	57.44	-4.77
5658	10/13/09 8:28	57.43	-4.78
5664	10/13/09 8:34	57.42	-4.79
5674	10/13/09 8:44	57.40	-4.81
5684	10/13/09 8:54	57.39	-4.82
5694	10/13/09 9:04	57.36	-4.85
5704	10/13/09 9:14	57.33	-4.88

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
5714	10/13/09 9:24	57.30	-4.91
5724	10/13/09 9:34	57.31	-4.90
5734	10/13/09 9:44	57.26	-4.95
5744	10/13/09 9:54	57.26	-4.95
5754	10/13/09 10:04	57.23	-4.98
5764	10/13/09 10:14	57.22	-4.99
5774	10/13/09 10:24	57.22	-4.99
5784	10/13/09 10:34	57.19	-5.02
5794	10/13/09 10:44	57.19	-5.02
5804	10/13/09 10:54	57.17	-5.04
5814	10/13/09 11:04	57.15	-5.06
5824	10/13/09 11:14	57.14	-5.07
5834	10/13/09 11:24	57.12	-5.09
5844	10/13/09 11:34	57.12	-5.09
5854	10/13/09 11:44	57.11	-5.10
5864	10/13/09 11:54	57.09	-5.12
5874	10/13/09 12:04	57.08	-5.13
5884	10/13/09 12:14	57.07	-5.14
5894	10/13/09 12:24	57.03	-5.18
5904	10/13/09 12:34	57.03	-5.18
5914	10/13/09 12:44	57.03	-5.18
5924	10/13/09 12:54	57.00	-5.21
5934	10/13/09 13:04	57.00	-5.21
5944	10/13/09 13:14	56.97	-5.24
5954	10/13/09 13:24	56.96	-5.25
5964	10/13/09 13:34	56.96	-5.25
5974	10/13/09 13:44	56.94	-5.27
5984	10/13/09 13:54	56.92	-5.29
5994	10/13/09 14:04	56.89	-5.32
6004	10/13/09 14:14	56.88	-5.33
6014	10/13/09 14:24	56.85	-5.36
6024	10/13/09 14:34	56.84	-5.37
6034	10/13/09 14:44	56.82	-5.39
6044	10/13/09 14:54	56.81	-5.40
6054	10/13/09 15:04	56.80	-5.41
6064	10/13/09 15:14	56.77	-5.44
6074	10/13/09 15:24	56.75	-5.46
6084	10/13/09 15:34	56.76	-5.45
6094	10/13/09 15:44	56.72	-5.49
6104	10/13/09 15:54	56.74	-5.47
6114	10/13/09 16:04	56.70	-5.51
6124	10/13/09 16:14	56.67	-5.54
6134	10/13/09 16:24	56.67	-5.54
6144	10/13/09 16:34	56.67	-5.54
6154	10/13/09 16:44	56.64	-5.57
6164	10/13/09 16:54	56.64	-5.57
6174	10/13/09 17:04	56.63	-5.58
6184	10/13/09 17:14	56.58	-5.63
6194	10/13/09 17:24	56.58	-5.63
6204	10/13/09 17:34	56.58	-5.63
6214	10/13/09 17:44	56.59	-5.62
6224	10/13/09 17:54	56.56	-5.65
6234	10/13/09 18:04	56.53	-5.68

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**

Distance from Pumping Well	Approximately 800 feet
Start Pumping:	2009-10-09 10:10 AM
End Pumping:	2009-10-12 10:10 AM
Initial Volume:	271729 x1000 gal
Final Volume:	272391 x1000 gal
Water Level at Start of Pump Test:	62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
6244	10/13/09 18:14	56.54	-5.67
6254	10/13/09 18:24	56.53	-5.68
6272	10/13/09 18:42	56.48	-5.73
6282	10/13/09 18:52	56.51	-5.70
6292	10/13/09 19:02	56.48	-5.73
6302	10/13/09 19:12	56.48	-5.73
6312	10/13/09 19:22	56.46	-5.75
6322	10/13/09 19:32	56.44	-5.77
6332	10/13/09 19:42	56.42	-5.79
6342	10/13/09 19:52	56.42	-5.79
6352	10/13/09 20:02	56.40	-5.81
6362	10/13/09 20:12	56.40	-5.81
6372	10/13/09 20:22	56.38	-5.83
6382	10/13/09 20:32	56.37	-5.84
6392	10/13/09 20:42	56.35	-5.86
6402	10/13/09 20:52	56.35	-5.86
6412	10/13/09 21:02	56.32	-5.89
6422	10/13/09 21:12	56.34	-5.87
6432	10/13/09 21:22	56.31	-5.90
6442	10/13/09 21:32	56.32	-5.89
6452	10/13/09 21:42	56.29	-5.92
6462	10/13/09 21:52	56.27	-5.94
6472	10/13/09 22:02	56.26	-5.95
6482	10/13/09 22:12	56.27	-5.94
6492	10/13/09 22:22	56.23	-5.98
6502	10/13/09 22:32	56.23	-5.98
6512	10/13/09 22:42	56.22	-5.99
6522	10/13/09 22:52	56.21	-6.00
6532	10/13/09 23:02	56.19	-6.02
6542	10/13/09 23:12	56.19	-6.02
6552	10/13/09 23:22	56.21	-6.00
6562	10/13/09 23:32	56.18	-6.03
6572	10/13/09 23:42	56.19	-6.02
6582	10/13/09 23:52	56.17	-6.04
6592	10/14/09 0:02	56.18	-6.03
6602	10/14/09 0:12	56.15	-6.06
6612	10/14/09 0:22	56.15	-6.06
6622	10/14/09 0:32	56.14	-6.07
6632	10/14/09 0:42	56.13	-6.08
6642	10/14/09 0:52	56.12	-6.09
6652	10/14/09 1:02	56.13	-6.08
6662	10/14/09 1:12	56.11	-6.10
6672	10/14/09 1:22	56.11	-6.10
6682	10/14/09 1:32	56.09	-6.12
6692	10/14/09 1:42	56.09	-6.12
6702	10/14/09 1:52	56.10	-6.11
6712	10/14/09 2:02	56.07	-6.14
6722	10/14/09 2:12	56.07	-6.14
6732	10/14/09 2:22	56.06	-6.15
6742	10/14/09 2:32	56.05	-6.16
6752	10/14/09 2:42	56.04	-6.17
6762	10/14/09 2:52	56.03	-6.18
6769	10/14/09 2:59	56.05	-6.16

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
6779	10/14/09 3:09	56.03	-6.18
6789	10/14/09 3:19	56.02	-6.19
6799	10/14/09 3:29	56.00	-6.21
6809	10/14/09 3:39	56.01	-6.20
6819	10/14/09 3:49	55.98	-6.23
6829	10/14/09 3:59	55.98	-6.23
6839	10/14/09 4:09	55.96	-6.25
6849	10/14/09 4:19	55.95	-6.26
6859	10/14/09 4:29	55.96	-6.25
6869	10/14/09 4:39	55.92	-6.29
6879	10/14/09 4:49	55.92	-6.29
6889	10/14/09 4:59	55.91	-6.30
6899	10/14/09 5:09	55.91	-6.30
6909	10/14/09 5:19	55.89	-6.32
6919	10/14/09 5:29	55.90	-6.31
6929	10/14/09 5:39	55.88	-6.33
6939	10/14/09 5:49	55.88	-6.33
6949	10/14/09 5:59	55.86	-6.35
6959	10/14/09 6:09	55.85	-6.36
6969	10/14/09 6:19	55.85	-6.36
6979	10/14/09 6:29	55.83	-6.38
6989	10/14/09 6:39	55.83	-6.38
6999	10/14/09 6:49	55.82	-6.39
7009	10/14/09 6:59	55.81	-6.40
7019	10/14/09 7:09	55.80	-6.41
7029	10/14/09 7:19	55.79	-6.42
7039	10/14/09 7:29	55.79	-6.42
7049	10/14/09 7:39	55.78	-6.43
7059	10/14/09 7:49	55.76	-6.45
7069	10/14/09 7:59	55.77	-6.44
7079	10/14/09 8:09	55.75	-6.46
7089	10/14/09 8:19	55.77	-6.44
7099	10/14/09 8:29	55.75	-6.46
7109	10/14/09 8:39	55.73	-6.48
7119	10/14/09 8:49	55.72	-6.49
7129	10/14/09 8:59	55.71	-6.50
7139	10/14/09 9:09	55.71	-6.50
7149	10/14/09 9:19	55.70	-6.51
7159	10/14/09 9:29	55.70	-6.51
7169	10/14/09 9:39	55.69	-6.52
7179	10/14/09 9:49	55.68	-6.53
7189	10/14/09 9:59	55.67	-6.54
7204	10/14/09 10:14	55.68	-6.53
7214	10/14/09 10:24	55.66	-6.55
7224	10/14/09 10:34	55.65	-6.56
7234	10/14/09 10:44	55.64	-6.57
7244	10/14/09 10:54	55.62	-6.59
7254	10/14/09 11:04	55.63	-6.58
7264	10/14/09 11:14	55.63	-6.58
7274	10/14/09 11:24	55.60	-6.61
7284	10/14/09 11:34	55.60	-6.61
7294	10/14/09 11:44	55.58	-6.63
7304	10/14/09 11:54	55.58	-6.63

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	W-VI Drawdown (feet)
7314	10/14/09 12:04	55.58	-6.63
7324	10/14/09 12:14	55.57	-6.64
7334	10/14/09 12:24	55.55	-6.66
7344	10/14/09 12:34	55.54	-6.67
7354	10/14/09 12:44	55.53	-6.68
7364	10/14/09 12:54	55.51	-6.70
7374	10/14/09 13:04	55.50	-6.71
7384	10/14/09 13:14	55.50	-6.71
7394	10/14/09 13:24	55.50	-6.71
7404	10/14/09 13:34	55.47	-6.74
7414	10/14/09 13:44	55.47	-6.74
7424	10/14/09 13:54	55.44	-6.77
7434	10/14/09 14:04	55.45	-6.76
7444	10/14/09 14:14	55.46	-6.75
7454	10/14/09 14:24	55.42	-6.79
7464	10/14/09 14:34	55.41	-6.80
7474	10/14/09 14:44	55.40	-6.81
7484	10/14/09 14:54	55.39	-6.82
7494	10/14/09 15:04	55.37	-6.84
7504	10/14/09 15:14	55.36	-6.85
7514	10/14/09 15:24	55.37	-6.84
7524	10/14/09 15:34	55.33	-6.88
7534	10/14/09 15:44	55.33	-6.88
7544	10/14/09 15:54	55.31	-6.90
7554	10/14/09 16:04	55.32	-6.89
7564	10/14/09 16:14	55.29	-6.92
7574	10/14/09 16:24	55.29	-6.92
7584	10/14/09 16:34	55.28	-6.93
7594	10/14/09 16:44	55.28	-6.93
7604	10/14/09 16:54	55.25	-6.96
7614	10/14/09 17:04	55.27	-6.94
7624	10/14/09 17:14	55.25	-6.96
7634	10/14/09 17:24	55.23	-6.98
7644	10/14/09 17:34	55.21	-7.00
7654	10/14/09 17:44	55.23	-6.98
7664	10/14/09 17:54	55.21	-7.00
7674	10/14/09 18:04	55.19	-7.02
7684	10/14/09 18:14	55.20	-7.01
7694	10/14/09 18:24	55.18	-7.03
7704	10/14/09 18:34	55.16	-7.05
7714	10/14/09 18:44	55.16	-7.05
7724	10/14/09 18:54	55.15	-7.06
7734	10/14/09 19:04	55.14	-7.07
7744	10/14/09 19:14	55.14	-7.07
7754	10/14/09 19:24	55.11	-7.10
7764	10/14/09 19:34	55.12	-7.09
7774	10/14/09 19:44	55.10	-7.11
7784	10/14/09 19:54	55.09	-7.12
7794	10/14/09 20:04	55.09	-7.12
7804	10/14/09 20:14	55.08	-7.13
7814	10/14/09 20:24	55.08	-7.13
7824	10/14/09 20:34	55.07	-7.14
7834	10/14/09 20:44	55.05	-7.16

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center

Project No.: 6486.200.503	**Geologist: Brooks Ramsdell**	
Distance from Pumping Well	Approximately 800 feet	
Start Pumping:	2009-10-09	10:10 AM
End Pumping:	2009-10-12	10:10 AM
Initial Volume:	271729	x1000 gal
Final Volume:	272391	x1000 gal
Water Level at Start of Pump Test:	62.21	feet, below ground surface

Elapsed Time (minutes)	Time	W-VI	
		Depth to Groundwater (feet, btc)	Drawdown (feet)
7844	10/14/09 20:54	55.05	-7.16
7854	10/14/09 21:04	55.06	-7.15
7864	10/14/09 21:14	55.03	-7.18
7874	10/14/09 21:24	55.02	-7.19
7884	10/14/09 21:34	55.01	-7.20
7894	10/14/09 21:44	55.00	-7.21
7904	10/14/09 21:54	55.00	-7.21
7914	10/14/09 22:04	54.99	-7.22
7924	10/14/09 22:14	54.98	-7.23
7934	10/14/09 22:24	54.99	-7.22
7944	10/14/09 22:34	54.97	-7.24
7954	10/14/09 22:44	54.97	-7.24
7964	10/14/09 22:54	54.96	-7.25
7974	10/14/09 23:04	54.93	-7.28
7984	10/14/09 23:14	54.94	-7.27
7994	10/14/09 23:24	54.91	-7.30
8004	10/14/09 23:34	54.90	-7.31
8014	10/14/09 23:44	54.92	-7.29
8024	10/14/09 23:54	54.91	-7.30
8034	10/15/09 0:04	54.88	-7.33
8044	10/15/09 0:14	54.88	-7.33
8054	10/15/09 0:24	54.87	-7.34
8064	10/15/09 0:34	54.87	-7.34
8074	10/15/09 0:44	54.84	-7.37
8084	10/15/09 0:54	54.85	-7.36
8094	10/15/09 1:04	54.85	-7.36
8104	10/15/09 1:14	54.83	-7.38
8114	10/15/09 1:24	54.81	-7.40
8124	10/15/09 1:34	54.80	-7.41
8134	10/15/09 1:44	54.81	-7.40
8144	10/15/09 1:54	54.79	-7.42
8154	10/15/09 2:04	54.78	-7.43
8164	10/15/09 2:14	54.80	-7.41
8174	10/15/09 2:24	54.78	-7.43
8184	10/15/09 2:34	54.75	-7.46
8194	10/15/09 2:44	54.74	-7.47
8204	10/15/09 2:54	54.73	-7.48
8214	10/15/09 3:04	54.73	-7.48
8224	10/15/09 3:14	54.72	-7.49
8234	10/15/09 3:24	54.73	-7.48
8244	10/15/09 3:34	54.70	-7.51
8254	10/15/09 3:44	54.69	-7.52
8264	10/15/09 3:54	54.69	-7.52
8274	10/15/09 4:04	54.68	-7.53
8284	10/15/09 4:14	54.67	-7.54
8294	10/15/09 4:24	54.66	-7.55
8304	10/15/09 4:34	54.66	-7.55
8314	10/15/09 4:44	54.64	-7.57
8324	10/15/09 4:54	54.63	-7.58
8334	10/15/09 5:04	54.65	-7.56
8344	10/15/09 5:14	54.62	-7.59
8354	10/15/09 5:24	54.63	-7.58
8364	10/15/09 5:34	54.61	-7.60

W-VI :: Observation Well 72-hour Pump Test @153 gpm

Project Name: Sutter Medical Center of Santa Rosa / Luther Burbank Center
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance from Pumping Well Approximately 800 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 62.21 feet, below ground surface

Elapsed Time (minutes)	Time	W-VI Depth to Groundwater (feet, btc)	Drawdown (feet)
8374	10/15/09 5:44	54.60	-7.61
8384	10/15/09 5:54	54.60	-7.61
8394	10/15/09 6:04	54.59	-7.62
8404	10/15/09 6:14	54.60	-7.61
8414	10/15/09 6:24	54.58	-7.63
8424	10/15/09 6:34	54.57	-7.64
8434	10/15/09 6:44	54.57	-7.64
8444	10/15/09 6:54	54.57	-7.64
8454	10/15/09 7:04	54.57	-7.64
8464	10/15/09 7:14	54.55	-7.66
8474	10/15/09 7:24	54.56	-7.65
8484	10/15/09 7:34	54.54	-7.67
8494	10/15/09 7:44	54.54	-7.67
8504	10/15/09 7:54	54.54	-7.67
8514	10/15/09 8:04	54.53	-7.68
8524	10/15/09 8:14	54.52	-7.69
8534	10/15/09 8:24	54.51	-7.70
8544	10/15/09 8:34	54.51	-7.70
8554	10/15/09 8:44	54.51	-7.70
8564	10/15/09 8:54	54.50	-7.71
8574	10/15/09 9:04	54.49	-7.72
8584	10/15/09 9:14	54.49	-7.72
8594	10/15/09 9:24	54.48	-7.73
8604	10/15/09 9:34	54.48	-7.73
8614	10/15/09 9:44	54.48	-7.73
8624	10/15/09 9:54	54.46	-7.75
8634	10/15/09 10:04	54.46	-7.75
8644	10/15/09 10:14	54.45	-7.76
8654	10/15/09 10:24	54.45	-7.76
8664	10/15/09 10:34	54.45	-7.76
8674	10/15/09 10:44	54.44	-7.77
8684	10/15/09 10:54	54.43	-7.78
8694	10/15/09 11:04	54.41	-7.80
8704	10/15/09 11:14	54.42	-7.79
8714	10/15/09 11:24	54.42	-7.79
8724	10/15/09 11:34	54.40	-7.81
8734	10/15/09 11:44	54.40	-7.81
8744	10/15/09 11:54	54.39	-7.82
8754	10/15/09 12:04	54.38	-7.83
8764	10/15/09 12:14	54.38	-7.83
8774	10/15/09 12:24	54.37	-7.84
8784	10/15/09 12:34	54.37	-7.84
8794	10/15/09 12:44	54.34	-7.87
8804	10/15/09 12:54	54.36	-7.85
8814	10/15/09 13:04	54.33	-7.88
8824	10/15/09 13:14	54.32	-7.89
8834	10/15/09 13:24	54.31	-7.90
8844	10/15/09 13:34	54.32	-7.89
8854	10/15/09 13:44	54.30	-7.91
8864	10/15/09 13:54	54.29	-7.92
8874	10/15/09 14:04	54.30	-7.91
8884	10/15/09 14:14	54.28	-7.93

W-SV :: Secondary Observation Well 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance From Pumping Well Approximately 1890 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 48.10

Time	W-SV		
	Depth to Groundwater	Drawdown (feet)	
10/9/2009 10:10	48.05	-0.05	
10/9/2009 10:22	48.05	-0.05	
10/9/2009 10:32	48.05	-0.05	
10/9/2009 10:43	48.05	-0.05	
10/9/2009 10:55	48.05	-0.05	
10/9/2009 11:06	48.05	-0.05	
10/9/2009 11:18	48.05	-0.05	
10/9/2009 11:29	48.05	-0.05	
10/9/2009 11:40	48.05	-0.05	
10/9/2009 11:51	48.03	-0.07	
10/9/2009 12:03	48.03	-0.07	
10/9/2009 12:14	48.02	-0.08	
10/9/2009 12:45	47.98	-0.12	
10/9/2009 13:15	47.95	-0.15	
10/9/2009 13:44	47.94	-0.16	
10/9/2009 14:14	47.9	-0.2	
10/9/2009 14:44	47.85	-0.25	
10/9/2009 15:14	47.82	-0.28	
10/9/2009 16:27	47.71	-0.39	
10/9/2009 17:15	47.7	-0.4	
10/9/2009 18:14	47.65	-0.45	
10/9/2009 19:13	47.6	-0.5	
10/9/2009 20:14	47.57	-0.53	
10/9/2009 21:01	47.55	-0.55	
10/9/2009 21:59	47.51	-0.59	
10/9/2009 23:01	47.49	-0.61	
10/10/2009 0:01	47.47	-0.63	
10/10/2009 1:01	47.45	-0.65	
10/10/2009 1:59	47.44	-0.66	
10/10/2009 3:00	47.44	-0.66	
10/10/2009 4:00	47.43	-0.67	
10/10/2009 5:01	47.41	-0.69	
10/10/2009 6:00	47.41	-0.69	
10/10/2009 7:00	47.38	-0.72	
10/10/2009 8:00	47.38	-0.72	
10/10/2009 9:00	47.38	-0.72	
10/10/2009 9:58	47.37	-0.73	
10/10/2009 17:34	47.22	-0.88	
10/11/2009 2:00	47.52	-0.58	
10/11/2009 11:48	47.78	-0.32	
10/11/2009 17:56	47.53	-0.57	
10/12/2009 2:00	47.75	-0.35	
10/12/2009 10:14	48.03	-0.07	SMC Pump Shut-Off 10:10 AM
10/12/2009 10:24	48.02	-0.08	
10/12/2009 10:40	48	-0.1	
10/12/2009 10:53	48	-0.1	
10/12/2009 11:04	47.99	-0.11	
10/12/2009 11:20	47.97	-0.13	
10/12/2009 11:32	47.95	-0.15	
10/12/2009 11:45	47.94	-0.16	
10/12/2009 11:58	47.93	-0.17	
10/12/2009 12:24	47.91	-0.19	
10/12/2009 12:34	47.91	-0.19	

W-SV :: Secondary Observation Well 72-hour Pump Test @ 153gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance From Pumping Well Approximately 1890 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 48.10

Time	W-SV		
	Depth to Groundwater	Drawdown (feet)	
10/12/2009 12:53	47.89	-0.21	
10/12/2009 13:07	47.87	-0.23	
10/12/2009 13:26	47.86	-0.24	
10/12/2009 13:37	47.85	-0.25	
10/12/2009 13:48	47.84	-0.26	
10/12/2009 14:01	47.83	-0.27	
10/12/2009 14:13	47.83	-0.27	
10/12/2009 14:35	47.81	-0.29	
10/12/2009 14:50	47.8	-0.3	
10/12/2009 17:18	47.76	-0.34	
10/12/2009 18:21	47.66	-0.44	
10/12/2009 19:06	47.61	-0.49	
10/12/2009 19:55	47.59	-0.51	
10/12/2009 20:55	47.56	-0.54	
10/12/2009 21:55	47.52	-0.58	
10/12/2009 22:55	47.5	-0.6	
10/12/2009 23:55	47.46	-0.64	
10/13/2009 0:55	47.43	-0.67	
10/13/2009 1:55	47.39	-0.71	
10/13/2009 2:55	47.37	-0.73	
10/13/2009 3:55	47.33	-0.77	
10/13/2009 4:55	47.3	-0.8	
10/13/2009 5:55	47.26	-0.84	
10/13/2009 6:55	47.21	-0.89	
10/13/2009 7:55	47.17	-0.93	
10/13/2009 8:55	47.09	-1.01	
10/13/2009 9:55	47.01	-1.09	
10/13/2009 18:01	46.73	-1.37	

W-C :: Secondary Observation Well 72-hour Pump Test @ 153 gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance From Pumping Well Approximately 1480 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 18.75

Time	W-C Depth to Groundwater	W-C Drawdown (feet)	
10/9/2009 10:16	18.75	0	
10/9/2009 10:27	18.77	0.02	
10/9/2009 10:38	18.77	0.02	
10/9/2009 10:48	18.77	0.02	
10/9/2009 11:01	18.77	0.02	
10/9/2009 11:12	18.77	0.02	
10/9/2009 11:24	18.77	0.02	
10/9/2009 11:34	18.77	0.02	
10/9/2009 11:46	18.77	0.02	
10/9/2009 11:57	18.77	0.02	
10/9/2009 12:08	18.77	0.02	
10/9/2009 12:36	18.77	0.02	
10/9/2009 13:08	18.77	0.02	
10/9/2009 13:37	18.77	0.02	
10/9/2009 14:08	18.77	0.02	
10/9/2009 14:39	18.77	0.02	
10/9/2009 15:09	18.77	0.02	
10/9/2009 16:15	18.77	0.02	
10/9/2009 17:08	18.77	0.02	
10/9/2009 18:08	18.77	0.02	
10/9/2009 19:09	18.77	0.02	
10/9/2009 20:07	18.77	0.02	
10/9/2009 21:09	18.76	0.01	
10/9/2009 22:07	18.77	0.02	
10/9/2009 23:08	18.77	0.02	
10/10/2009 0:08	18.77	0.02	
10/10/2009 1:08	18.77	0.02	
10/10/2009 2:06	18.77	0.02	
10/10/2009 3:07	18.77	0.02	
10/10/2009 4:08	18.77	0.02	
10/10/2009 5:08	18.78	0.03	
10/10/2009 6:08	18.78	0.03	
10/10/2009 7:08	18.78	0.03	
10/10/2009 8:07	18.78	0.03	
10/10/2009 9:08	18.79	0.04	
10/10/2009 10:05	18.79	0.04	
10/10/2009 17:00	18.77	0.02	
10/11/2009 2:00	18.79	0.04	
10/11/2009 11:40	18.83	0.08	
10/11/2009 18:04	18.82	0.07	
10/12/2009 2:14	18.84	0.09	
10/12/2009 10:06	18.85	0.1	
10/12/2009 10:18	18.85	0.1	W-SMC Pump Shut off at 10:10 AM
10/12/2009 10:33	19.02	0.27	
10/12/2009 10:47	18.88	0.13	
10/12/2009 10:58	18.88	0.13	
10/12/2009 11:12	18.87	0.12	
10/12/2009 11:26	18.86	0.11	
10/12/2009 11:40	18.87	0.12	
10/12/2009 11:52	18.86	0.11	
10/12/2009 12:18	18.86	0.11	
10/12/2009 12:30	18.86	0.11	
10/12/2009 13:00	18.87	0.12	

W-C :: Secondary Observation Well 72-hour Pump Test @ 153 gpm

Project Name: Sutter Medical Center of Santa Rosa
Project No.: 6486.200.503 **Geologist: Brooks Ramsdell**
Distance From Pumping Well Approximately 1480 feet
Start Pumping: 2009-10-09 10:10 AM
End Pumping: 2009-10-12 10:10 AM
Initial Volume: 271729 x1000 gal
Final Volume: 272391 x1000 gal
Water Level at Start of Pump Test: 18.75

Time	W-C		
	Depth to Groundwater	Drawdown (feet)	
10/12/2009 13:16	18.87	0.12	
10/12/2009 13:32	18.86	0.11	
10/12/2009 14:07	18.87	0.12	
10/12/2009 15:04	18.87	0.12	
10/12/2009 16:16	18.9	0.15	
10/12/2009 17:34	18.88	0.13	
10/12/2009 18:54	18.87	0.12	
10/12/2009 21:20	18.87	0.12	
10/13/2009 0:20	18.87	0.12	
10/13/2009 3:20	18.87	0.12	
10/13/2009 6:20	18.87	0.12	
10/13/2009 10:05	18.5	-0.25	

APPENDIX D

Water Quality Analysis

APPENDIX D

Analytical Sciences

August 25, 2009

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9082107 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Report Date: August 25, 2009

Laboratory Report

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Medical Center**	**6486.200.503**
Lab Project:	**9082107**	

This 15 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Antimony (Sb)	ND	5.0
		Arsenic (As)	3.3	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006202
Date Received:	08/21/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Aluminum (Al)	350	50
		Barium (Ba)	76	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	5.1	2.5
		Iron (Fe)	470	100
		Manganese (Mn)	120	20
		Nickel (Ni)	ND	10

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch: B006180
Date Received:	08/21/09	Method:	EPA 200.7 4x conc.	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Sodium (Na)	160	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/21/09	Method:	EPA 200.7	

Silica

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Silica (SiO_2)	39	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch:	B006180
Date Received:	08/21/09	Method:	EPA 200.7		

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Calcium (Ca)	18	5.0
		Magnesium (Mg)	6.9	1.0
		Hardness	74	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch:	B006180
Date Received:	08/21/09	Method:	SM 2340 B		

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082107-01	**Well #1**	Mercury (Hg)	ND	0.20

Date Sampled:	08/21/09	Date Analyzed:	08/25/09	QC Batch:	B006199
Date Received:	08/21/09	Method:	EPA 245.1		

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9082107-01	**Well #1**	pH	7.52	1.00

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch:	B006192
Date Received:	08/21/09	Method:	SM 4500-H B		

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9082107-01	**Well #1**	Total Alkalinity	350	5.0
		Bicarbonate Alkalinity	350	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006224
Date Received:	08/21/09	Method:	SM 2320 B	

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Fluoride	ND	0.10
		Chloride	29	2.0
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50
		Sulfate as SO4	22	5.0

Date Sampled:	08/21/09	Date Analyzed:	08/21/09	QC Batch: B006223
Date Received:	08/21/09	Method:	EPA 300.0	

Total Dissolved Solids

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082107-01	**Well #1**	Total Dissolved Solids	450	10

Date Sampled:	08/21/09	Date Analyzed:	08/24/09	QC Batch: B006197
Date Received:	08/21/09	Method:	SM 2540 C	

Quality Assurance Report

Graphite Furnace Metals

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006202 - EPA 200.9										
Blank (B006202-BLK1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	ND	5.0	µg/L							
Arsenic (As)	ND	2.0	µg/L							
Selenium (Se)	ND	5.0	µg/L							
Thallium (Tl)	ND	2.0	µg/L							
LCS (B006202-BS1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	8.9	5.0	µg/L	10.0		89	85-115			
Arsenic (As)	9.4	2.0	µg/L	10.0		94	85-115			
Selenium (Se)	9.61	5.0	µg/L	10.0		96	85-115			
Thallium (Tl)	10.3	2.0	µg/L	10.0		103	85-115			
LCS Dup (B006202-BSD1)				Prepared: 08/17/09 Analyzed: 08/21/09						
Antimony (Sb)	8.8	5.0	µg/L	10.0		88	85-115	1	20	
Arsenic (As)	9.1	2.0	µg/L	10.0		91	85-115	3	20	
Selenium (Se)	10.4	5.0	µg/L	10.0		104	85-115	8	20	
Thallium (Tl)	10.5	2.0	µg/L	10.0		105	85-115	2	20	

Drinking Water Metals (ug/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	ND	50	µg/L							
Barium (Ba)	ND	50	µg/L							
Beryllium (Be)	ND	1.0	µg/L							
Cadmium (Cd)	ND	1.0	µg/L							
Chromium (Cr)	ND	2.5	µg/L							
Iron (Fe)	ND	100	µg/L							
Manganese (Mn)	ND	20	µg/L							
Nickel (Ni)	ND	10	µg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	471	50	µg/L	500		94	70-130			
Barium (Ba)	567	50	µg/L	500		113	70-130			
Beryllium (Be)	512	4.0	µg/L	500		102	70-130			
Cadmium (Cd)	492	4.0	µg/L	500		98	70-130			
Chromium (Cr)	530	10	µg/L	500		106	70-130			
Iron (Fe)	463	100	µg/L	500		93	70-130			
Manganese (Mn)	533	20	µg/L	500		107	70-130			
Nickel (Ni)	527	40	µg/L	500		105	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Aluminum (Al)	466	50	µg/L	500		93	70-130	1	20	
Barium (Ba)	498	50	µg/L	500		100	70-130	13	20	
Beryllium (Be)	467	4.0	µg/L	500		93	70-130	9	20	
Cadmium (Cd)	448	4.0	µg/L	500		90	70-130	9	20	
Chromium (Cr)	485	10	µg/L	500		97	70-130	9	20	
Iron (Fe)	410	100	µg/L	500		82	70-130	12	20	
Manganese (Mn)	488	20	µg/L	500		98	70-130	9	20	
Nickel (Ni)	478	40	µg/L	500		96	70-130	10	20	

Drinking Water Metals (mg/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	ND	0.10	mg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	0.637	0.10	mg/L	0.500		127	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Sodium (Na)	0.505	0.10	mg/L	0.500		101	70-130	23	24	

Silica

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/24/09						
Silica (SiO2)	ND	0.10	mg/L							
LCS (B006180-BS1)				Prepared: 08/10/09 Analyzed: 08/18/09						
Silica (SiO2)	5.14	0.10	mg/L	5.35		96	70-130			
LCS Dup (B006180-BSD1)				Prepared: 08/10/09 Analyzed: 08/18/09						
Silica (SiO2)	4.64	0.10	mg/L	5.35		87	70-130	10	20	

Hardness

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006180 - EPA 200.7										
Blank (B006180-BLK1)				Prepared: 08/10/09 Analyzed: 08/13/09						
Calcium (Ca)	ND	5.0	mg/L							
Magnesium (Mg)	ND	1.0	mg/L							
Hardness	ND	5.0	mg/L							

Mercury

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006199 - EPA 7470A Prep										
Blank (B006199-BLK1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	ND	0.20	µg/L							
LCS (B006199-BS1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120			
LCS Dup (B006199-BSD1)				Prepared & Analyzed: 08/13/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120	0	20	

pH

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006192 - NO PREP										
Duplicate (B006192-DUP1)		**Source: 9081118-01**		Prepared & Analyzed: 08/11/09						
pH	8.45	1.00	pH Units		8.36			1	15	

Alkalinity

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006224 - NO PREP										
Blank (B006224-BLK1)				Prepared: 08/20/09 Analyzed: 08/24/09						
Total Alkalinity	ND	5.0	mg CaC03/L							
Bicarbonate Alkalinity	ND	5.0	mg CaC03/L							
Carbonate Alkalinity	ND	5.0	mg CaC03/L							
Hydroxide Alkalinity	ND	5.0	mg CaC03/L							

Anions

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006223 - NO PREP										
Blank (B006223-BLK1)				Prepared & Analyzed: 08/20/09						
Fluoride	ND	0.10	mg/L							
Chloride	ND	0.20	mg/L							
Nitrite as N	ND	0.15	mg/L							
Nitrate	ND	0.50	mg/L							
Sulfate as SO4	ND	0.50	mg/L							
Matrix Spike (B006223-MS1)		**Source: 9082001-02**		Prepared & Analyzed: 08/20/09						
Fluoride	1.05	0.10	mg/L	1.00	ND	105	75-125			
Chloride	1.90	0.20	mg/L	2.00	0.170	86	75-125			
Nitrite as N	0.377	0.15	mg/L	0.304	ND	124	75-125			
Nitrate	4.26	0.50	mg/L	4.00	ND	106	75-125			
Sulfate as SO4	4.51	0.50	mg/L	4.00	ND	113	75-125			
Matrix Spike Dup (B006223-MSD1)		**Source: 9082001-02**		Prepared & Analyzed: 08/20/09						
Fluoride	1.06	0.10	mg/L	1.00	ND	106	75-125	0.9	20	
Chloride	1.94	0.20	mg/L	2.00	0.170	88	75-125	2	20	
Nitrite as N	0.377	0.15	mg/L	0.304	ND	124	75-125	0	20	
Nitrate	4.12	0.50	mg/L	4.00	ND	103	75-125	3	20	
Sulfate as SO4	4.30	0.50	mg/L	4.00	ND	108	75-125	5	20	

Total Dissolved Solids

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006197 - NO PREP										
Blank (B006197-BLK1)				Prepared & Analyzed: 08/14/09						
Total Dissolved Solids	ND	10	mg/L							
Duplicate (B006197-DUP1)		**Source: 9081401-01**		Prepared & Analyzed: 08/14/09						
Total Dissolved Solids	335	10	mg/L		321			4	10	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
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110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 9082107
CLIENT'S PROJECT NAME: 6486.200.503
CLIENT'S PROJECT NUMBER: Sutter medical Center

RUSH

CLIENT INFORMATION

COMPANY NAME: ENGEO
ADDRESS: 2010 Crow Canyon pl. Suite 250 San Ramon, CA 94583
CONTACT: Brooks Ramsdell
PHONE#: 925-570-7782
FAX #: 888-279-2698

BILLING INFORMATION

CONTACT: Brooks Ramsdell
COMPANY NAME: ENGEO
ADDRESS: 2010 Crow Canyon place, Suite 250 San Ramon, CA 94583
PHONE#: 925-570-7782
FAX #: 888-279-2698

TURNAROUND TIME (check one)

SAME DAY ____
24 HOURS ____
48 HOURS X
72 HOURS ____
5 DAYS ____
NORMAL ____

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ____

COOLER TEMPERATURE ____ °C

COC

PAGE ____ OF ____

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	* Title 22												COMMENTS	LAB SAMPLE #
1	well #1	8-21-09	11:51			yes	X												9082107-01	
2	well #1	8-21-09	11:52			NO	X													
3																				
4																				
5																				
6																			* Plus	
7																			SO_4, TDS, Cl,	
8																			Silica	
9																				
10																				
11																				

SIGNATURES

SAMPLED BY: Jacob white

RELINQUISHED BY: [signature]
SIGNATURE
DATE 8-21-09 TIME 12:27

RECEIVED BY LABORATORY: [signature]
SIGNATURE
DATE 8-21-09 TIME 1227

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

August 26, 2009

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9082402 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Analytical Sciences

Report Date: August 26, 2009

Laboratory Report

Brooks Ramsdell
ENGEO
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Medical Center**	**6486.200.503**
Lab Project:	**9082402**	

This 5 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Antimony (Sb)	ND	5.0
		Arsenic (As)	6.2	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006202
Date Received:	08/24/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Aluminum (Al)	130	50
		Barium (Ba)	ND	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	ND	2.5
		Iron (Fe)	210	100
		Manganese (Mn)	1000	20
		Nickel (Ni)	ND	10

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	EPA 200.7 4x conc.	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Sodium (Na)	23	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006180
Date Received:	08/24/09	Method:	EPA 200.7	

Silica

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Silica (SiO_2)	69	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch:	B006180
Date Received:	08/24/09	Method:	EPA 200.7		

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Calcium (Ca)	19	5.0
		Magnesium (Mg)	14	1.0
		Hardness	100	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch:	B006180
Date Received:	08/24/09	Method:	SM 2340 B		

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9082402-01	**6486 Zone 3**	Mercury (Hg)	ND	0.20

Date Sampled:	08/22/09	Date Analyzed:	08/25/09	QC Batch:	B006199
Date Received:	08/24/09	Method:	EPA 245.1		

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9082402-01	**6486 Zone 3**	pH	6.92	1.00

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch:	B006237
Date Received:	08/24/09	Method:	SM 4500-H B		

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9082402-01	**6486 Zone 3**	Total Alkalinity	140	5.0
		Bicarbonate Alkalinity	140	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006224
Date Received:	08/24/09	Method:	SM 2320 B	

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Fluoride	0.10	0.10
		Chloride	14	0.40
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50
		Sulfate as SO4	8.4	0.50

Date Sampled:	08/22/09	Date Analyzed:	08/24/09	QC Batch: B006236
Date Received:	08/24/09	Method:	EPA 300.0	

Total Dissolved Solids

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9082402-01	**6486 Zone 3**	Total Dissolved Solids	100	10

Date Sampled:	08/22/09	Date Analyzed:	08/25/09	QC Batch: B006197
Date Received:	08/24/09	Method:	SM 2540 C	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Please Note: The drinking water Maximum Contamination Limits (MCL) set by the California Department of Health Services are as follows:

Arsenic (10 ug/L)
Iron (300 ug/L)
Manganese (50 ug/L)
Nitrate (45 mg/L)
Lead (15 ug/L)
Total Coliform (<1 MPN/100 mL)

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

LAB PROJECT NUMBER: 9082402
CLIENT'S PROJECT NAME: Sutter Medical Center
CLIENT'S PROJECT NUMBER:

CLIENT INFORMATION

COMPANY NAME: ENGEO, Inc
ADDRESS: 2010 Crow Canyon Pl Suite 250 San Ramon CA
CONTACT: Brooks Ramsdell
PHONE#: 925 570-7782
FAX #: 888 279-2698

BILLING INFORMATION

CONTACT: SAME
COMPANY NAME:
ADDRESS:
PHONE#:
FAX #:

RUSH

TURNAROUND TIME (check one)

SAME DAY ____
24 HOURS ____
48 HOURS X
72 HOURS ____
5 DAYS ____
NORMAL ____

GEOTRACKER EDF: ___Y X N
GLOBAL ID: ____

COOLER TEMPERATURE cool °C

COC

PAGE ___ OF ___

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO		Title 22 Primary	Secondary	TDS, Sulfate	Nitrate Silica								COMMENTS	LAB SAMPLE #
1	6486 Zone ~~2~~ 3	8/22/09	10:15		~~#~~	~~No~~		X	X	X	X								9082402	-01
2	6486 Zone ~~2~~ 3	8/22/09	10:15		2	Yes		~~X~~	~~X~~	~~X~~	~~X~~									
3																				
4																				
5																				
6																				
7																				
8																			see Job	
9																			9082107 for list	
10																				
11																				

SIGNATURES

SAMPLED BY: ____

RELINQUISHED BY: J. Brooks Ramsdell
SIGNATURE
8/24/09 DATE
10 Am. TIME

RECEIVED BY LABORATORY: Mark A. Valentine
SIGNATURE
8/24/09 DATE
10:00 TIME

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

October 19, 2009

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9101517 for your Sutter Well project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini, Ph.D.

Laboratory Director

P.O. Box 750336
Petaluma, CA 94975-0336
Telephone: (707) 769-3128

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

Report Date: October 19, 2009

Laboratory Report

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Well**	**6486.200.503**
Lab Project:	**9101517**	

This 3 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-01	**1**	Arsenic (As)	7.0	2.0

Date Sampled:	10/15/09	Date Analyzed:	10/19/09	QC Batch: B006500
Date Received:	10/15/09	Method:	EPA 200.9	

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-02	**2**	Arsenic (As)	4.3	2.0

Date Sampled:	10/15/09	Date Analyzed:	10/19/09	QC Batch: B006500
Date Received:	10/15/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-01	**1**	Manganese (Mn)	810	20

Date Sampled:	10/15/09	Date Analyzed:	10/16/09	QC Batch: B006443
Date Received:	10/15/09	Method:	EPA 200.7	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101517-02	**2**	Manganese (Mn)	850	20

Date Sampled:	10/15/09	Date Analyzed:	10/16/09	QC Batch: B006443
Date Received:	10/15/09	Method:	EPA 200.7	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Please Note: The drinking water Maximum Contamination Limits (MCL) set by the California Department of Health Services are as follows:

Arsenic (10 ug/L)
Iron (300 ug/L)
Manganese (50 ug/L)
Nitrate (45 mg/L)
Lead (15 ug/L)
Total Coliform (<1 MPN/100 mL)

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Petaluma, CA 94975-0336
Telephone: (707) 769-3128

Analytical Sciences
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(707) 769-3128

CHAIN OF CUSTODY

RUSH

LAB PROJECT NUMBER: 910517
CLIENT'S PROJECT NAME: Sutter Well
CLIENT'S PROJECT NUMBER: 6486.200.503

CLIENT INFORMATION

COMPANY NAME: ENGEO INC
ADDRESS: 2010 Crow Canyon PL
Suite 250
CONTACT: Brooks Ransdell
PHONE#: 925 570 7782
FAX #: 888 279 2698

BILLING INFORMATION

CONTACT: Brooks Ransdell
COMPANY NAME: SAME
ADDRESS:
PHONE#:
FAX #:

TURNAROUND TIME (check one)

SAME DAY ____
24 HOURS ____
48 HOURS X
72 HOURS ____
5 DAYS ____
NORMAL ____

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ____

COOLER TEMPERATURE
____ °C

COC

PAGE ___ OF ___

ANALYSIS

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO		Arsenic	Manganese											COMMENTS	LAB SAMPLE #
1	1	10-15	4p			N		X	X											910517-	01
2	2	10-15	4p			N		X	X											↓ -	02
3																					
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					

SIGNATURES

SAMPLED BY: Eric Grace

Scott – Confirmation sampling for Brooks + Shawn

RELINQUISHED BY: [signature]
SIGNATURE
DATE 10-15-09 TIME 4:55 p

RECEIVED BY LABORATORY: Gail Hellman
SIGNATURE
DATE 10/15/09 TIME 1655

110 Liberty Street
Petaluma, CA 94952

Analytical Sciences

November 12, 2009

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Dear Brooks,

Enclosed you will find Analytical Sciences' final report 9101207 for your Sutter Medical Center project. An invoice for this work is enclosed.

Should you or your client have any questions regarding this report please contact me at your convenience. We appreciate you selecting Analytical Sciences for this work and look forward to serving your analytical chemistry needs on projects in the future.

Sincerely,

Analytical Sciences

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Analytical Sciences

Report Date: November 12, 2009

Laboratory Report

Brooks Ramsdell
ENGEO, Inc.
2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583

Project Name:	**Sutter Medical Center**	**6486.200.503**
Lab Project:	**9101207**	

This 18 page report of analytical data has been reviewed and approved for release.

Mark A. Valentini

Mark A. Valentini, Ph.D.

Laboratory Director

Volatile Hydrocarbons by GC/MS

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Dichlorodifluoromethane (F-12)	ND	0.50
		Chloromethane	ND	0.50
		Vinyl chloride	ND	0.50
		Bromomethane	ND	0.50
		Chloroethane (CE)	ND	0.50
		Trichlorofluoromethane (F-11)	ND	0.50
		1,1-Dichloroethene (1,1-DCE)	ND	0.50
		Trichlorotrifluoroethane (F-113)	ND	0.50
		Methylene chloride	ND	0.50
		Carbon disulfide	ND	0.50
		trans-1,2-Dichloroethene	ND	0.50
		1,1-Dichloroethane (1,1-DCA)	ND	0.50
		cis-1,3-Dichloropropene	ND	0.50
		1,3-Dichloropropene	ND	0.50
		cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.50
		2,2-Dichloropropane	ND	0.50
		Chloroform (THM1)	ND	0.50
		Bromochloromethane	ND	0.50
		1,1,1-Trichloroethane (TCA)	ND	0.50
		1,2-Dichloroethane (EDC)	ND	0.50
		1,1-Dichloropropene	ND	0.50
		Carbon tetrachloride	ND	0.50
		Benzene	ND	0.50
		Trichloroethene (TCE)	ND	0.50
		1,2-Dichloropropane (DCP)	ND	0.50
		Dibromomethane	ND	0.50
		Bromodichloromethane (THM2)	ND	0.50
		Toluene	ND	0.50
		1,1,2-Trichloroethane	ND	0.50
		1,3-Dichloropropane	ND	0.50
		Dibromochloromethane (THM3)	ND	0.50
		Tetrachloroethene (PCE)	ND	0.50
		1,2-Dibromoethane (EDB)	ND	0.50
		Chlorobenzene	ND	0.50
		1,1,1,2-Tetrachloroethane	ND	0.50
		Ethylbenzene	ND	0.50
		m,p-Xylene	ND	0.50
		Styrene	ND	0.50
		o-Xylene	ND	0.50
		Bromoform (THM4)	ND	0.50
		1,1,2,2-Tetrachloroethane	ND	0.50
		Isopropylbenzene	ND	0.50
		1,2,3-Trichloropropane	ND	0.50
		Bromobenzene	ND	0.50
		n-Propyl Benzene	ND	0.50
		2-Chlorotoluene	ND	0.50
		4-Chlorotoluene	ND	0.50
		1,3,5-Trimethylbenzene	ND	0.50
		tert-Butylbenzene	ND	0.50

Volatile Hydrocarbons by GC/MS

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	1,2,4-Trimethylbenzene	ND	0.50
		sec-Butylbenzene	ND	0.50
		1,3-Dichlorobenzene	ND	0.50
		1,4-Dichlorobenzene	ND	0.50
		1,2-Dichlorobenzene	ND	0.50
		p-Isopropyltoluene	ND	0.50
		n-Butylbenzene	ND	0.50
		1,2-Dibromo-3-chloropropane	ND	0.50
		1,2,4-Trichlorobenzene	ND	0.50
		Naphthalene	ND	0.50
		Hexachlorobutadiene	ND	0.50
		1,2,3-Trichlorobenzene	ND	0.50
		Tertiary Butyl Alcohol (TBA)	ND	5.0
		Methyl tert-Butyl Ether (MTBE)	ND	0.50
		Di-isopropyl Ether (DIPE)	ND	0.50
		Ethyl tert-Butyl Ether (ETBE)	ND	0.50
		Tert-Amyl Methyl Ether (TAME)	ND	0.50

Surrogates	Result (µg/L)	% Recovery	Acceptance Range (%)
Bromofluorobenzene	10.4	104	70-130
1,2-Dichlorobenzene-d4	8.94	89	70-130

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006276
Date Received:	10/12/09	Method:	EPA 524.2	

Graphite Furnace Metals

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Antimony (Sb)	ND	5.0
		Arsenic (As)	9.5	2.0
		Selenium (Se)	ND	5.0
		Thallium (Tl)	ND	2.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006404
Date Received:	10/12/09	Method:	EPA 200.9	

Drinking Water Metals (ug/L)

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Aluminum (Al)	ND	50
		Barium (Ba)	ND	50
		Beryllium (Be)	ND	1.0
		Cadmium (Cd)	ND	1.0
		Chromium (Cr)	ND	2.5
		Iron (Fe)	ND	100
		Manganese (Mn)	870	20
		Nickel (Ni)	ND	10
		Zinc (Zn)	110	50

Date Sampled:	10/12/09	Date Analyzed:	11/12/09	QC Batch: B006443
Date Received:	10/12/09	Method:	EPA 200.7	

Drinking Water Metals (mg/L)

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Boron (B)	0.15	0.050
		Sodium (Na)	22	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006443
Date Received:	10/12/09	Method:	EPA 200.7	

Hardness

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Calcium (Ca)	16	5.0
		Magnesium (Mg)	13	1.0
		Hardness	92	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch: B006443
Date Received:	10/12/09	Method:	SM 2340 B	

Mercury

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Mercury (Hg)	ND	0.20

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch:	B006336
Date Received:	10/12/09	Method:	EPA 245.1		

pH

Lab#	Sample ID	Compound Name	Result (pH Units)	RDL (pH Units)
9101207-01	**1**	pH	6.95	1.00

Date Sampled:	10/12/09	Date Analyzed:	10/12/09	QC Batch:	B006424
Date Received:	10/12/09	Method:	SM 4500-H B		

Alkalinity

Lab#	Sample ID	Compound Name	Result (mg CaC03/L)	RDL (mg CaC03/L)
9101207-01	**1**	Total Alkalinity	140	5.0
		Bicarbonate Alkalinity	140	5.0
		Carbonate Alkalinity	ND	5.0
		Hydroxide Alkalinity	ND	5.0

Date Sampled:	10/12/09	Date Analyzed:	10/13/09	QC Batch:	B006358
Date Received:	10/12/09	Method:	SM 2320 B		

Anions

Lab#	Sample ID	Compound Name	Result (mg/L)	RDL (mg/L)
9101207-01	**1**	Fluoride	0.16	0.10
		Nitrite as N	ND	0.15
		Nitrate	ND	0.50

Date Sampled:	10/12/09	Date Analyzed:	10/12/09	QC Batch:	B006471
Date Received:	10/12/09	Method:	EPA 300.0		

Perchlorate

Lab#	Sample ID	Compound Name	Result (µg/L)	RDL (µg/L)
9101207-01	**1**	Perchlorate	ND	2.0

Date Sampled: 10/12/09		Date Analyzed: 10/13/09		QC Batch: B006481
Date Received: 10/12/09		Method: EPA 314.0		

Quality Assurance Report

Volatile Hydrocarbons by GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006276 - EPA 5030 GC/MS										
Blank (B006276-BLK1)				Prepared: 09/01/09 Analyzed: 09/04/09						
Dichlorodifluoromethane (F-12)	ND	0.50	µg/L							
Chloromethane	ND	0.50	µg/L							
Vinyl chloride	ND	0.50	µg/L							
Bromomethane	ND	0.50	µg/L							
Chloroethane (CE)	ND	0.50	µg/L							
Trichlorofluoromethane (F-11)	ND	0.50	µg/L							
1,1-Dichloroethene (1,1-DCE)	ND	0.50	µg/L							
Trichlorotrifluoroethane (F-113)	ND	0.50	µg/L							
Methylene chloride	ND	0.50	µg/L							
Carbon disulfide	ND	0.50	µg/L							
trans-1,2-Dichloroethene	ND	0.50	µg/L							
1,1-Dichloroethane (1,1-DCA)	ND	0.50	µg/L							
cis-1,3-Dichloropropene	ND	0.50	µg/L							
1,3-Dichloropropene	ND	0.50	µg/L							
cis-1,2-Dichloroethene (c1,2-DCE)	ND	0.50	µg/L							
2,2-Dichloropropane	ND	0.50	µg/L							
Chloroform (THM1)	ND	0.50	µg/L							
Bromochloromethane	ND	0.50	µg/L							
1,1,1-Trichloroethane (TCA)	ND	0.50	µg/L							
1,2-Dichloroethane (EDC)	ND	0.50	µg/L							
1,1-Dichloropropene	ND	0.50	µg/L							
Carbon tetrachloride	ND	0.50	µg/L							
Benzene	ND	0.50	µg/L							
Trichloroethene (TCE)	ND	0.50	µg/L							
1,2-Dichloropropane (DCP)	ND	0.50	µg/L							
Dibromomethane	ND	0.50	µg/L							
Bromodichloromethane (THM2)	ND	0.50	µg/L							
Toluene	ND	0.50	µg/L							
1,1,2-Trichloroethane	ND	0.50	µg/L							
1,3-Dichloropropane	ND	0.50	µg/L							
Dibromochloromethane (THM3)	ND	0.50	µg/L							
Tetrachloroethene (PCE)	ND	0.50	µg/L							
1,2-Dibromoethane (EDB)	ND	0.50	µg/L							
Chlorobenzene	ND	0.50	µg/L							
1,1,1,2-Tetrachloroethane	ND	0.50	µg/L							
Ethylbenzene	ND	0.50	µg/L							
m,p-Xylene	ND	0.50	µg/L							
Styrene	ND	0.50	µg/L							
o-Xylene	ND	0.50	µg/L							
Bromoform (THM4)	ND	0.50	µg/L							
1,1,2,2-Tetrachloroethane	ND	0.50	µg/L							

Volatile Hydrocarbons by GC/MS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006276 - EPA 5030 GC/MS										
Blank (B006276-BLK1)				Prepared: 09/01/09 Analyzed: 09/04/09						
Isopropylbenzene	ND	0.50	µg/L							
1,2,3-Trichloropropane	ND	0.50	µg/L							
Bromobenzene	ND	0.50	µg/L							
n-Propyl Benzene	ND	0.50	µg/L							
2-Chlorotoluene	ND	0.50	µg/L							
4-Chlorotoluene	ND	0.50	µg/L							
1,3,5-Trimethylbenzene	ND	0.50	µg/L							
tert-Butylbenzene	ND	0.50	µg/L							
1,2,4-Trimethylbenzene	ND	0.50	µg/L							
sec-Butylbenzene	ND	0.50	µg/L							
1,3-Dichlorobenzene	ND	0.50	µg/L							
1,4-Dichlorobenzene	ND	0.50	µg/L							
1,2-Dichlorobenzene	ND	0.50	µg/L							
p-Isopropyltoluene	ND	0.50	µg/L							
n-Butylbenzene	ND	0.50	µg/L							
1,2-Dibromo-3-chloropropane	ND	0.50	µg/L							
1,2,4-Trichlorobenzene	ND	0.50	µg/L							
Naphthalene	ND	0.50	µg/L							
Hexachlorobutadiene	ND	0.50	µg/L							
1,2,3-Trichlorobenzene	ND	0.50	µg/L							
Tertiary Butyl Alcohol (TBA)	ND	5.0	µg/L							
Methyl tert-Butyl Ether (MTBE)	ND	0.50	µg/L							
Di-isopropyl Ether (DIPE)	ND	0.50	µg/L							
Ethyl tert-Butyl Ether (ETBE)	ND	0.50	µg/L							
Tert-Amyl Methyl Ether (TAME)	ND	0.50	µg/L							
Surrogate: Bromofluorobenzene	*9.72*		*µg/L*	*10.0*		*97*	*70-130*			
Surrogate: 1,2-Dichlorobenzene-d4	*9.82*		*µg/L*	*10.0*		*98*	*70-130*			

Graphite Furnace Metals

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006404 - EPA 200.9										
Blank (B006404-BLK1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	ND	5.0	µg/L							
Arsenic (As)	ND	2.0	µg/L							
Selenium (Se)	ND	5.0	µg/L							
Thallium (Tl)	ND	2.0	µg/L							
LCS (B006404-BS1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	9.2	5.0	µg/L	10.0		92	85-115			
Arsenic (As)	9.9	2.0	µg/L	10.0		99	85-115			
Selenium (Se)	11.3	5.0	µg/L	10.0		113	85-115			
Thallium (Tl)	9.30	2.0	µg/L	10.0		93	85-115			
LCS Dup (B006404-BSD1)				Prepared: 09/28/09 Analyzed: 09/29/09						
Antimony (Sb)	9.4	5.0	µg/L	10.0		94	85-115	3	20	
Arsenic (As)	9.8	2.0	µg/L	10.0		98	85-115	1	20	
Selenium (Se)	11.0	5.0	µg/L	10.0		110	85-115	3	20	
Thallium (Tl)	9.90	2.0	µg/L	10.0		99	85-115	6	20	

Drinking Water Metals (ug/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	ND	50	µg/L							
Barium (Ba)	ND	50	µg/L							
Beryllium (Be)	ND	1.0	µg/L							
Cadmium (Cd)	ND	1.0	µg/L							
Chromium (Cr)	ND	2.5	µg/L							
Iron (Fe)	ND	100	µg/L							
Manganese (Mn)	ND	20	µg/L							
Nickel (Ni)	ND	40	µg/L							
Zinc (Zn)	ND	50	µg/L							
LCS (B006443-BS1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	470	50	µg/L	500		94	70-130			
Barium (Ba)	481	50	µg/L	500		96	70-130			
Beryllium (Be)	483	4.0	µg/L	500		97	70-130			
Cadmium (Cd)	472	4.0	µg/L	500		94	70-130			
Chromium (Cr)	455	10	µg/L	500		91	70-130			
Iron (Fe)	514	100	µg/L	500		103	70-130			
Manganese (Mn)	465	20	µg/L	500		93	70-130			
Nickel (Ni)	485	40	µg/L	500		97	70-130			
Zinc (Zn)	486	50	µg/L	500		97	80-120			
LCS Dup (B006443-BSD1)				Prepared & Analyzed: 10/05/09						
Aluminum (Al)	475	50	µg/L	500		95	70-130	1	20	
Barium (Ba)	485	50	µg/L	500		97	70-130	0.7	20	
Beryllium (Be)	482	4.0	µg/L	500		96	70-130	0.2	20	
Cadmium (Cd)	474	4.0	µg/L	500		95	70-130	0.3	20	
Chromium (Cr)	456	10	µg/L	500		91	70-130	0.1	20	
Iron (Fe)	514	100	µg/L	500		103	70-130	0.004	20	
Manganese (Mn)	466	20	µg/L	500		93	70-130	0.3	20	
Nickel (Ni)	486	40	µg/L	500		97	70-130	0.2	20	
Zinc (Zn)	485	50	µg/L	500		97	80-120	0.05	20	

Drinking Water Metals (mg/L)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	ND	0.050	mg/L							
Sodium (Na)	ND	0.10	mg/L							
LCS (B006443-BS1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	0.504	0.050	mg/L	0.500		101	70-130			
Sodium (Na)	0.427	0.10	mg/L	0.500		85	70-130			
LCS Dup (B006443-BSD1)				Prepared: 10/05/09 Analyzed: 10/20/09						
Boron (B)	0.498	0.050	mg/L	0.500		100	70-130	1	20	
Sodium (Na)	0.437	0.10	mg/L	0.500		87	70-130	2	20	

Hardness

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006443 - EPA 200.7										
Blank (B006443-BLK1)				Prepared & Analyzed: 10/05/09						
Calcium (Ca)	ND	5.0	mg/L							
Magnesium (Mg)	ND	1.0	mg/L							
Hardness	ND	5.0	mg/L							

Mercury

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006336 - EPA 7470A Prep										
Blank (B006336-BLK1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	ND	0.20	µg/L							
LCS (B006336-BS1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	7.00	0.20	µg/L	7.50		93	80-120			
LCS Dup (B006336-BSD1)				Prepared & Analyzed: 09/14/09						
Mercury (Hg)	7.75	0.20	µg/L	7.50		103	80-120	10	20	

pH

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006424 - NO PREP										
Duplicate (B006424-DUP1)		**Source: 9093005-01**		Prepared & Analyzed: 09/30/09						
pH	6.19	1.00	pH Units		6.11			1	15	

Alkalinity

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006358 - NO PREP										
Blank (B006358-BLK1)				Prepared: 09/17/09 Analyzed: 09/22/09						
Total Alkalinity	ND	5.0	mg CaC03/L							
Bicarbonate Alkalinity	ND	5.0	mg CaC03/L							
Carbonate Alkalinity	ND	5.0	mg CaC03/L							
Hydroxide Alkalinity	ND	5.0	mg CaC03/L							

Anions

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006471 - NO PREP										
Blank (B006471-BLK1)				Prepared & Analyzed: 10/09/09						
Fluoride	ND	0.10	mg/L							
Nitrite as N	ND	0.15	mg/L							
Nitrate	ND	0.50	mg/L							
Matrix Spike (B006471-MS1)		**Source: 9101301-01**		Prepared: 10/13/09	Analyzed: 10/14/09					
Fluoride	1.17	0.10	mg/L	1.00	ND	117	75-125			
Nitrite as N	0.380	0.15	mg/L	0.304	ND	125	75-125			
Nitrate	4.16	0.50	mg/L	4.00	0.220	98	75-125			
Matrix Spike Dup (B006471-MSD1)		**Source: 9101301-01**		Prepared: 10/13/09	Analyzed: 10/14/09					
Fluoride	1.08	0.10	mg/L	1.00	ND	108	75-125	8	20	
Nitrite as N	0.356	0.15	mg/L	0.304	ND	117	75-125	7	20	
Nitrate	4.14	0.50	mg/L	4.00	0.220	98	75-125	0.5	20	

Perchlorate

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B006481 - NO PREP										
Blank (B006481-BLK1)				Prepared & Analyzed: 10/13/09						
Perchlorate	ND	2.0	µg/L							
Matrix Spike (B006481-MS1)		**Source: 9101207-01**		Prepared & Analyzed: 10/13/09						
Perchlorate	9.13	2.0	µg/L	10.0	ND	91	80-120			
Matrix Spike Dup (B006481-MSD1)		**Source: 9101207-01**		Prepared & Analyzed: 10/13/09						
Perchlorate	9.03	2.0	µg/L	10.0	ND	90	80-120	1	20	

Notes and Definitions

RDL	Reporting Detection Limit
ND	Analyte NOT DETECTED at or above the reporting detection limit (RDL)
RPD	Relative Percent Difference
NR	Not Reported

Analytical Sciences
P.O. Box 750336, Petaluma, CA 94975-0336
110 Liberty Street, Petaluma, CA 94952
(707) 769-3128

CHAIN OF CUSTODY

RUSH

LAB PROJECT NUMBER: 9101207
CLIENT'S PROJECT NAME: 6486.208.503
CLIENT'S PROJECT NUMBER: Sutter medical center

CLIENT INFORMATION	
COMPANY NAME:	ENGEO
ADDRESS:	2010 crow Canyon place Suite 250 San Ramon, CA
CONTACT:	Brooks Ramsdell
PHONE#:	925-520-7782
FAX #:	

BILLING INFORMATION	
CONTACT:	
COMPANY NAME:	SAME
ADDRESS:	
PHONE#:	
FAX #:	

TURNAROUND TIME (check one)

SAME DAY	___		
24 HOURS	___		
48 HOURS	X	5 DAYS	___
72 HOURS	___	NORMAL	___

GEOTRACKER EDF: ___Y ___N
GLOBAL ID: ___

COOLER TEMPERATURE
___ °C

COC

PAGE ___ OF ___

ANALYSIS *

ITEM	CLIENT SAMPLE I.D.	DATE SAMPLED	TIME	MATRIX	# CONT.	PRESV. YES/NO	Al, Sb, As, Ba, Be, Cd, Cr	F, Hg, Ni, Se, Tl	Perchlorate	Asbestos, NO3, NO2 as N	Fe, Mn, Na, Alk, Hardness	pH, Gross Alpha	524	525, 515	505	Zinc, Boron				COMMENTS	LAB SAMPLE #
1	1	10-12-09	10am				X	X	X	X	X	X	X	X	X	X				15 Bottles	9101207-01
2	Trip Blank	10/12/09																			↓ -02
3																					
4																					
5																					
6																				Asbestos	
7																				Gross Alpha	
8																				525, 515	
9																				505 on	
10																				standard	
11																				TAT	

SIGNATURES * added per Brooks 11/10/09 STAT

SAMPLED BY: Brooks Ramsdell

RELINQUISHED BY:			RECEIVED BY LABORATORY:		
[signature]	10-12-09		[signature]	10-12-09	1425
SIGNATURE	DATE	TIME	SIGNATURE	DATE	TIME

APPENDIX I

NOISE TECHNICAL REPORTS

Appendix I1

Environmental Noise Assessment
Sutter Hospital

ENVIRONMENTAL NOISE ASSESSMENT
SUTTER HOSPITAL /
LUTHER BURBANK MEMORIAL FOUNDATION
MASTER PLAN
SANTA ROSA, CALIFORNIA
5th DRAFT

April 16, 2009
Updated July 21, 2009

◆ ◆ ◆

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Job No. 04-135

INTRODUCTION

This report presents the results of the noise impact assessment conducted for the proposed Sutter Hospital/Luther Burbank Memorial Foundation Master Plan project in Sonoma County, California. The project site is located at the southeast quadrant of the Mark West Springs Road/ Highway 101 interchange and is shown in Figure 1. This assessment presents the fundamentals of environmental noise, provides a discussion of policies and standards applicable to the project, presents the results of a noise monitoring survey conducted at the site, and provides an evaluation of the potential for significant noise impacts resulting from the proposed project. This assessment addresses noise impacts associated with; (1) traffic noise increases on the local street systems, (2) the noise generated by onsite mechanical equipment at the new central plant and medical center buildings, and parking, (3) helicopter flights to-and-from the proposed emergency helistop, and (4) the construction of the Medical Center.

FIGURE 1: PROJECT SITE PLAN

FUNDAMENTAL CONCEPTS OF ENVIRONMENTAL ACOUSTICS

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its loudness. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (frequency) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is amplitude of sound waves combined with the reception characteristics of the ear. Amplitude may be compared with the height of an ocean wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales that are used to describe noise in a particular location. *A decibel (dB)* is a unit of measurement, which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its level. Humans do not perceive sound in *absolute* terms but instead they hear sounds *relative* to the background, or ambient, sound environment, whether transient or continuous. Under controlled listening test, humans have been shown to judge a 10 dB increase in sound levels in the mid to high frequencies to represent an approximate doubling or halving of the loudness of a sound. In these tests a 6 dB change was perceived to be a "noticeable" change and a 3 dB change to be just perceptible. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level or dBA.* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This energy-equivalent sound/noise descriptor is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level, CNEL,* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level, L_{dn},* is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity; above 35 dBA, and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12-17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Therefore the 45 dBA L_{dn} interior residential standard may be exceeded with exterior noise levels between 57-62 dBA L_{dn} with open windows and 65-70 dBA

L_{dn} if the windows are closed. Levels of 55-60 dBA are common along collector streets and secondary arterials, while 65-70 dBA is a typical value for a primary/major arterial. Levels between 75-80 dBA are normal at the first row of development outside a freeway right-of-way.

Table 1 Definitions of Acoustical Terms Used in this Report

	Definitions
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, Leq	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn}	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: ILLINGWORTH & RODKIN, INC./Acoustical Engineers

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise.

Table 2 Typical Noise Levels in the Environment

		Common Indoor Noise Source
	120 dBA	
Jet fly-over at 300 meters		Rock concert
	110 dBA	
Pile driver at 20 meters	100 dBA	
		Night club with live music
	90 dBA	
Large truck pass by at 15 meters		
	80 dBA	Noisy restaurant
		Garbage disposal at 1 meter
Gas lawn mower at 30 meters	70 dBA	Vacuum cleaner at 3 meters
Commercial/Urban area daytime		Normal speech at 1 meter
Suburban expressway at 90 meters	60 dBA	
Suburban daytime		Active office environment
	50 dBA	
Urban area nighttime		Quiet office environment
	40 dBA	
Suburban nighttime		
Quiet rural areas	30 dBA	Library
		Quiet bedroom at night
Wilderness area	20 dBA	
	10 dBA	Quiet recording studio
Threshold of human hearing	0 dBA	Threshold of human hearing

Source: ILLINGWORTH & RODKIN, INC./Acoustical Engineers

There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 55 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 2 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 12 percent of the population. There is, therefore, an increase of about 1 percent per dBA between an L_{dn} of 60-70 dBA. Between an L_{dn} of 70-80 dBA, each decibel increase increases by about 2 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 10 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 2 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 3 percent increase in the percentage of the population highly annoyed.

REGULATORY CRITERIA

Regulatory criteria that would be applicable to the proposed project would include guidelines, goals, policies, and standards established by the State of California and Sonoma County. The State CEQA guidelines pose questions to assist decision-makers in assessing the potential for significant impacts resulting from planned projects. The State Building Code and the Sonoma County Noise Element establish quantifiable noise levels deemed acceptable for a specified land use. The State Aeronautics Act and California Airport Noise Regulations also regulate noise exposure from special-use helistops at hospitals.

State CEQA Guidelines

The California Environmental Quality Act (CEQA) contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. CEQA asks whether the proposed project would result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance, or applicable standards of other agencies?
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

CEQA does not define what noise level increase would be considered substantial. Typically, in high noise environments, if the L_{dn} due to the project would increase by more than 3 dBA at noise-sensitive receptors, the impact would be considered significant. Where the existing noise level is lower, a somewhat higher increase can be tolerated before significance occurs.

State Building Code

The interior noise environment inside hospital patient rooms is subject to the environmental noise standards set forth in Appendix Chapter 35 sec. 3501 of the California State Building Code (Part 2, Title 24,CCR). The purpose of the regulations as stated therein is to establish uniform minimum noise insulation performance standards to protect persons within new hotels, motels, dormitories, long-term care facilities, apartment houses, and dwellings, other than detached single-family dwellings from the effects of excessive noise, including but not limited to, hearing loss or impairment and interference with speech and sleep.

Multi-family residential structures located in noise-critical areas, such as proximity to highways, county roads, or city streets, shall be designed to prevent the intrusion of exterior noises beyond prescribed levels. The allowable interior noise level attributable to exterior sources shall not exceed 45 dBA in any habitable room. The noise metric shall be either the day/night average noise level (L_{dn}) or the community noise equivalent level (CNEL) consistent with the Noise Element of the local General Plan.

<u>Sonoma County Noise Element</u>

The Sonoma County Noise Element of the 2020 General Plan identifies a goal to:

> *"Protect people from the adverse effects of exposure to excessive noise and to achieve an environment in which people and land uses function without impairment from noise."*

The following policies, which are applicable for use at the subject project, are intended to achieve this goal;

NE-1a: Designate areas within Sonoma County as Noise Impacted if they are exposed to existing or projected exterior noise levels exceeding 60 dBA L_{dn}, 60 dBA CNEL, or the performance standards of Table NE-2.

Table NE-2: Maximum Allowable Exterior Noise Exposures for Non-transportation Sources

Hourly Noise Metric[1]	Maximum Exterior Noise Level Standards, dBA	
	Daytime 7 AM to 10 PM	Nighttime 10 PM to 7 AM
L_{50} (30 minutes in any hour)	50	45
L_{25} (15 minutes in any hour)	55	50
L_{08} (5 minutes in any hour)	60	55
L_{02} (1 minute in any hour)	65	60

[1] The sound level exceeded n% of the time in any hour. For example, the L_{50} is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L_{02} is the sound level exceeded 1 minute in any hour.

NE-1b: Avoid noise sensitive land use development in noise impacted areas unless effective measures are included to reduce noise levels. For noise due to traffic on public roadways, railroads, and airports, reduce exterior noise to 60 dB Ldn or less in outdoor activity areas and interior noise levels to 45 dB Ldn or less with windows and doors closed. Where it is not possible to meet this 60 dB Ldn standard using a practical application of the best available noise reduction technology, a maximum level of up to 65 dB Ldn may be allowed provided that the interior noise level shall be maintained so as not to exceed 45 dB Ldn.

NE-1c: Control non-transportation related noise from new projects. The total noise level resulting from new sources shall not exceed the standards in Table NE-2 of the recommended revised policies as measured at the exterior property line of any adjacent noise sensitive land use. Limit exceptions to the following:

(1) If the ambient noise level exceeds the standard in Table NE-2, adjust the standard to equal the ambient level, up to a maximum of 5dBA above the standard, provided that no measurable increase (i.e. +/- 1.5 dBA) shall be allowed.

(2) Reduce the applicable standards in Table NE-2 by five dBA. for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises, such as pile drivers and dog barking at kennels.

(3) Reduce the applicable standards in Table NE-2 by 5 decibels if the proposed use exceeds the ambient level by 10 or more decibels.

(4) For short-term noise sources, which are permitted to operate no more than six days per year, such as concerts or race events, the allowable noise exposures shown in Table NE-2 may be increased by 5 dB. These events shall be subject to a noise management

plan including provisions for maximum noise level limits, noise monitoring, complaint response and allowable hours of operation. The plan shall address potential cumulative noise impacts from all events in the area.

(5) Noise levels may be measured at the location of the outdoor activity area of the noise sensitive land use, instead of at the exterior property line of the adjacent noise sensitive use where:
   (a) the property on which the noise sensitive use is located has already been substantially developed pursuant to its existing zoning, and
   (b) there is available open land on these noise sensitive lands for noise attenuation.

This exception may not be used on vacant properties, which are zoned to allow noise sensitive uses.

California Airport Noise Regulations

Section 5006, Title 21, Division 2.5, Chapter 6 of the California Code of Regulations establishes the level of noise acceptable to a 'reasonable' person at a CNEL of 65 dB and identifies the following types of land uses as incompatible with a noise level of 65 dB CNEL or greater:

- Residences of all types;
- Public or private schools;
- Hospitals and convalescent homes

State Aeronautics Act

The State Aeronautics Act (Public Utilities Code Sections 21001 et seq.) covers a range of aeronautical issues governed by the State of California. It references the California Airport Noise Regulations (above) and the California Department of Transportation Airport Land Use Planning Handbook regarding noise issues. The Act also specifically exempts individual emergency aircraft flights from restrictions on time of departure and arrival as described below.

Section 21662.4(a) of the State Aeronautics Act titled "Emergency Flights for Medical Purposes" states that;

> "Emergency aircraft flights for medical purposes by law enforcement, fire fighting, military, or other persons who provide emergency flights for medical purposes are exempt from local ordinances adopted by a city, county, or city and county, whether general law or chartered, that restrict flight departures and arrivals to particular hours of the day or night, that restrict the departure or arrival of aircraft based upon the aircraft's noise level, or that restrict the operation of certain types of aircraft."

Single Event Noise Exposures and Sleep Disturbance (Awakenings)

The State of California and Sonoma County typical use a noise descriptor based on average day/night levels (L_{dn} or CNEL) when judging the compatibility of noise with various land-uses. The L_{dn}/CNEL metric includes a penalty for noises that occur during the nighttime and evening hours and has proven to be an excellent indicator of potential adverse community response in cases where the dominant noise source is highway or major roadway noise. However, in cases where the noise environment is composed of relatively infrequent high noise level events, such as in the vicinity of an emergency helistop, the L_{dn}/CNEL descriptor has a tendency to average out the effect that high noise level events can have in terms of sleep disturbance and annoyance. The compatibility of the proposed project has, therefore, been evaluated against supplemental sleep disturbance criteria recommended by the Federal Interagency Committee on Aviation

Noise (FICAN) in the December 2008 finding titled, "FICAN Recommendation for use of ANSI Standard to Predict Awakenings from Aircraft Noise"[1]. In this finding FICAN recommends the use of the American National Standards Institute (ANSI) standard S12.9-2008, Quantities and Procedures for Description and Measurement of Environmental Sound - Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes to predict behavioral awakenings from aircraft noise. ANSI S12.9-2008 Part 6 provides a method to predict sleep disturbance in terms of percent awakenings or numbers of people awakened associated with noise levels in terms of indoor A-weighted sound exposure level (ASEL) and also enables the estimation of awakenings from an entire night of noise events as follows:

- The probability that a person of average sensitivity will be awakened by a single noise event is given by the formula $P_{A,single} = 1/(1+e^{-z})$, (1)
  where Z= -6.884+0.04444*L_{AE}, and L_{AE} represents the indoor ASEL of an outdoor single noise event.
- The probability that this person of average sensitivity will be awakened by a single noise event as a function of both the single-event indoor ASEL and the time since retiring is given by the formula $P_{A,single} = 1/(1+e^{-z})$, (2)
  where Z= -7.594+0.04444*L_{AE} + 0.00336T_{retire}, and T_{retire} is the time in minutes since retiring
- The probability of Not awakening at least once to the sound from distributions of single noise events is given by the formula, $P_{NptA,N} = (1-P_{A,single})^N$ (3)
  where $P_{A,i}$ is the probability of being awakened by the *i*th event as found in the proceeding equations.

Using equation (1) shows that there would be a less than 5% probability of awakening from a single event, which produces a single indoor ASEL level of 85 dB or less. However, using equation (2) for an indoor ASEL of 85 dB shows that if the event occurs more than four hours after retiring the probability of awakening begins to increase beyond 5%. Further use of this equation shows that an indoor ASEL of 78 dB or less will result in the probability of awakening remaining at or below 5% as long as the event occurs within 6 hours of the time since retiring with a maximum probability of awakening of 6% an entire seven-hour night of sleep[2]. Also, using the relationship of the number of noise events in a single nighttime period as given in equation (3) it can be seen that with two noise events evenly distributed over a single night an indoor ASEL of 78 dB or less continues to result in the probability of awakening remaining at or below 6%, with one flight per night at an indoor ASEL of 78 dB or less resulting in the probability of awakening remaining at or below 3%. Because of its expected project use (see discussion on pages 11 & 12), the average nighttime usage of the proposed helistop is projected to be less than one flight per night, however a worst-case condition could be two flights per night.

Based on the above, we have established an indoor ASEL of 78 dB as the sound level at which helicopter noise would begin to significantly affect the sleep of residents in the surrounding community. As noted in the Fundamental Concepts of Environmental Acoustics section at the beginning of this report, typical wood framed residential structures provide exterior to interior noise attenuation of 12 to 17 dBA with open windows and around 20 to 25 dBA with closed windows. With the lower range of exterior to interior residential structural attention (i.e. 12 dB

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[1] Available at http://www.fican.org/pdf/Final_Sleep_Dec2008.pdf
[2] ANSI S12.9-2008 Part 6 considers that adults typically sleep for an average of 7 hours per night.

with open windows and 20 dB with closed windows) exterior ASEL levels of 90 and 98 dB would produce respective interior SEL levels of 78 dB with open and closed windows. Because there are no recognized thresholds of significance regarding number of persons awakened by helicopter operations and data to allow calculations of the number of residents who may be awakened by such events is unavailable for this study, the use of the 90 dB exterior ASEL contour is judged to be a good predictor of areas exposed to a heightened degree of potential sleep disturbance during helicopter operations in the worst-case condition with windows open.

EXISTING NOISE ENVIRONMENT

A noise monitoring survey was conducted from Tuesday, November 2, 2004 to Wednesday, November 3, 2004 to establish existing noise levels in the project vicinity. Environmental noise was measured at three locations in the project study area. The first location was selected to quantify existing noise levels generated by Highway 101 at the approximate setback of the proposed hospital. The second and third noise measurement locations were selected to represent the noise environment at residential land uses in the immediate vicinity of the project site. The locations of these noise measurements are shown on Figure 3, and the data charts for these measurements are presented in Appendix A of this report.

Measurement Location LT-1 was selected to characterize the existing noise environment at the approximate setback of the proposed hospital building. Noise measured at this site resulted primarily from vehicular traffic along Highway 101, and the measured day-night average noise level was 70 L_{dn} (Chart 1, Appendix A). Hourly average noise levels during the daytime (7 a.m. to 10 p.m.) were typically 64 - 68 dBA $L_{eq.}$ During the night (10 p.m. to 7 a.m.), hourly average noise levels were generally 56 to 68 dBA $L_{eq.}$

Noise measurement LT-2 was conducted at the easternmost property line of the site adjacent to residential uses accessed from Darbster Place. Noise levels measured at this site were predominantly the result of vehicular traffic along Highway 101. Typical hourly average noise levels ranged form 55-59 dBA during the daytime and dropped to a minimum level of 48 dBA L_{eq} during the middle of the night (Chart 2, Appendix A). The calculated day-night average noise level at this location was 61 dBA.

The daily trend in noise levels was also measured at a position north of the project site along Lavell Road. Noise levels measured at this site were primarily the result of local and distant vehicular traffic. Chart 3 (Appendix A) summarizes the noise data collected at measurement location LT-3. Hourly average noise levels ranged from as low as 52 dBA L_{eq} at 3 a.m. to 65 to 70 dBA L_{eq} throughout the majority of the day. The calculated L_{dn} noise level at this measurement position was 69 dBA.

FIGURE 3: EXISTING SITE PLAN WITH NOISE MEASUREMENT LOCATIONS

FUTURE NOISE ENVIRONMENT

<u>Traffic Noise</u>

Based on a review of existing, background, and future project traffic volumes for the area roadways shown in the Dowling Associates, Inc traffic study for the project, the following conclusions related to noise level increases on area roadways can be made (See Appendix B for traffic data and calculations);

1. Future traffic noise levels without the project are anticipated to increase by 1 to 3 dBA L_{dn} on area roadways as a result of anticipated growth excluding the project.
2. Project generated traffic would further increase noise levels on these area roadways by up to 2 dBA L_{dn}.

Central Plant Mechanical Equipment Operational Noise

Typical hospital and medical office building mechanical equipment could include chillers, cooling towers, hot water boilers, medical vacuum pump(s), compressor(s), and emergency power generator(s). With the exception of the cooling towers, all of this equipment is usually contained within a central plant building structure. Considering typical manufacturers sound power level ratings for such equipment of less than 80 dBA, that the interior to exterior noise reduction for closed buildings using common building techniques is typically greater than 20 dBA (refer to discussion in the 'Fundamental Concepts of Environmental Acoustics' section above), and that the proposed location of the Central Plant is over 300 feet from the nearest residential property line, and that the expected placement of cooling towers and other mechanical equipment, not in the central plant, on the building rooftops where they would receive noise shielding from the building edge and or parapet walls, the expected noise levels from all hospital mechanical equipment can be expected to produce noise levels at the nearest residential property line below 45 dBA.

Emergency Helistop Operational Noise

Helicopter noise has it's own distinct character. Although a portion of the noise emanates from the engines themselves, the distinctness of helicopter noise is largely due to the modulation of sound created by the relatively slow turning main rotor. This sound modulation is referred to as blade slap. Blade slap is most pronounced during low speed descents and high-speed cruise.

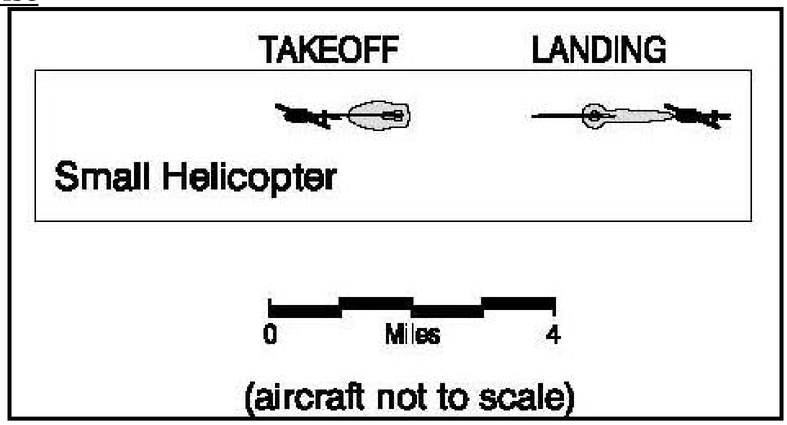

FIGURE 3: Typical Helicopter Noise footprint

To the ground observer helicopters are most audible as the aircraft approaches a landing area. Figure 4 shows 65 and 75 dBA maximum instantaneous noise level ground contours for a typical small helicopter on takeoff and landing.

Average Noise Exposure

The emergency Helistop is proposed be located at ground level between the Sutter Medical Center Building and Highway 101 (see Figure 1). The proposed helistop would take over operations from the current emergency helistop site. Based on the current level of helicopter operations an average of 20 flights per month may be expected for the helistop. The primary helicopter model expected to utilize the helistop is the Bell model B222[3]. Over the last 3 years (2006,2007,and 2008) the helistop at the Sutter Medical Center had an average of 200 yearly flights (one flight = 1 roundtrip = 1 landing and 1 take off). This analysis is based on conservative worst-case scenario with an increase of 20% in annual flights at the helistop for the year 2021 (the project's foreseeable future).

To determine the expected noise levels produced by helicopter operations on the site and in its

[3] Draft Heliport Design Report, Mead & Hunt, January 2009, Page 4.

vicinity, the Federal Aviation Administration's (FAA) Integrated Noise Model (INM) version 7.0a was used to establish current ground level noise contours for an expected (or worst case) future scenario of 240 annual (20 monthly) flights at the helistop[4], based on up to 13% of the helicopter trips occurring during the evening and 37% during the nighttime hours, the proposed primary ground tracks[5], 75% of the flights approaching from the north and departing to the south, a Bell model B222 helicopter with standard configuration (i.e. Noise-Power-Distance [NPD] curves, rotor speeds, etc.) as provided in the INM model, and the takeoff and departure profiles shown in Figures 4a and 4b.

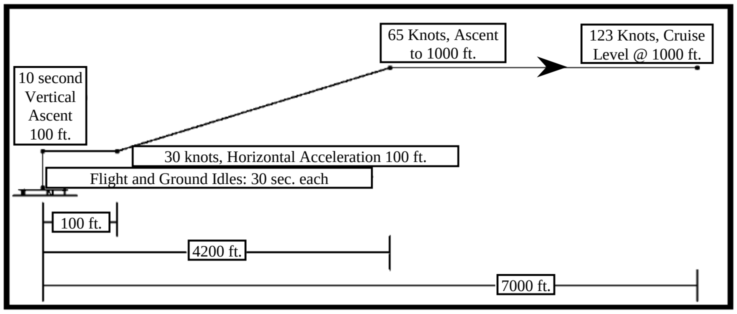

Figure 4a: Typical Departure Profile

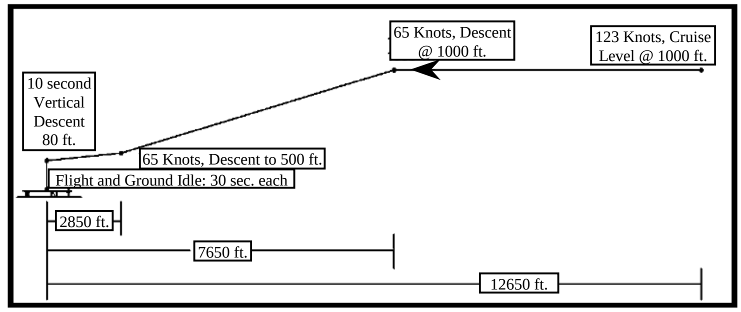

Figure 4b: Typical Approach Profile

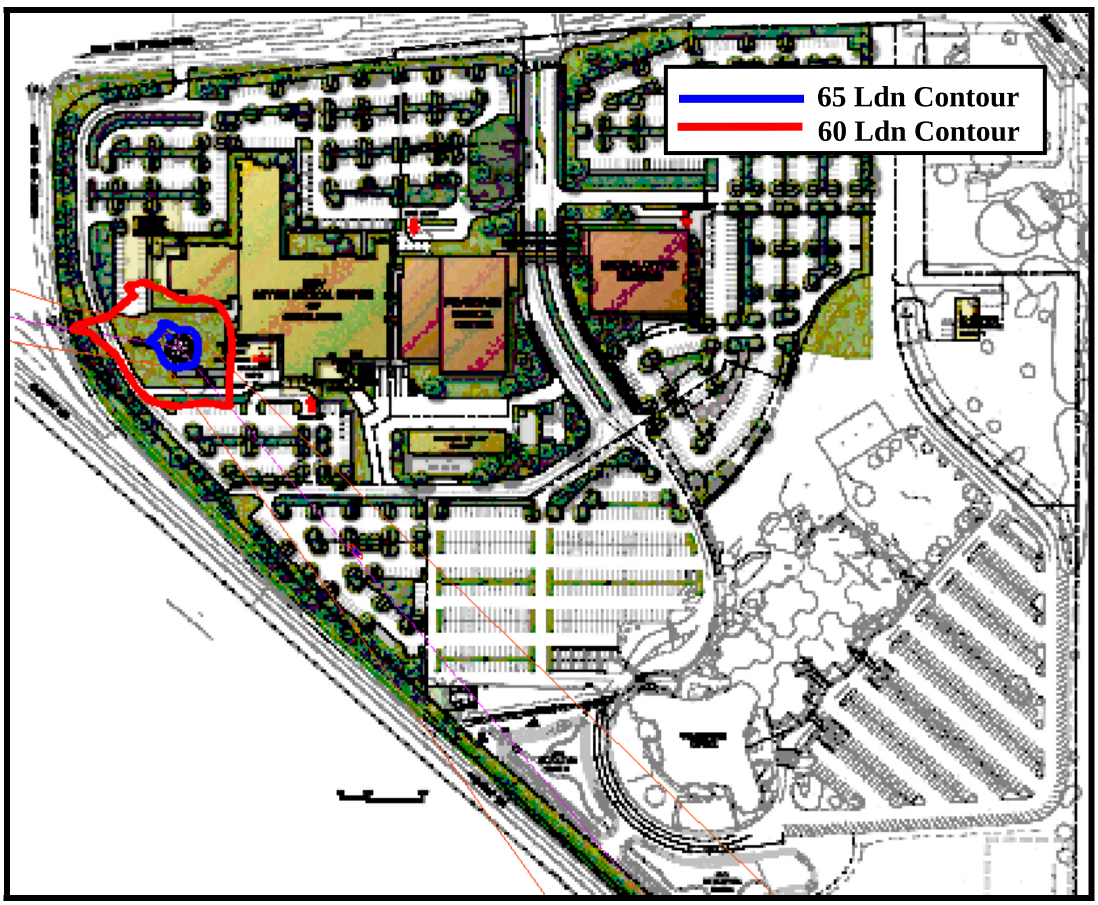

FIGURE 5: 60 AND 65 dBA L_{dn} HELISTOP FUTURE NOISE CONTOURS

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[4] Draft Heliport Design Report, Mead & Hunt, January 2009, Page 3.

[5] The ground tracks of the northern and southern approaches and departures are shown under the Ldn and SEL contours in Figures 5 and 6 **.**

The 60 and 65 dBA L_{dn} ground level contours for operations using the INM model output are shown overlaying the proposed Medical Center site plan in Figure 5. Based on the modeling results the 65 dBA L_{dn} contour would not extend beyond the landscaped area surrounding the helistop pad, and the 60 dBA L_{dn} contour would just meet to southern façade of the Medical Center immediately noise of the helistop.

Maximum Noise Exposure and Sleep Disturbance

To determine the worst-case noise exposure at residential uses under the proposed approach and departure paths, the ASEL during a single combined takeoff and landing of an Bell 222 helicopter (the design helicopter for the helistop) was modeled with INM 7.0a both for an operation involving an approach from the north and departure to the south and an operation involving an approach from the south and departure to the north. The extent of the 90 dBA ASEL ground level contours for north-to-south & south-to-north flight operations are shown in Figure 6.

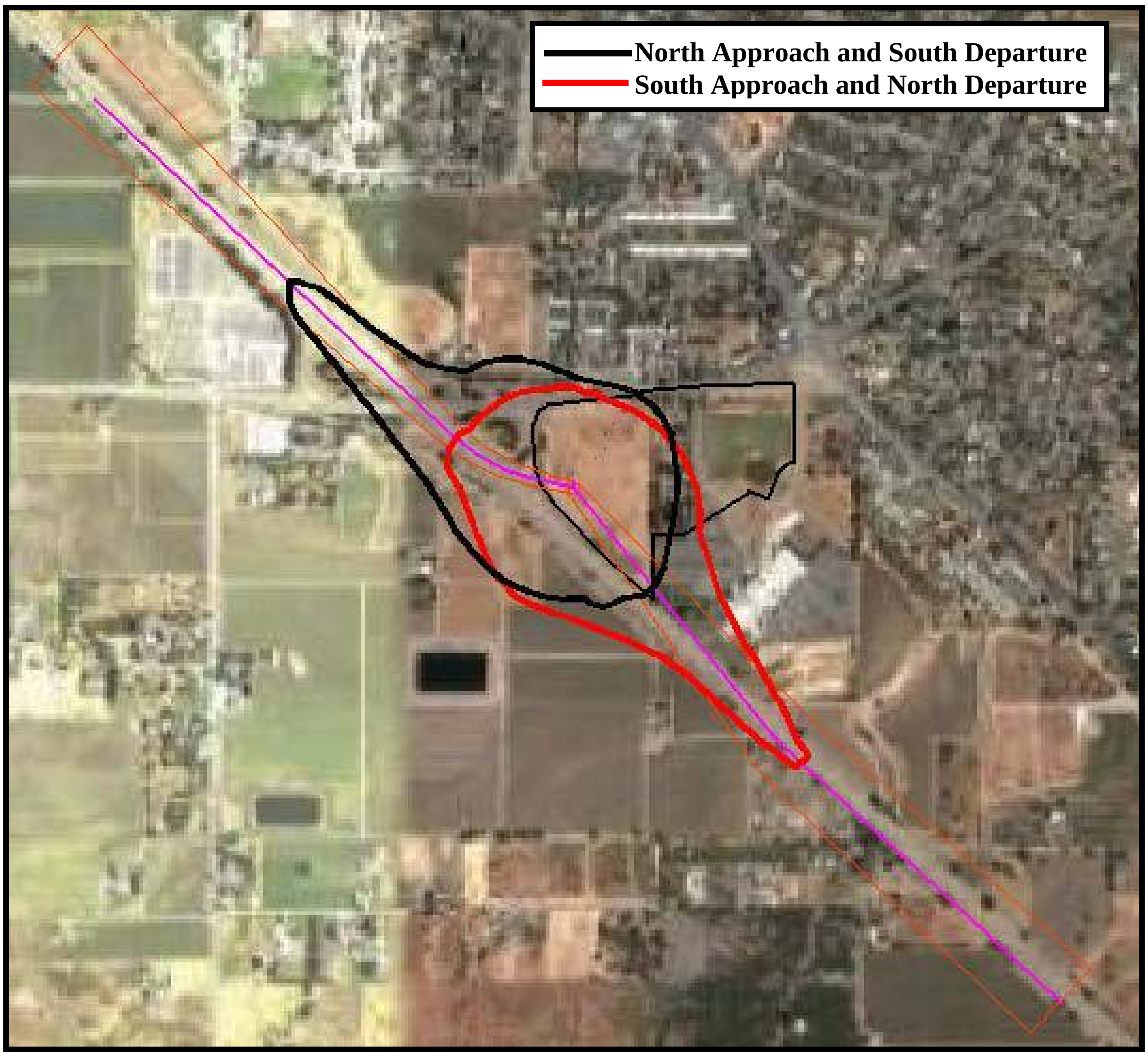


Figure 6: 90 dBA SEL contours for north-to-south and south-to-north flight

NOISE IMPACTS AND MITIGATION MEASURES

Significance Criteria

1. A significant impact would be identified for existing uses on the project site or land uses adjacent to the project, if they would be exposed to noise levels exceeding the noise and land use compatibility guidelines established in the Noise Element of the Sonoma County General Plan.
2. The project would be exposed to or generate excessive groundborne vibration,
3. According to CEQA, a significant noise impact would result if noise levels increase substantially at noise-sensitive land uses (e.g., residences). A substantial increase to noise levels would occur if the project resulted in an increase of 3 dBA or greater[6] at noise-sensitive land uses where noise levels already exceed 60 dBA L_{dn}.
4. A significant local impact can be identified for existing uses near the project if they would be exposed to a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project. A substantial periodic increase is judged to occur if the operation of the project results in awakening or annoyance rates of greater than 6% of the people in residences, hospitals, day care, convalescent homes in the project vicinity. Based on the sleep disturbance prediction methods from ANSI standard S12.9-2008 Part 6, the 90 dB exterior ASEL contour is judged to be a good predictor of areas within which a heightened degree of sleep disturbance during helicopter operations would be experienced.
5. Construction noise levels would be treated somewhat differently because they are temporary. Significant noise impacts could result from construction if noise levels are sufficiently high to interfere with speech, sleep, or normal residential activities. Construction-related hourly average noise levels received at noise-sensitive land uses above 70 dBA during the daytime and 55 dBA at night would be considered significant if the construction phase lasted more than 12 months.

Impact 1: Noise and Land Use Compatibility. Development proposed as part of the project would be exposed to noise levels exceeding local thresholds for acceptability. **This is a significant impact.**

The entire project site is exposed to noise levels exceeding 60 dBA L_{dn}, the Sonoma County threshold of acceptability for noise-sensitive development. The highest noise levels occur along the Highway 101 frontage where the existing noise exposure level at the approximate setback of the proposed hospital is about 70 dBA L_{dn}. According to the General Plan, noise-sensitive developments are considered acceptable where exterior noise levels are 60 dBA L_{dn}. The site plan for the proposed project includes many outdoor areas that are sheltered from perimeter vehicular traffic noise by the buildings themselves. The site plan, therefore, does reduce noise exposure levels in some of the proposed common outdoor activity areas to below the 60 dBA L_{dn} threshold.

The maximum allowable interior noise level for a noise-sensitive use resulting from environmental noise sources is 45 dBA L_{dn}. Standard construction methods for hospitals includes air-conditioning. The building typically provides approximately 25 to 30 dBA of noise reduction when going from outside to inside when the windows are assumed to be closed. Because the noise exposure levels are approximately 70 dBA L_{dn} or higher at the facade of the

[6] As discussed in the section of this report entitled "Fundamental Concepts of Environmental Acoustics" a 3 dB increase in sound levels with similar acoustic qualities is judged to be a perceptible difference in sound.

proposed hospital building, there is the potential for interior levels to exceed the interior noise limit with windows closed for noise control.

Mitigation 1:

- As the site plan develops, continue to utilize building massing to shield outdoor activity areas from traffic noise. Encourage the development of these common outdoor activity areas within the acoustically sheltered portions of the site.
- Incorporate sound insulation treatments into the buildings so as to achieve an interior L_{dn} of 45 dBA or less with windows closed. Such treatments may include, but would not be limited to acoustically rated windows and doors, acoustical caulking at all exterior wall penetrations and noise control treatments for all air transmission paths associated with mechanical ventilation systems. An acoustical analysis of the project's design and the preparation of a report detailing the necessary noise reduction features shall be completed during the project design.

After Mitigation: *Less than Significant*
With the implementation of the above measures should be effective in reducing outdoor use area and interior noise levels to allow compliance with County and State noise standards.

Impact 2: Groundborne Vibration. There are no existing sources of groundborne vibration that affects the proposed development of the project. Though not planned at this time, construction activities may include driven piles using an impact hammer. Pile driving can generate perceptible groundborne vibration levels within 25-50 feet of the pile driving activity. No vibration sensitive receptors, either on- or off-site, are located within 50 feet of where pile driving could occur, and thus any pile driving would be imperceptible at the closest adjacent structures. **This is a less-than-significant impact.**

Mitigation 2: None required.

Impact 3: Vehicular Traffic. The project would increase vehicle trips along roadways used to access the project site. Traffic resulting from the operation of the project would increase noise levels by up to 2 dBA L_{dn}. **This is a less-than-significant impact.**
As discussed previously the relative noise level increases resulting from non-emergency vehicle trips would increase noise levels adjacent to area roadways by 2 dBA or less. This increase would less than the 3 dB significance criteria, and below the typical limit of perceptibility. Based this, such an increase is not considered to be a significant increase in noise.

Mitigation 3: None required.

Impact 4: Hospital Mechanical Equipment operational noise impacts. With proper design noise resulting from operations of the Central Plant is expected to be below ambient noise levels at sensitive receptors. **This is a potentially significant impact.**
As discussed previously the expected noise levels from all hospital mechanical equipment can be expected to produce noise levels at the nearest residential property line below 45 dBA. Noise from the mechanical equipment is assessed with respect to Table NE-2 Noise Limits in the County Noise Element of the General Plan. Considering the steady nature of mechanical equipment noise and measured ambient noise levels in the area, the allowable noise levels at nearby residences would be 55 dBA during the daytime (7:00 am to 10:00 pm) and 50 dBA

during the nighttime (10:00 pm to 7:00 am). Based upon assumptions regarding the final design of the central plant and the placement of auxiliary equipment at building rooftops, noise levels from the mechanical equipment would be expected to be below these allowable noise levels.

However, it is possible that noise from the equipment, if not enclosed or attenuated in what would be considered a normal design, could produce higher noise levels at the nearest residential property lines and exceed he allowable noise levels at nearby residences. **Therefore, this is a potentially significant impact.**

Mitigation 4:
- An acoustical consultant shall review the final design of the Central Plant facility and the placement of auxiliary outdoor mechanical equipment to determine that sufficient noise attenuation is in place to limit equipment noise levels below the County Noise Standards of 55 dBA daytime, 50 dBA nighttime at the nearest residential property line.

After Mitigation: ***Less than Significant***
The implementation of the above measure should insure that outdoor noise levels from Central Plant and auxiliary outdoor mechanical equipment are below the County Noise Standards at the nearest residential property lines.

Impact 5: Parking lot and onsite circulation. Noise from parking and onsite circulation may be annoying or disturbing to residences located adjacent to the proposed parking lot along the east property boundary. **This is a potentially significant impact.**

The proposed Master Plan includes parking adjacent to residences along the project's eastern property boundary. Onsite circulation of motor vehicles including low speed driving, sounds resulting from engine starts and door slams, would intermittently exceed the noise and land use compatibility guidelines of the Sonoma County General Plan. Only a small portion of the parking is proposed near the residences so the impact on the overall noise environment will be negligible. There may, however, be intermittent and occasional disturbances when parking lots are full.

Mitigation 5:
Construct a solid 6-foot high noise barrier on the project side of the eastern property line, as shown in Figure 7, where parking areas are adjacent to residential properties. To be effective the barrier must be constructed airtight over its face and at the base and have a minimum surface weight of 3 lbs./sq. foot. Suitable materials include wood, pre-cast masonry or pre-cast concrete panels.

After Mitigation: ***Less than Significant***
With the implementation of the above measure the noise and land use compatibility guidelines of the Sonoma County General Plan should be met at the residential uses adjacent to project parking areas.

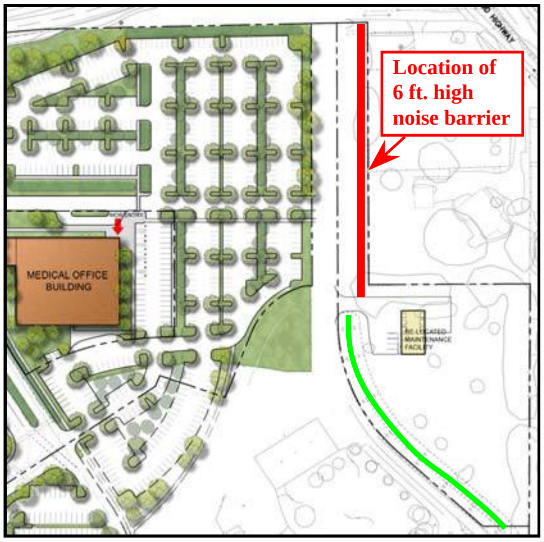


Figure 7: Noise Barrier Location

Impact 6: Helistop operational noise impacts on the adjacent land uses due to average noise exposure levels. This is a less-than-significant impact.

As previously discussed, the L_{dn} contours for a future helistop operations will not expose any non-project site land uses or residential structures to an Ldn/CNEL of 60 dBA or greater.

Mitigation 6: None Required

Impact 7: Helistop operational noise impacts on the adjacent land uses resulting from annoyance and sleep disturbance.

A review of Figure 6 shows that some residential areas north of the project site would be exposed to an ASEL in excess of 90 dB during helicopter operations. Based on this, it is expected that these residential areas may be exposed to noise levels sufficient to result periodic sleep disturbance of some residents. Due to the possible number of helicopter overflights, particularily at nighttime, the noise levels could be annoying and awaken a number of residents and are regarded as locally significant. **This is a considered a significant noise impact.**

Mitigation 7:

Sonoma County cannot designate specific flight paths that must be flown by helicopters or restrict the hours of operation of a helistop used by emergency helicopters. Under the State of California Aeronautics Act (Section 21662.4) emergency aircraft flights for medical purposes are exempt from local ordinances adopted by a city that restrict flight departures and arrivals to particular hours of the day or night, restrict aircraft based upon the aircraft's noise level or that restrict the operation of certain types of aircraft. Minimization of high noise level exposures under the approach track to the helistop may be achieved by the following measures; (a) modify the approach profile to maintain a greater elevation over the residential uses under the flight tracks, or (b) maintaining a log of flight operations and on-going communications with helicopter pilots regarding approach and departure paths. These mitigation measures are discussed below.

a. *Approach profile modification*. Based on a review of the noise-power-distance (NPD) curves contained in INM version 7.0a the SEL of approaching helicopters may be reduced by maintaining higher elevations over residences to the north and using a steep approach angle to the helistop.
b. *Monitoring and Adaptive Management*. A program of monitoring helicopter operations and designating a community noise disturbance coordinator could be used to reduce noise annoyance in nearby residential areas. As a part of these measures, helicopter ambulance companies and pilots would be informed of designated flight paths to and from the hospital helistop to avoid or reduce short-term noise exposures to residential areas. A helistop log could be maintained that includes arrival and departure times, the approach route taken, and explanation of any flight path deviation from the designated flight paths. A noise disturbance coordinator would be identified who would record citizen complaints and review the helistop log to determine the source of the noise disturbance.

After Mitigation: ***significant and unavoidable***

Under worst-case conditions, the project would result in significant noise annoyance from new emergency helicopter operations. Establishing a program of monitoring helicopter operations and responding to community noise disturbance complaints could reduce potential annoyance by avoiding flight elevations and paths that are most annoying to residents, to the extent feasible for individual emergency flights and by providing information on the nature and purpose of emergency flights. However, since the timing and frequency of helicopter operations is a function of when non-scheduled (emergency) evacuations are required, the effects of the project would be considered significant and unavoidable.

Impact 8: Helistop operational noise impacts on the project site.
The operation of the proposed helistop would not result in any ground level outdoor use areas over Ldn/CNEL of 60 dBA, however the majority of the site will be exposed to an ASEL of 90 dB or greater under future conditions. Depending on the construction of the exterior walls and windows of patient rooms and other hospital areas requiring relative quiet on the exterior facades of the hospital may be exposed to interior levels high enough to result in a significant disturbance. **This is a significant noise impact.**

Mitigation 8:

- Maximum noise levels produced by helicopters at the helistop may result in daytime disturbances and nighttime sleep disturbances (awakenings) within patient rooms of the hospital facilities. To reduce these adverse noise effects, patient rooms and other sensitive hospital use areas should be studied during design to determine whether the proposed construction provides sufficient sound insulation with closed windows to reduce the interior SEL to 65 dBA and/or and maximum noise levels (L_{max}) to 55 dBA during helicopter operations. If this review finds the design lacking in sound insulation, the needed degree of sound attenuation should be incorporated in the design.

After Mitigation: *Less than Significant*
The implementation of the above measure should insure that indoor noise levels during helicopter operations do not result in daytime disturbances and nighttime sleep disturbances within patient rooms of the hospital facilities.

Impact 9a: Construction Noise (non-pile driving).
Construction on the site will temporarily increase noise levels at nearby noise-sensitive receptors. Construction could be expected to occur in phases, with the entire build-out of the site taking several building seasons. Construction activities would not typically be located adjacent to a particular receptor during the entire construction period. Therefore, noise generated by construction would create a temporary noise impact on adjacent noise sensitive receptors, but this would be considered a less-than-significant impact provided that standard construction noise control measures are implemented.

Mitigation 9a:
The following mitigation measures are recommended to reduce noise generated by construction:

- Construct temporary noise barriers, such as a solid plywood construction barrier, around the perimeter of project phases before site grading and earthwork begins. There should be no openings for site access between the project site and adjacent residential land uses during these phases of construction. Noise barriers may be removed once all ground level work is complete and upper floor construction is underway.
- Limit noise-generating construction activities, including truck traffic coming to and from the site for any purpose, to daytime, weekday, non-holiday hours (7:00 am to 6:00 pm).
- Properly muffle and maintain all construction equipment powered by internal combustion

engines.

- Prohibit unnecessary idling of internal combustion engines.
- Locate all stationary noise-generating construction equipment, such as air compressors, as far as practical from existing nearby residences and other noise-sensitive land uses. Acoustically shield such equipment.
- Select quiet construction equipment, particularly air compressors, whenever possible. (Fit motorized equipment with proper mufflers in good working order).
- Designate a "noise disturbance coordinator" to be responsible for responding to any local complaints about construction noise. The disturbance coordinator would determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and would require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule. (The project sponsor should be responsible for designating a noise disturbance coordinator and posting the phone number and providing construction schedule notices).

After Mitigation: *Less than Significant*
With the implementation of the above measures will limit the overall noise level and duration of construction activities while also giving any persons disturbed by occasional loud noises an identifiable method of recourse.

Impact 9b: Construction Noise Associated With Pile Driving.
At this time the project intends to surcharge the property rather than develop the site using driven or drilled piers. Such surcharging will have to be approved by OSHPD as part of its review of site design and seismic safety. If surcharging is not approved by OSHPD, then driven piles or possibly drilled pier, foundations will be required.

The Roadway Construction Noise Model (RCNM v.1.1) was used to calculate the maximum and average noise levels anticipated during pile driving activities. This construction noise model includes representative sound levels for the most common types of construction equipment and the approximate usage factors of such equipment that were developed based on an extensive database of information gathered during the construction of the Central Artery/Tunnel Project in Boston, Massachusetts (CA/T Project or "Big Dig"). The usage factors represent the percentage of time that the equipment would be operating at full power. Based on the RCNM results, the L_{eq} during impact or vibratory pile driving activities at 50 feet would be 94 dBA. The nearest residences are located more than 270 feet north, and more than 500 feet to the east and west of the proposed project. Wells Fargo Center is located more than 500 feet southeast of the proposed project. Average noise levels during impact or vibratory pile driving activities at 270 and 500 feet would, respectively, be 94 and 80 dBA. If the foundations for the new buildings can be drilled, with cast-in-place piers, the noise level from this foundation work would be reduced to 86 dBA at a distance of 50 feet and 71 and 65 dBA, respectively, at 270 and 500 feet.

This noise impact would be potentially significant. There is concern that the vibration associated with driven or drilled and driven pile construction could impact the integrity of the nearby homes or the WFC. Due to their distance from the construction this impact is not determined to be significant (see Impact 2, above).

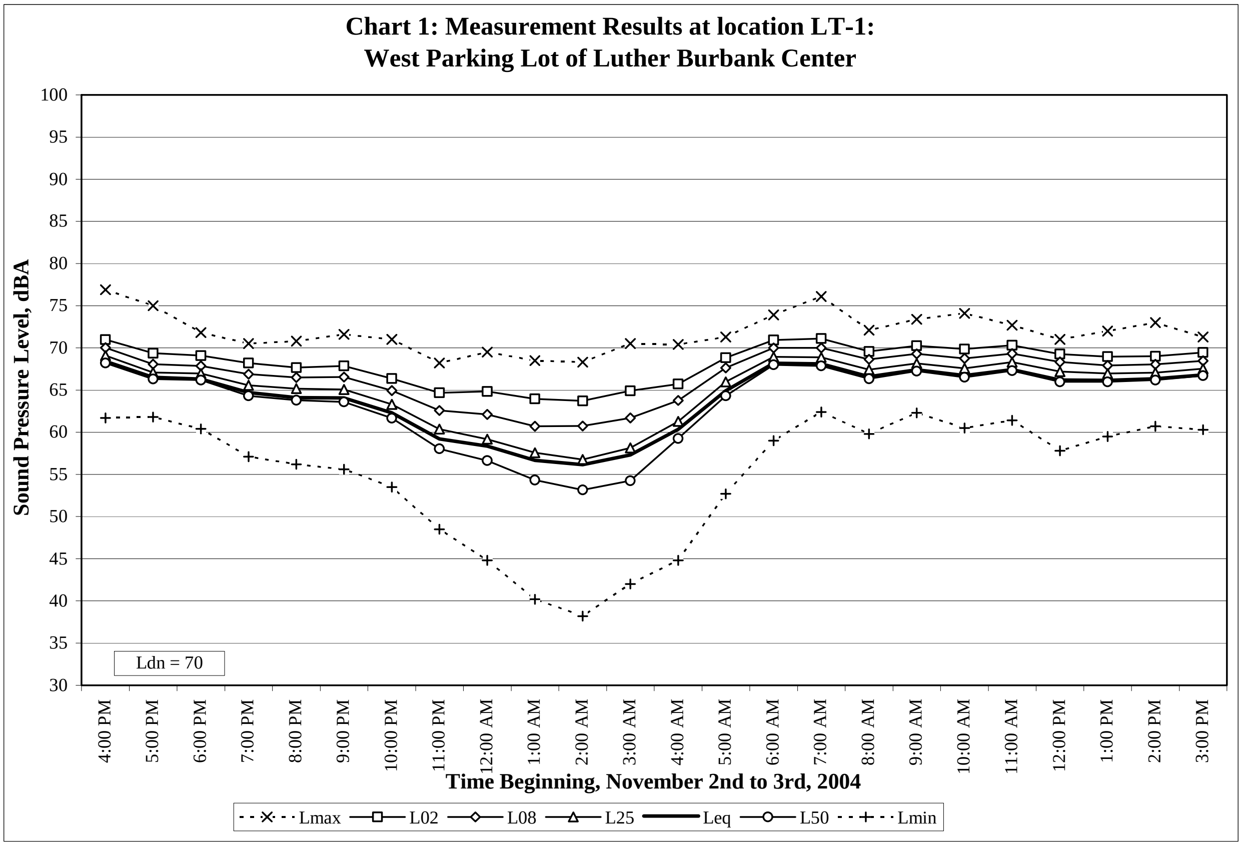
Mitigation 9b: While construction using pile driven or drilled foundations is not anticipated the following mitigation measures are provided should OSHPOD disallow the use of surcharge:

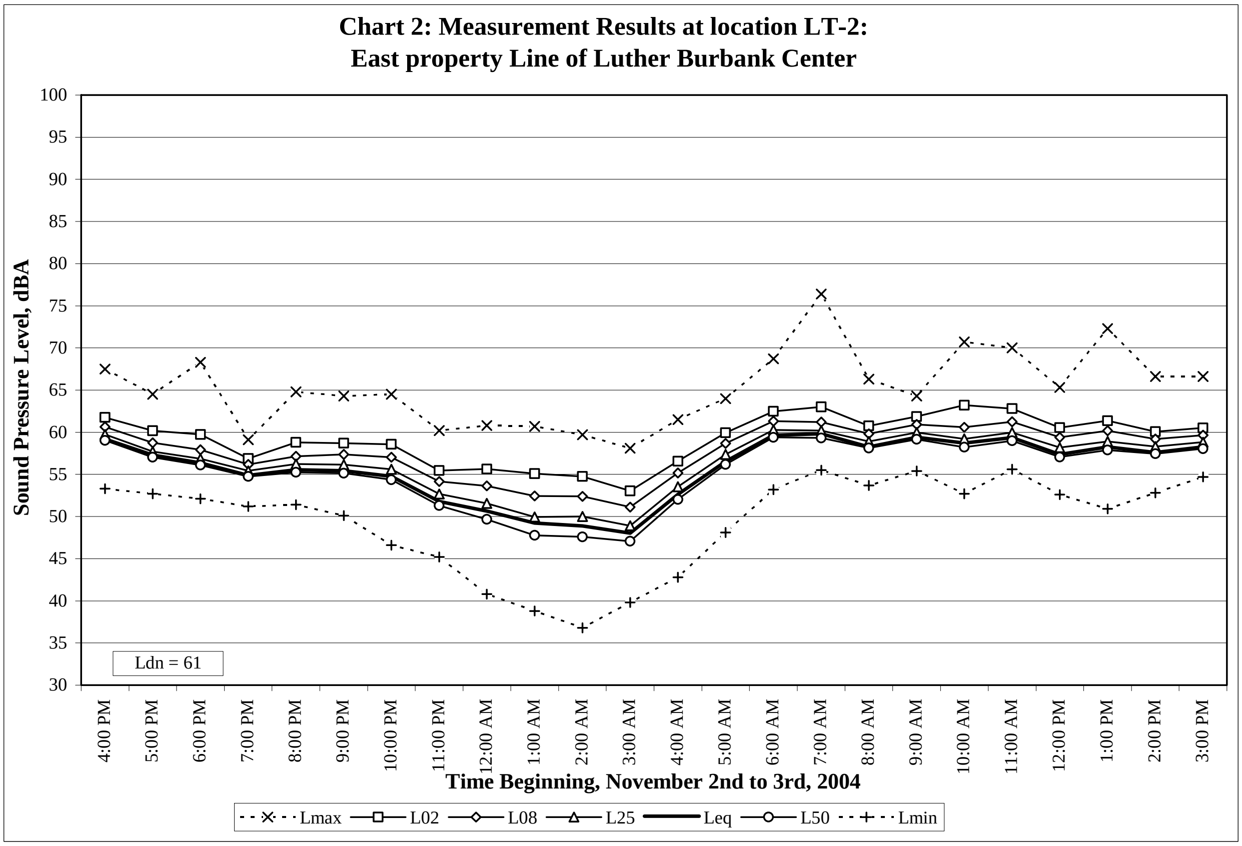
- Where feasible based on a consideration of geotechnical conditions and structural requirements implement "quiet" pile driving technology, such as drilled and cast-in-place piers, the pre-drilling of piles, and the use of more than one pile driver to shorten the total pile driving duration,
- Erect temporary plywood noise barriers or noise control blankets around pile driving rigs to reduce noise emissions from the site and shield adjacent uses.

After Mitigation: ***Less than Significant with full mitigation***
Significant and unavoidable with driven piles

With the implementation of "quiet" pile driving technology and the use of temporary noise barriers the overall noise level at the adjacent residences will be reduced to a less than significant level, however if geotechnical conditions and structural requirements necessitate the use of pile driving, then though somewhat reduced by the use of temporary noise control barriers, this impact would be considered significant and unavoidable.

APPENDIX A: NOISE MEASUREMENT DATA





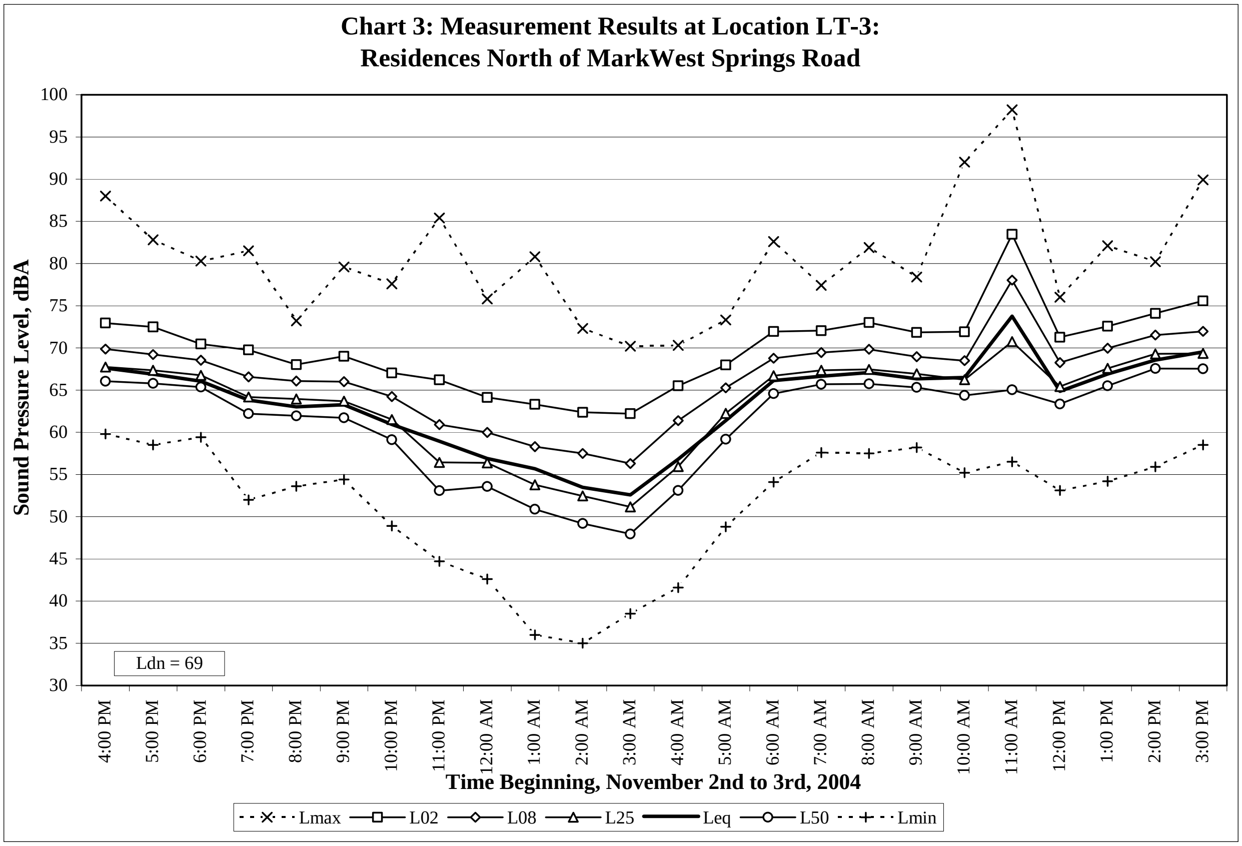


Chart 3: Measurement Results at Location LT-3:
Residences North of MarkWest Springs Road
Sound Pressure Level, dBA
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
Ldn = 69
4:00 PM
5:00 PM
6:00 PM
7:00 PM
8:00 PM
9:00 PM
10:00 PM
11:00 PM
12:00 AM
1:00 AM
2:00 AM
3:00 AM
4:00 AM
5:00 AM
6:00 AM
7:00 AM
8:00 AM
9:00 AM
10:00 AM
11:00 AM
12:00 PM
1:00 PM
2:00 PM
3:00 PM
Time Beginning, November 2nd to 3rd, 2004
Lmax
L02
L08
L25
Leq
L50
Lmin

APPENDIX B: TRAFFIC NOISE DATA AND RESULTS

Year 2020 WEEKDAY AM PEAK HOUR
Project Phase 2, 101 O/C 2 lanes

Intersection Volume Report
Base Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	0	0	0	0	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1107	722	0	0	1222	2	534	0	326	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	233	0	100	0	613	602	0	868	0
9 Mark West Spgs Rd/ ORH	299	603	312	428	844	351	224	624	238	419	1040	394
10 US 101 NB Ramps/MWS-River Rd.	472	0	344	0	0	0	0	704	0	0	1169	254
14 Kaiser MOB No. Entry/ ORH [Main project site access]	445	1627	0	0	1118	75	42	0	228	0	0	0
45 River Rd/ Fulton Rd	363	1718	195	152	682	167	124	726	120	197	733	50
46 River Rd./Barnes Rd.	88	0	218	0	0	0	0	985	74	139	859	0
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	11	0	132	66	984	0	0	1294	150
51 LBC Main dr/MWS Rd [Unsig Extg]	3	0	3	0	0	0	0	931	18	2	1171	0
52 Mark W. Spgs/E. Fulton	0	0	2	0	0	0	0	775	0	0	1128	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	26	465	0	0	923	17	4	0	60	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	34	0	23	0	0	0	0	54	58	45	6	0

Intersection Volume Report
Future Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
Node Intersection	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	33	0	0	10	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1107	755	0	0	1232	2	534	0	326	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	281	0	100	0	674	602	0	885	0
9 Mark West Spgs Rd/ ORH	340	603	312	428	850	365	229	626	346	419	1045	394
10 US 101 NB Ramps/MWS-River Rd.	472	0	507	0	0	0	0	813	0	0	1228	254
14 Kaiser MOB No. Entry/ ORH [Main project site access]	445	1660	0	0	1128	75	42	0	228	0	0	0
45 River Rd/ Fulton Rd	363	1718	236	152	682	167	124	739	120	208	737	50
46 River Rd./Barnes Rd.	88	0	225	0	0	0	0	1039	74	141	874	0
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	20	0	132	66	1256	0	0	1365	152
51 LBC Main dr/MWS Rd [Unsig Extg]	63	0	18	0	0	0	0	1030	200	47	1185	0
52 Mark W. Spgs/E. Fulton	0	0	3	0	0	0	0	889	0	0	1187	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	32	492	0	0	932	122	18	0	61	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	35	0	37	0	0	0	0	54	58	155	6	0

	Base	Future	Project Increase % dB	Existing Base	Base Increase over Existing % dB	Future Increase over Existing % dB
Mark West Spgs Rd West of Lavell	2476	2819	13.9% 0.6	2359	5.0% 0.2	19.5% 0.8
Mark West Spgs Rd East of Lavell	2439	2793	14.5% 0.6	2262	7.8% 0.3	23.5% 0.9
Mark West Spgs Rd West of ORH	2776	2951	6.3% 0.3	2227	24.7% 1.0	32.5% 1.2
Mark West Spgs Rd East of ORH	3217	3224	0.2% 0.0	1608	100.1% 3.0	100.5% 3.0
ORH North of Mark West Springs	2844	2869	0.9% 0.0	1846	54.1% 1.9	55.4% 1.9
ORH South of Mark West Springs	2715	2870	5.7% 0.2	1721	57.8% 2.0	66.8% 2.2

Year 2020 WEEKDAY PM PEAK HOUR
Project Phase 2, 101 O/C 2 lanes

Intersection Volume Report
Base Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	0	0	0	0	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1052	853	0	0	1591	4	334	0	239	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	324	0	296	0	620	282	0	845	0
9 Mark West Spgs Rd/ ORH	277	531	628	466	572	275	310	540	249	220	743	312
10 US 101 NB Ramps/MWS-River Rd.	368	0	427	0	0	0	0	785	113	0	884	315
14 Kaiser MOB No. Entry/ ORH [Main project site access]	264	923	0	0	1250	51	75	0	396	0	0	0
45 River Rd/ Fulton Rd	260	921	213	64	992	71	79	548	385	359	565	38
46 River Rd./Barnes Rd.	87	0	238	0	0	0	1	725	103	343	858	2
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	11	0	152	126	908	0	0	1045	35
51 LBC Main dr/MWS Rd [Unsig Extg]	19	0	12	0	0	0	0	934	22	13	921	0
52 Mark W. Spgs/E. Fulton	0	0	12	0	0	0	0	815	0	0	804	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	38	724	0	0	413	15	100	0	97	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	13	0	18	0	0	0	0	0	0	40	18	0

Intersection Volume Report
Future Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
Node Intersection	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	19	0	0	42	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1052	872	0	0	1633	4	334	0	239	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	348	0	296	0	652	282	0	921	0
9 Mark West Spgs Rd/ ORH	403	531	628	466	573	284	334	546	307	220	746	312
10 US 101 NB Ramps/MWS-River Rd.	368	0	506	0	0	0	0	841	113	0	1161	315
14 Kaiser MOB No. Entry/ ORH [Main project site access]	264	942	0	0	1292	51	75	0	396	0	0	0
45 River Rd/ Fulton Rd	260	921	234	64	992	71	79	555	385	410	582	38
46 River Rd./Barnes Rd.	87	0	241	0	0	0	1	753	103	351	926	2
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	15	0	152	126	1043	0	0	1382	46
51 LBC Main dr/MWS Rd [Unsig Extg]	257	0	72	0	0	0	0	957	139	42	1030	0
52 Mark W. Spgs/E. Fulton	0	0	18	0	0	0	0	897	0	0	942	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	39	742	0	0	449	39	209	0	103	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	19	0	133	0	0	0	0	0	0	65	18	0

			Increase	
	Base	Future	%	dB
Mark West Spgs Rd West of Lavell	2231	2703	21.2%	0.8
Mark West Spgs Rd East of Lavell	1999	2486	24.4%	0.9
Mark West Spgs Rd West of ORH	2394	2620	9.4%	0.4
Mark West Spgs Rd East of ORH	2909	2918	0.3%	0.0
ORH North of Mark West Springs	2466	2500	1.4%	0.1
ORH South of Mark West Springs	2477	2662	7.5%	0.3

Year 2020 WEEKDAY AM PEAK HOUR
Project Phase 3, 101 O/C 2 lanes

Intersection Volume Report
Base Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	0	0	0	0	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1107	722	0	0	1222	2	534	0	326	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	233	0	100	0	613	602	0	868	0
9 Mark West Spgs Rd/ ORH	299	603	312	428	844	351	224	624	238	419	1040	394
10 US 101 NB Ramps/MWS-River Rd.	472	0	344	0	0	0	0	704	0	0	1169	254
14 Kaiser MOB No. Entry/ ORH [Main project site access]	445	1627	0	0	1118	75	42	0	228	0	0	0
45 River Rd/ Fulton Rd	363	1718	195	152	682	167	124	726	120	197	733	50
46 River Rd./Barnes Rd.	88	0	218	0	0	0	0	985	74	139	859	0
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	11	0	132	66	984	0	0	1294	150
51 LBC Main dr/MWS Rd [Unsig Extg]	3	0	3	0	0	0	0	931	18	2	1171	0
52 Mark W. Spgs/E. Fulton	0	0	2	0	0	0	0	775	0	0	1128	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	26	465	0	0	923	17	4	0	60	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	34	0	23	0	0	0	0	54	58	45	6	0

Intersection Volume Report
Future Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
Node Intersection	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	35	0	0	11	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1107	757	0	0	1233	2	534	0	326	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	284	0	100	0	677	602	0	886	0
9 Mark West Spgs Rd/ ORH	342	603	312	428	850	366	230	626	347	419	1045	394
10 US 101 NB Ramps/MWS-River Rd.	472	0	515	0	0	0	0	819	0	0	1233	254
14 Kaiser MOB No. Entry/ ORH [Main project site access]	445	1662	0	0	1129	75	42	0	228	0	0	0
45 River Rd/ Fulton Rd	363	1718	238	152	682	167	124	740	120	209	737	50
46 River Rd./Barnes Rd.	88	0	225	0	0	0	0	1042	74	141	875	0
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	20	0	132	66	1270	0	0	1372	152
51 LBC Main dr/MWS Rd [Unsig Extg]	69	0	20	0	0	0	0	1030	215	51	1185	0
52 Mark W. Spgs/E. Fulton	0	0	3	0	0	0	0	891	0	0	1191	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	32	495	0	0	933	122	18	0	61	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	35	0	37	0	0	0	0	54	58	155	6	0

	Base	Future	**Project Increase**		Existing Base	**Base Increase over Existing**		**Future Increase over Existing**	
			%	dB		%	dB	%	dB
Mark West Spgs Rd West of Lavell	2476	2840	14.7%	0.6	2359	5.0%	0.2	20.4%	0.8
Mark West Spgs Rd East of Lavell	2439	2814	15.4%	0.6	2262	7.8%	0.3	24.4%	0.9
Mark West Spgs Rd West of ORH	2776	2956	6.5%	0.3	2227	24.7%	1.0	32.7%	1.2
Mark West Spgs Rd East of ORH	3217	3224	0.2%	0.0	1608	100.1%	3.0	100.5%	3.0
ORH North of Mark West Springs	2844	2871	0.9%	0.0	1846	54.1%	1.9	55.5%	1.9
ORH South of Mark West Springs	2715	2873	5.8%	0.2	1721	57.8%	2.0	66.9%	2.2

Year 2020 WEEKDAY PM PEAK HOUR
Project Phase 3, 101 O/C 2 lanes

Intersection Volume Report
Base Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	0	0	0	0	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1052	853	0	0	1591	4	334	0	239	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	324	0	296	0	620	282	0	845	0
9 Mark West Spgs Rd/ ORH	277	531	628	466	572	275	310	540	249	220	743	312
10 US 101 NB Ramps/MWS-River Rd.	368	0	427	0	0	0	0	785	113	0	884	315
14 Kaiser MOB No. Entry/ ORH [Main project site access]	264	923	0	0	1250	51	75	0	396	0	0	0
45 River Rd/ Fulton Rd	260	921	213	64	992	71	79	548	385	359	565	38
46 River Rd./Barnes Rd.	87	0	238	0	0	0	1	725	103	343	858	2
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	11	0	152	126	908	0	0	1045	35
51 LBC Main dr/MWS Rd [Unsig Extg]	19	0	12	0	0	0	0	934	22	13	921	0
52 Mark W. Spgs/E. Fulton	0	0	12	0	0	0	0	815	0	0	804	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	38	724	0	0	413	15	100	0	97	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	13	0	18	0	0	0	0	0	0	40	18	0

Intersection Volume Report
Future Volume Alternative

	Northbound			Southbound			Eastbound			Westbound		
Node Intersection	L --	T -	- R	L -	- T -	- R	L --	T -	- R	L -	- T -	- R
1 Mendo Ave/Fountain Grve Pkwy [(ORH Overcrossing)]	0	20	0	0	44	0	0	0	0	0	0	0
3 ORH-Mendo Av/ US 101 NB Ramps	1052	873	0	0	1635	4	334	0	239	0	0	0
4 River Road/ US 101 SB Ramp [Unsignalized Extg]	0	0	0	349	0	296	0	653	282	0	924	0
9 Mark West Spgs Rd/ ORH	404	531	628	466	573	284	335	546	309	220	746	312
10 US 101 NB Ramps/MWS-River Rd.	368	0	510	0	0	0	0	843	113	0	1172	315
14 Kaiser MOB No. Entry/ ORH [Main project site access]	264	943	0	0	1294	51	75	0	396	0	0	0
45 River Rd/ Fulton Rd	260	921	235	64	992	71	79	555	385	412	582	38
46 River Rd./Barnes Rd.	87	0	242	0	0	0	1	755	103	352	928	2
50 Mark W. Spgs Rd./Lavell Rd.	0	0	0	15	0	152	126	1049	0	0	1395	46
51 LBC Main dr/MWS Rd [Unsig Extg]	271	0	75	0	0	0	0	957	144	44	1030	0
52 Mark W. Spgs/E. Fulton	0	0	18	0	0	0	0	901	0	0	944	0
53 Old E Fulton Rd/ ORH (Mark West Ctr)	39	742	0	0	451	39	209	0	103	0	0	0
56 E Fulton/WFC E d/w (SR CS) [Santa Rosa Christian Academy]	19	0	133	0	0	0	0	0	0	65	18	0

			Increase	
	Base	Future	%	dB
Mark West Spgs Rd West of Lavell	2231	2722	22.0%	0.9
Mark West Spgs Rd East of Lavell	1999	2505	25.3%	1.0
Mark West Spgs Rd West of ORH	2394	2624	9.6%	0.4
Mark West Spgs Rd East of ORH	2909	2918	0.3%	0.0
ORH North of Mark West Springs	2466	2501	1.4%	0.1
ORH South of Mark West Springs	2477	2665	7.6%	0.3

Appendix I2

Facility Planning for Proposed New Sutter Medical Center, Helistop Design Report

Facility Planning for Proposed New
Sutter Medical Center of Santa Rosa

Santa Rosa, California

Helistop Design Report

October 2009

A Technical Report

Prepared for

Sutter Health

by

Mead & Hunt, Inc.

OVERVIEW

This design report examines the site location, proposed site design, projected use, and selected environmental issues pertaining to construction of a helistop at a new campus for the Sutter Medical Center of Santa Rosa (SMCSR), California, proposed to be built by Sutter Health. The report's primary purpose is to provide the supporting documentation necessary for obtaining federal, state, and local approval of the helistop design and operation. It also serves as technical input to an environmental analysis of the Sutter Medical Center project.

General Note

The interrelated terms "heliport" and "helistop" are both used in this report. "Heliport" is a broad category that includes all types of helicopter landing facilities, including helistops. "Helistop" is a functional term that applies to a limited type of heliport where (1) the landing area and the helicopter parking area are usually the same, (2) helicopters generally remain on the ground only for as long as it takes to load or unload patients; and (3) no fueling or maintenance are conducted (except under emergency circumstances if needed for flight safety). The helicopter facility proposed for SMCSR is a helistop. In this report, "helistop" is used when the reference is to the proposed facility. The more encompassing term "heliport" is used when referring to Federal Aviation Administration and other generic design standards. Also, the operating permit that will need to be issued by the California Department of Transportation Division of Aeronautics for the SMCSR helicopter facility will be called a "Heliport Permit" as that is the state permit type for all helicopter landing facilities, including helistops.

Project Site

The site of the proposed new Sutter Medical Center (SMC) is the undeveloped northwestern corner of a 78-acre property previously owned in its entirety by the Luther Burbank Center for the Arts (LBC), now Luther Burbank Memorial Foundation (LBMF). The arts center currently operates under the name Wells Fargo Center for the Arts (WFC). The SMC site consists of 15 acres now owned by Sutter Health that would be exclusively used by the hospital and related facilities together with approximately 10 acres that would be devoted to shared parking facilities. The site lies within unincorporated Sonoma County a short distance beyond the northern edge of the City of Santa Rosa. U.S. Highway 101 runs along the westerly boundary of the site. The site is bounded on the north by Mark West Springs Road and East Fulton Road. The performing arts theater and other facilities that comprise the WFC complex lie to the southeast and residential development is located to the north and east. PG&E high-voltage electrical transmission lines pass approximately 600 feet to the north of the project site, running in a roughly east-west direction. The topography of the site and surrounding area is generally flat.

Information regarding current Sonoma County general plan land use designation and zoning requirements for the site are contained in other technical reports.

Project Description

The proposed helistop is part of a new medical center campus to replace Sutter Health's current Santa Rosa hospital on Chanate Road. Development of the new site has been contemplated for several years, during which time the components of the proposed facility and their sizes and designs have been modified on multiple occasions. Refinement of the current plans will continue to be made.

For the purposes of this technical report, the medical center is expected to consist of three principal components: a 70-bed, two-story hospital; a three-story medical office building containing physician offices; and a two- and three-story physicians medical center which will include a surgery center and 28 beds. The hospital will provide a full range of comprehensive inpatient and outpatient treatment and diagnostic services, including all ancillary and support services. The hospital is not being planned as a trauma center. Automobile parking will be in surface lots. Additionally, the medical center and WFC will share use of part of the parking facilities.

Site Design Alternatives

The conceptual site plan for the Sutter Medical Center, including the proposed helistop, was developed as a coordinated effort among all involved parties including hospital representatives, architects, environmental consultants, and others. Numerous alternatives were sketched and evaluated during this process. Although the LBMF property encompasses some 78 acres and the medical center will share some parking space with WFC, fitting the hospital, other buildings, helistop, additional auto parking, and other essential facilities into the 15 acres available exclusively for these functions is challenging.

Many of the early alternatives that potentially could have worked well in terms of requirements for other facilities to be built on the site would be infeasible with respect to helicopter facility requirements. Subsequent alternatives focused on placing the helistop on the roof of one of the buildings. Such alternatives would have the benefit of not taking space on the ground that could otherwise be used for automobile parking and circulation. However, the cost of a rooftop facility would be significantly greater than for a ground-level site. Further evaluation of possible ground-level helistop sites resulted in a plan that has relatively minimal impact on parking and other facility needs, yet meets aeronautical requirements. This helistop site, immediately adjacent to the emergency room entrance, has now been incorporated into the preferred plan for the medical center as a whole. For the record, though, the design requirements both for ground level and rooftop helistops are outlined in the remainder of this report along with discussion of the functional tradeoffs between these options as evaluated during the site design process.

Summary Description of Proposed Design

As further detailed in this report, major features of the helistop are proposed to include the following:

- A ground-level site on the southwest side of the medical center building, adjacent to the emergency room entrance.
- A 42-foot round landing pad (helipad) with an adjacent working surface for medical staff at least 10 feet wide—thus making an overall minimum surface area of 50 feet diameter. The overall size of the helipad and adjacent area that must be clear of obstructions including parapets and other building features will be a minimum of 103-feet square, although the outer edges of this area can extend beyond the sides of the building.
- Elevation of the pad approximately 5 feet above ground level. A ramp will slope down to the emergency room entrance level. Elevation of the pad provides greater clearance of the approach-departure paths above adjacent auto parking areas and internal roadways, thus reducing the size of the area in which the latter facilities would be precluded.
- Approach/departure paths following Highway 101, then curving in to the helistop. This alignment matches the prevailing winds at the site and minimizes overflight of noise-sensitive land uses.

SMCSR HELISTOP USAGE

Anticipated Activity Levels

Since the new Sutter Medical Center is not proposed to be a designated trauma center, inbound transportation of patients by helicopter from highway accident sites or other hospitals is expected to be infrequent. Santa Rosa Memorial Hospital is the regional trauma center for the area and will continue to receive the majority of accident victims. The primary function of the proposed helistop is anticipated to be outbound transfer of patients who arrive at the Sutter facility by ground, are initially treated, and then require more extensive treatment available only at other hospital facilities in the Bay Area. Flights related to organ transports are another prospect. The primary helicopter flight destinations will likely be John Muir Hospital in Walnut Creek, Oakland Children's Hospital, and Stanford Hospital Medical Center in Palo Alto. If San Francisco General Hospital is successful in building a helistop as is currently proposed, then some patients may be transported there.

The volume of helicopter operations at the new helistop is expected to be similar to the activity levels experienced at the existing Sutter hospital on Chanate Road—an average of approximately 200 flights per year from 2006 through mid 2009. In no case will the number be more than 240 flights (240 landings and 240 takeoffs) per year. This volume equals 4 to 5 flights per week on average. Helicopter operations will be conducted only under visual flight conditions—no instrument approach capabilities will be provided. However, the helipad will be lighted to permit nighttime operations.

Under most circumstances, helicopters will remain at the helistop only for as long as necessary to load or unload patients or medical staff. The facility will be designed for use by only one helicopter at a time. No helicopters will be based there and no fueling or maintenance will be conducted unless emergency repairs are necessary for the airworthiness of the aircraft.

Design Helicopter

A primary variable in the design of heliports, especially hospital heliports, is the size of the helicopters that are to be accommodated. The dimensions of several key components of a heliport depend directly upon the size of the largest helicopter that will operate there. Exhibit 1 lists the characteristics of common aeromedical helicopters including ones operated by companies in the Bay Area.

The Sutter Medical Center helistop will be utilized by a variety of aeromedical companies operating various helicopter types. Only helicopter operators authorized by the hospital will be allowed to land at the helistop. The primary users will be REACH (Redwood Empire Air Care Helicopter) which is based at the Sonoma County Airport; CALStar which is based in Hayward with aircraft at Concord's Buchanan Field; and Stanford Life Flight based at Stanford Hospital in Palo Alto. REACH's primary helicopter currently is a twin engine, instrument-flight capable, Eurocopter EC 135. Stanford Life Flight flies a custom-configured Eurocopter EC 145 helicopter that can operate under both visual and instrument flight rules. CALStar's primary helicopter, a Bell 222, is among the largest helicopter models found in aeromedical use.

For the purposes of the Sutter Medical Center helistop design, the Bell 222 is considered to be the design helicopter. The Bell 222 has a rotor diameter of 42.0 feet, an overall length of 50.3 feet and weighs 8,250 pounds.

One larger helicopter sometimes used for aeromedical purposes is the Bell 212 which has a 48.0-foot rotor diameter. No aeromedical helicopter operator in Northern California is currently operating the Bell 212, however, and none is known to have plans to do so. Moreover, discussions with REACH personnel indicate that the trend in the industry is for larger helicopters to be phased out in favor of lighter, smaller twin-engine helicopters.

Need for use of the helistop by larger helicopters, such as those operated by the U.S. Coast Guard and the California Air National Guard in rescue operations, is expected to be rare and they need not be accommodated. Nearby Sonoma County Airport is available for their use if necessary and patients would be ground transported between the two locations.

Aeronautical Requirements for Heliport Design

The principal aeronautical requirements for the design of heliports are established by the Federal Aviation Administration in Advisory Circular No. 150/5390-2B, published September 30, 2004, and entitled *Heliport Design*. This document establishes dimensions and other standards for the features common to helicopter facilities. Standards such as landing area size, peripheral area dimensions, approach/departure path criteria, marking and lighting specifications, etc., are included. Most of these standards apply to all types of heliports, but the document also contains a chapter focusing specifically on hospital heliports/helistops.

For heliports requiring a permit from the California Department of Transportation, the principal dimensional standards set forth in the *Heliport Design* advisory circular are treated as requirements. Hospital helistops are among the types of heliports for which a state permit is required.

Most of the requirements outlined here apply to all hospital heliports regardless of whether they are located on the ground or on top of a building. Where the requirements differ between ground level and rooftop facilities, these are noted. Also, the information here is not specific to the new Sutter Medical Center of Santa Rosa helistop. Discussion of the manner in which certain of these requirements are issues with regard to the Santa Rosa facility are included later in this report.

Heliport Components

A heliport consists of three primary aeronautical components:

- **Touchdown and Liftoff Area (TLOF)**—The TLOF, often referred to as a helipad, is the surface on which the helicopter actually lands. It can be square or round. The choice is largely a matter of aesthetics and cost. In either case, the minimum dimension must equal the rotor diameter of the design helicopter, but not be less than 40 feet. Specifically, with respect to the Bell 222, the TLOF must be at least 42 feet across, either square or round.

- **Final Approach and Takeoff Area (FATO)—**The FATO is the area within which helicopters complete the final phase of an approach to landing and initiate a takeoff. It encompasses the TLOF and needs to be clear of protruding objects or surface irregularities, but does not need to be load bearing. In the case of a rooftop heliport, the FATO can extend beyond the edges of the building or raised platform on the building roof. The minimum dimensions of the FATO must be no less than 1.5 times the overall length of the design helicopter. For the Bell 222, the required FATO size is 75 feet square.

- **Safety Area**—Surrounding the FATO is a safety area. Except for small frangible objects that functionally must be located there, the safety area must be clear of all obstacles including, fences, poles, trees, and parked vehicles protruding above the helipad level. For rooftop heliports, no portion of the building or equipment can extend upward into the safety area, but the area can extend beyond the edges of the building. The normal minimum width of the safety area is one-third of the helicopter rotor diameter, but not less than 10 feet. For the Bell 222, this width would be 14 feet.

The above components comprise the portion of the heliport required for the landings and takeoffs of helicopters. Functionally, these components are the equivalent of a runway and associated safety areas at an airport. Also similar to airports, some large heliports provide separate areas for the parking of multiple helicopters. At these facilities, the helipad serves only as the place where landings are made and takeoffs initiated. Helicopters ground or hover taxi between the helipad and the parking positions, leaving the helipad free for use by other helicopters.

Most hospital heliports, including the one proposed for the new Sutter Medical Center of Santa Rosa, need to accommodate only one helicopter at a time. Thus, the helipad serves both as the landing and takeoff spot and a parking place while the helicopter is at the hospital.

Approach/Departure Path Requirements

Although the high degree of maneuverability of helicopters gives them wide latitude in the choice of a flight path into and out of a heliport, establishment of a formal landing site requires that defined approach/departure paths be designated. The purpose for designation of these paths is to assure that adequate airspace is and will continue to be available for safe operation of helicopters to and from the heliport. It is desirable, although not absolutely essential, that a heliport have two approach/departure paths separated by an arc of at least 90 degrees. The two most important aeronautical factors in design of the approach/departure paths are the direction of the prevailing wind and the location of potential obstructions.

Wind Speed and Direction

As with fixed-wing aircraft, helicopter takeoffs and landings are easiest and most efficient when conducted into the wind. Unlike fixed-wing aircraft, however, helicopters of the type that will be operating at the hospital need very little final approach distance into the wind—some 500 to 1,200 feet is preferable although they can get by with less if necessary.

Wind data from the nearby Sonoma County Airport indicate that the prevailing winds at the Sutter Medical Center site are from the south-southeast approximately 37% of the time and secondarily from the north-northwest approximately 16% of the time. Winds are from other directions approximately 38% of the time and calm (4 mph or less) 9% of the time. Wind speeds of 13 mph or less occur approximately 60% of the time.

Obstacle Clearance

The standards for heliport approach/departure paths are set by Part 77 of the Federal Aviation Regulations (FAR), *Objects Affecting Navigable Airspace*. These regulations establish a set of imaginary surfaces in the airspace around the heliport. In general, the heliport and its approach/departure paths should be designed so that no objects penetrate the FAR Part 77 surfaces. Motor vehicles on public roads are assumed to have a height of 15 feet; those using private roads or parking lots are assumed to be 10 feet high except where taller vehicles are known to travel.

For heliports, the FAR Part 77 standards specify two types of surfaces:

- **Approach Surfaces**—These surfaces begin at the edge of and having a width equal to the FATO and slope upward 1 foot per every 8 feet horizontally (8:1). The approach surface length is 4,000 feet and the width at the outer end is 500 feet. The surface follows the approach path and the outer portion can be curved if necessary.
- **Transitional Surfaces**—Transitional surfaces are situated along the sides of the FATO and approach surfaces. They slope upward 1 foot per every 2 feet horizontally (2:1) for a horizontal distance of 250 feet from the FATO and approach surface centerlines.

Overall Heliport Size

With the Bell 222 as the design helicopter, the minimum overall size of the heliport is 103 feet square. For rooftop heliports, a portion of this area can extend beyond the sides of the building. However, regardless of whether the facility is on the ground or a roof, additional space must be provided for clearance over obstacles along the approach/departure paths and lateral to the helipad—that is, tall objects cannot be placed immediately adjacent to the 103-foot clear area.

For ground level heliports, the effect of the dimensional standards and obstruction criteria is that public roads must be excluded from an area extending approximately 120 feet (8:1 times 15 feet) along the approach/departure paths from the edge of the FATO. Perpendicular to the approach/departure paths, no roads should be within 30 feet of the FATO. For parking lots, the minimum overhead clearance of 10 feet means that a setback distance of at least 80 feet along the flight path and 20 feet perpendicular to it is required. These distances can be reduced to some extent by elevating the helipad several feet above the adjacent roads and parking areas. However, because of the rotor downwash created as a helicopter passes overhead at low altitude, a minimum distance of approximately 100 feet is advisable.

In general, as much maneuvering airspace as possible should be provided near the heliport either by removing nonessential obstacles or locating the pad at a greater distance from them. As determined by FAA and California Division of Aeronautics analyses, obstruction lights may be required on buildings or other tall objects near the helipad.

OTHER HELIPORT DESIGN AND LOCATION REQUIREMENTS

Design Features

- **Helipad Surface**—As noted above, the surface of the helipad (TLOF) must be capable of supporting the dynamic loads of the helicopters that will operate there. For hospital heliports, a paved, all-weather, surface is essential both for the helicopters and for medical staff working around the helicopters. Ground level helipads typically are constructed of Portland Cement Concrete (PCC) as asphalt surfaces can easily be damaged by the skids on some types of helicopters. Rooftop helipads may be constructed of metal or concrete (or other materials subject to local building codes). Pavements should have a "broomed" or other roughened finish that provides a skid-resistant surface for helicopters and non-slippery footing for people and for moving patients on gurneys. For ground level heliports, surfaces beyond the paved area of the helipad should be constructed of a material that will not be blown around by the downwash of the helicopter rotor. Sod is common, although large cobbles or even asphalt or concrete pavement can be used.

- **Work Space**—The TLOF dimensions cited above are established with respect to the landing and takeoff needs of a helicopter. When the helicopter is parked on the helipad rather than at a separate parking spot, relatively little work space remains around the helicopter for medical staff to maneuver gurneys, ambulances, and other equipment. At a minimum, an additional 10-foot wide work area is recommended on the side of the helipad that provides access to the helicopter doors.

- **Helipad Access**—To enable gurneys and other wheeled equipment to be rolled up to the helicopters, hospital helipads must be accessible without the necessity of negotiating stairs, curbs, or soft ground. Ramps should be built in accordance with state and local requirements. The width of the ramp, and any turns in the ramp, should be wide enough to accommodate a gurney with a person walking on each side. Straight segments should be not less than 6 feet wide. Additional width may be required at turns. A 10-foot width is necessary if there is a need for ground ambulances to be driven up to the helicopter. The ramp surface should provide a slip-resistant surface. The slope should be no steeper than one inch per foot (12:1). Inside the FATO and safety area, any handrails should not extend above the elevation of the TLOF. Where a handrail is not provided, other means such as a safety net must be utilized to protect personnel from fall hazards. Rooftop heliports must have elevator access. If the elevator stops at roof level and the helipad is built on a platform above the roof, ramps can be used to reach the helipad from the level at which the elevator stops. This arrangement is often necessary to keep the elevator penthouse, mechanical equipment, and parapet walls from obstructing necessary heliport airspace. OSHA standards require two separate access points for an elevated helipad such as one on a rooftop. Stairs can be used for the second access point, provided that stair railings are not airspace obstructions.

- **Spill Containment**—Helipads must have fuel spill containment capabilities built in to their design. This capability is particularly critical for rooftop heliports. A rooftop helipad should have a specially designed drainage system capable of containing a catastrophic fuel spill and the means to divert the spilled fuel away from the structure and keep it out of the storm drain system. This can be accomplished by either a perimeter drain or drains (the helipad slopes outward) or a drain near the center of the pad (the helipad slopes inward) that collect rainwater runoff or spilled fuel and direct it into a holding tank equipped with an oil water separator. The holding tank should be designed with sufficient capacity to hold a volume of fuel equivalent to that of the fuel capacity of the helicopters serving the facility plus any rainwater that may fall at the time of the spillage. For rooftop helipads, the drain line typically would run down the outside of the building to a tank on the ground. On ground-level helipads, drainage to a surrounding landscaped area may be considered adequate. The primary requirement is to ensure that any fuel spillage that might occur would not directly enter a nearby storm drain.

- **Lighting**— For nighttime operation, perimeter lighting of the helipad is required. The lights can surround either the TLOF or the FATO. A minimum of eight lights are required. The lights are green in color. Lights on the perimeter of the TLOF must be flush-mounted with the surface. Stake-mounted lights can be used around the edge of the FATO provided that they extend no more than 2 inches above the TLOF surface elevation. In addition to these aviation-related lights, flood lighting is needed to enable medical staff to see while working around the helicopter to load and/or unload patients. Controls for the lights typically are located in an equipment panel near the helipad. The floodlights need to be separately controlled from the perimeter lights so as not to shine in the eyes of pilots while the helicopter is landing at the heliport.

- **Wind Direction Indicator**—A lighted wind cone should be installed near the heliport so that pilots of approaching helicopters can tell the direction and speed of the wind and modify their landing approaches as appropriate. The wind indicator should be located on top of a building or other position where the wind indications would not be affected by nearby structures.

- **Security**—To ensure the safety of helicopter operations and pedestrians, a 3 to 4-foot high chain-link fence should surround a ground level heliport. The fence must be situated sufficiently far from the helipad so as not to be an airspace obstruction. If the approach/departure paths pass over roads or parking areas close to the heliport, temporary controls can be used to keep people out of the area while the helicopter flies over so that they would not be injured by blowing dust or debris caused by the rotor downwash. Rooftop heliports can be secured by limiting elevator and stairway access to authorized personnel only.

- **Communications**—Direct, two-way communication capabilities between approaching helicopters and hospital staff is essential. Advance communication is necessary not only so that medical personnel will be ready for the helicopter, but also so that security personnel can be on hand.

Additional Requirements for Rooftop Heliports

- **Safety Net**—For rooftop heliports having a TLOF on a platform elevated more than 30 inches above its surroundings, a safety net not less than 5 feet wide should be provided. A railing or fence should not be used since it would be a hazardous to helicopter operations. The safety net should have a load carrying capability of 25 pounds per square foot. The net should not project above the level of the TLOF. Both the inside and outside edges of the safety net should be fastened to a solid structure (designers should consider state and local regulations when determining the width required for the safety net).

- **Rooftop Equipment**—For rooftop heliports, particular attention must be paid to the location or placement of antennas, elevator penthouses, fresh-air vents and other raised rooftop structures. Also to be considered is that helicopter exhaust can impact building air quality if the heliport is too close to fresh-air vents. These issues should be resolved during facility design. In addition, design control mechanisms should be established to ensure that objects that would be hazards are not installed after the heliport is operational.

Heliport Location Considerations

- **Proximity to Emergency Room—**A siting consideration unique to hospital heliports is the proximity of the landing pad to the emergency room or operating room. Patients typically are transported between the helicopter and the emergency room by gurney. The maximum distance considered acceptable between the helipad and the emergency room entrance depends upon various factors such as whether slopes must be negotiated, whether roads or congested public areas must be traversed, and how much of the distance is outdoors exposed to the weather. Ideally, this distance should be no more than about 400 feet, but some hospitals have found distances of as much as 850 feet to be workable. Greater distances may require patients to be transferred to an ambulance for transport between the heliport and the emergency room.

- **MRI Equipment**—Magnetic Resonance Imaging (MRI) equipment found in many hospitals can create a strong magnetic field that, if not shielded, will cause temporary aberrations in a helicopter's magnetic compass and may interfere with other navigational systems. The location of any MRI equipment should be considered in the siting of a hospital heliport. A warning sign alerting pilots to the presence of an MRI is recommended. Steps should be taken to inform pilots of the locations of MRIs and other similar equipment.

Land Use Compatibility Factors

Land use compatibility is the other important factor to be considered in locating heliport approach/departure paths. Noise and safety are the two predominant issues of concern.

- **Noise**—In California, the noise impacts of airports is typically measured using a cumulative noise exposure metric, the Community Noise Equivalent Level (CNEL). CNEL takes into account both the loudness of individual noise events and the number and time of day of these events. Cumulative noise exposure metrics are well suited to land use compatibility planning decisions, but they do not give a complete picture of noise impacts. This is particularly true for hospital heliports in that the volume of operations is rarely high enough to show significant cumulative noise levels much beyond the immediate environs of the helipad. A greater concern is the noise level of individual helicopter operations. Helicopter noise can be excessively loud and it also has characteristics that are judged particularly annoying by many people. Helicopter noise also has a vibration component that can cause rattle in window or other parts of buildings. The most significant noise impacts can usually be avoided by aligning the approach/departure paths as far as possible from residential areas and other noise-sensitive land uses. Special sound-attenuation design may be appropriate for portions of the hospital building that face the heliport or approach/departure paths.

- **Safety**—The other principal land use compatibility consideration in the design of heliport approach/departure paths is safety. Accidents by helicopters approaching or departing a designated heliport are rare occurrences. Most accidents by aeromedical helicopters take place either at unimproved landing sites such as near a highway accident or en route between those sites and a hospital or airport. Nevertheless, prudent practice suggests that overflight of buildings near the heliport should be minimized as much as practical. Aligning the approach/departure paths over highways or other relatively open areas also enhances safety by providing places where a helicopter can make an emergency landing if one should become necessary.

SPECIFIC DESIGN AND LOCATION CONSIDERATIONS FOR SMCSR HELISTOP

The preceding sections of this report outline the basic design and location requirements for hospital heliports. The discussion in this section focuses on factors specific to the proposed WFC site for the new Sutter Medical Center of Santa Rosa.

- **Approach/Departure Path Alignment**—The optimum alignment for the approach/departure paths for the proposed helistop are from the south-southeast and north-northwest (Exhibit 3). This alignment coincides not only with the prevailing winds at the site, but also provides the opportunity for helicopters to approach and depart the helistop by flying over Highway 101. This is an ideal flight route for both noise and safety reasons. Noise impacts of the proposed helistop are described in a separate technical report. The inner portion of the flight paths will need to curve to some extent to enable the helicopters to reach the helipad. The exact path will depend upon how far from the highway the helistop is to be situated on the site. In any case, the paths should be aligned so that helicopters do not fly directly over the WFC buildings or the residential area north of Mark West Springs Road.

- **Approach Obstacles**—Existing obstacles around the hospital site are major factors in planning for the helistop. Redwood trees as much as 100 feet tall border Highway 101 and the off ramp to Mark West Springs Road, all within the state right-of-way. Some of these trees have been removed as part of the Highway 101 widening project that began in January 2009, but ones most critical to the helistop approach/departure paths remain. Additionally, power transmission lines are located along the north side of Mark West Springs Road and taller high-voltage lines pass a short distance farther north. Lastly, several light poles are situated along the freeway adjacent to the planned helistop site. Of these obstacles, the trees are the most significant. With the helistop site and approach/departure path alignments as currently planned, the remaining trees will not be obstructions. However, their height and proximity to the helistop limits other options for approach/departure path alignment. One light pole also is a factor and will need to be eliminated or moved.

- **Interaction with Highway 101**—Other than the FAR Part 77 surface clearance requirements, there is no restriction on flight paths following the highway alignment. Helicopters could have a potentially disruptive effect on highway traffic, but the time required for a helicopter to pass by and land would be brief. Having the pad itself visible from the highway could be somewhat more of a factor. In both cases, however, the effects are likely to diminish over time as helicopter activity becomes more familiar to motorists who regularly use the route. Also, planned landscaping will largely shield the view of the pad from the highway.

- **Interaction with Sonoma County Airport**—Informal discussions in 2006 and 2009 with the chief of the air traffic control tower at the airport indicate that a helistop at the proposed hospital site would not be a conflict with air traffic at the airport. However, the site is in the tower's control area and two-way communications between helicopters and the tower would be required. Highway 101 is already a major helicopter flight route. Helicopters passing through the area fly at 500 feet AGL, below the typical airplane altitude of at least 1,000 feet.

HELISTOP APPROVAL PROCESS

Although the SMCSR helistop is being planned as part of the overall medical center project, it has distinct approval requirements of its own. The final step in this approval process will be for Sutter Health to obtain a Heliport Permit from the Division of Aeronautics of the California Department of Transportation as required by California Public Utilities Code Section 21663.

Under the process established by the Division, approval from three other agencies must be obtained prior to issuance of the Heliport Permit.

- **Federal Aviation Administration**—Notice of the proposed facility must be submitted to the FAA (FAA Form 7480-1, *Notice of Landing Area Proposal*). The FAA will conduct an aeronautical study to determine whether the helistop's approach/departure paths would be free of obstructions and not conflict with the approaches to nearby airports.

- **Sonoma County Airport Land Use Commission (ALUC)**—The helistop proposal must be submitted to the ALUC for review in accordance with Public Utilities Code Section 21661.5. The concerns of the ALUC will focus on the compatibility of the helistop with respect to nearby land uses. Noise and safety impacts must be avoided or adequately mitigated.

- **County of Sonoma**—The state requires that the Sonoma County Board of Supervisors, as the governing body of the jurisdiction in which the helistop will be located, approve the plans for the helistop. This action is expected to be taken in conjunction with approval of the medical center project as a whole. County certification that the project complies with California Environmental Quality Act requirements also must be documented.

Once these approvals have been obtained, copies of the approval documents must be submitted to the Division of Aeronautics along with a permit application and certain other materials describing the proposed facility. If the proposal meets state criteria, the Division will first issue a Heliport Site Approval Permit indicating the Division's concurrence with the construction plans. Following construction, the Division staff will inspect the facility to verify that it has been built as proposed. Assuming that the project is built according to those plans, the Division will then issue a Heliport Permit enabling air operations to commence.

A completely separate approval step worth noting involves the California Office of Statewide Health Planning and Development (OSHPD). This agency has specific review and approval authority over the construction of hospital buildings. This approval authority extends to hospital heliports if the heliport is an integral part of the hospital building—as would be the case for a rooftop facility—or draws electrical power from the hospital power supply. Normally, a ground level heliport with its own power connections does not require OSHPD approval.

Aircraft	Gross Weight (Pounds)	Overall Length (Feet)	Rotor Diameter (Feet)	Landing Gear (length x width) (Feet)	Std. Fuel Capacity (Gallons)	Local Operator
Aerospatiale 355F (Twin Star)	5,071	42.6	35.1	4.5 x 6.6	193	Stockton
Agusta A109	5,730	42.8	36.1	11.6 x 8.0	146	CalStar REACH – Santa Rosa
Bell 206 L (Long Ranger)	4,150	42.5	37.0	6.8 x 7.2	110	Calif. Hwy Patrol Sonoma Co. Sheriff
Bell 212	11,200	57.3	48.0	7.6 x 8.3	215	
Bell 222	8,250	50.3	42.0	12.2 x 9.1	187	CalStar
Eurocopter EC 135	6,250	33.5	33.5	10.5 x 6.6	177	Life Flight – Stanford REACH – Santa Rosa
Eurocopter H-65 (Dolphin)	9,480	44.4	39.1	11.8 x 6.2	300	U.S. Coast Guard
MBB BO105	5,732	38.8	32.2	8.3 x 14.8	151	CalStar
MBB BK117	7,056	42.7	36.1	8.2 x 10.6	157	
MD 902 Explorer	6,740	38.8	33.8	7.3 x 9.3	159	CalStar
Sikorsky S76	11,400	52.5	44.0	16.4 x 8.0	281	
Sikorsky HH-60G (Pavehawk)	19,000	64.8	53.6	28.9 x 8.8	117	Calif. Air Guard

Source: Mead & Hunt, Inc. (January 2009)

Exhibit 1

Common Aeromedical Helicopters

Northern California

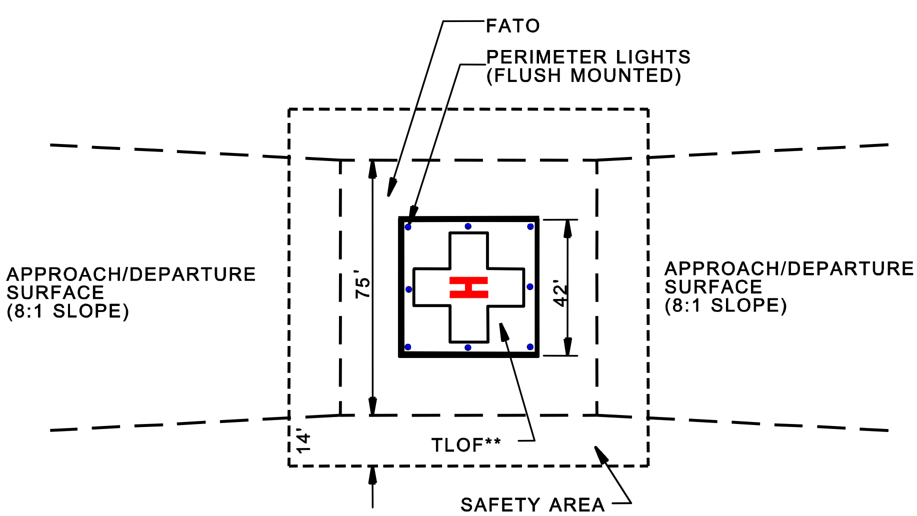
Minimum Standards

Feature	Criterion	Dimension*	Comments
Touchdown and Liftoff Area (TLOF)	1.0 x rotor diameter	42 feet	Sometimes referred to as *helipad*; Must be load bearing surface; Can be round or square
Final Approach and Takeoff Area (FATO)	1.5 x overall length	75 feet	Clear of objects; Graded to remove surface irregularities and assure drainage
Safety Area	⅓ rotor diameter beyond FATO (minimum 10 feet)	14 feet	Clear of objects including poles, trees, parked vehicles
Approach/Departure Surface		8:1 (12.5%) slope	Clear of obstructions, 75 feet wide at inner end, 4,000 feet long, 500 feet wide at outer end; can be curved
Transitional Surface		2:1 slope	Clear of objects, including poles, trees, parked vehicles

* Based upon critical helicopter having 42-foot rotor diameter and 50-foot overall length (e.g., Bell 222).

Recommended Dimensions

(same dimensions apply to a circular design)



**The TLOF is shown square, but can also be circular

Source: *FAA* Heliport Design *Advisory Circular (September 2004)*

Exhibit 2

Hospital Helipad Design Standards

Sutter Medical Center of Santa Rosa

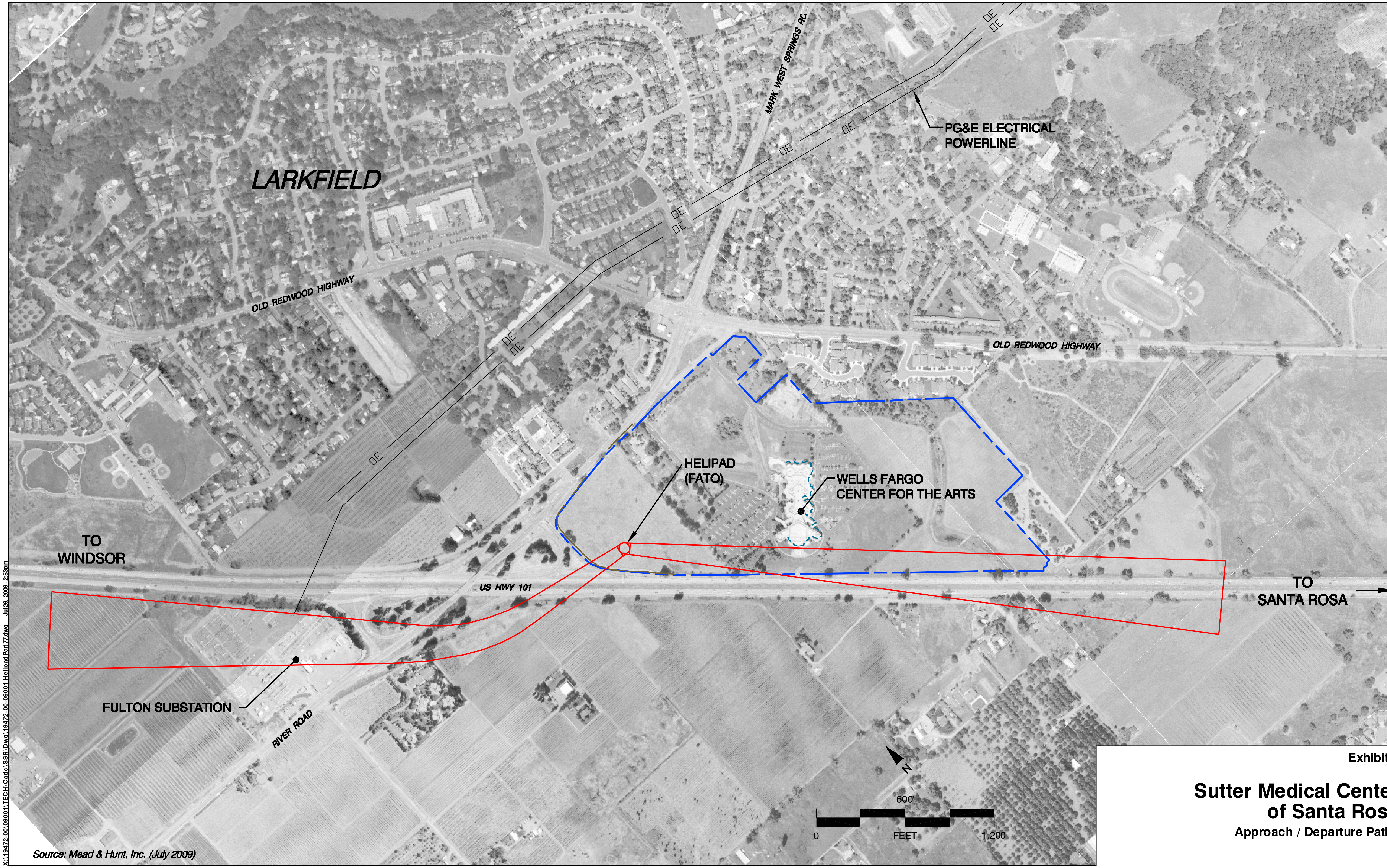


Exhibit 3

Sutter Medical Center of Santa Rosa

Approach / Departure Paths

X:\19472-00\09001\TECH\Cadd\SSR\Dwg\19472-00-09001 Helipad Part77.dwg Jul 29, 2009 - 2:53pm

APPENDIX J

PUBLIC SERVICES TECHNICAL REPORTS

Appendix J1

Fire System Proposal for the Sutter Medical Center of Santa Rosa

Brelje & Race
CONSULTING CIVIL ENGINEERS

August 18, 2009

Bob McIntyre, Fire Marshal
Department of Emergency Services
2300 County Center Drive, Room A221
Santa Rosa, CA 95403

Fire Chief Doug Williams
Rincon Valley Fire District
91 Middle Rincon Road
Santa Rosa, CA 95409

Subject: **Fire System Proposal for the Sutter Medical Center of Santa Rosa**
50 Mark West Springs Rd, Santa Rosa
Assessor's Parcel Numbers 58-040-058 and 059

B&R File No. 3231.01

Gentlemen:

We have been working diligently on the proposed fire and life safety design for the Sutter Medical Center Santa Rosa (SMCSR) project, proposed adjacent to the Wells Fargo Center for the Arts (WFC) to meet the needs of the County Department of Emergency Service and the Rincon Valley Fire District. There is an existing 8" diameter fire and domestic water system loop, owned and operated by California American Water Company (Cal Am), serving the WFC property. SMCSR proposes a privately owned fire system loop for the medical complex. This private loop system will be connected to the Cal Am system in Mark West Springs Road in at least two locations (one directly, one indirectly), and to the existing Cal Am system on the WFC property in two additional locations. This highly looped system will provide significant redundancy and therefore reliability in the expanded fire protection system. The proposal that we offer for your review and approval consists of the following components:

1. Cal Am has confirmed that they can provide a minimum fire flow of 2500 gallons per minute for a duration of 2 hours from their existing water main located in Mark West Springs Road along the project frontage. The calculated basic fire flow for the proposed hospital (SMCSR), future Physician's Medical Center (PMC), and future Medical Office Building (MOB), based upon their size and type of construction, is 3750 GPM. However, §B105 CFC allows the local fire authorities to approve up to a 75% reduction of the required fire flow under certain circumstances, such as providing NFPA 13 fire sprinkler systems in all structures, but in no case less than 1500 GPM. The fire flow available from Cal Am at the project frontage represents a 34% reduction from the base flow, and is approximately 67% more than the 1500 GPM minimum flow.

2. All medical center buildings will be separated into separate fire areas so that if there were an event in one of the buildings, it will be contained within that building.

3. Providing an improved emergency access to the Wells Fargo Center by widening and improving the main and secondary entrance roadways.

4. SMCSR is currently assisting the Wells Fargo Center in securing necessary permits for a new fire alarm system for the WFC facility. This work is intended to be executed by WFC as their separate project.

5. The proposed hospital, future PMC, and future MOB will all be provided with Class I standpipes in the stair enclosures even though Class I standpipes are not required in less than 4 story buildings. These facilities provide additional support for the reduction in the base fire flow.

6. The proposed new hospital (125,715 SF; 2 stories) will be of Type I-B Construction rather than Type III-B as allowed by the California Building Code, providing superior fire resistant construction.

7. The proposed future PMC (100,000 SF; 3 stories) will be of Type II-A Construction rather than Type III-B as allowed by the California Building Code, providing superior fire resistant construction.

8. The proposed future MOB (80,000 SF; 3 Stories) will be of Type I-B Construction rather than Type III-B as allowed by the California Building Code providing superior fire resistant construction. Alternatively, the owner may propose a smaller (72,000 SF, 3 stories) building of Type II-A construction if the cost of the Type I-B building is prohibitive.

9. The proposed new Central Utility Plant (CUP, 4,400 SF; 1 Story) will be of Type II-B Construction rather than Type V-B as allowed by the California Building Code, again, providing superior fire resistant construction. The proposed new Plant Operations and Maintenance building (PO&M, 3,200 SF; 1 Story) will be of Type V-B Construction.

An exhibit depicting the locations on the site of the various structures discussed above is attached to assist with your initial review of the proposal.

Matthew Stockton, PE has met with Kevin Moore, OSHPD Fire Marshal, to preview this proposed design. Mr. Moore has indicated his initial opinion that the proposed design appears to meet the OSHPD requirements for fire flow, contingent upon review and approval from your two jurisdictions.

We would like to meet with you to formally present our proposed design. Please let us know when we can schedule such a meeting.

Very truly yours,

BRELJE & RACE

Thomas R. Jones

enclosure

cc w/enc: Jerry Faddis – Fire Plan Check Specialist II
Department of Emergency Services
County of Sonoma
2300 County Center Drive, Suite 221 – Building "A"
Santa Rosa, CA. 95403

Kevin Moore
OSHPD FLSO II – Northern Region
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Tom Minard, Project Manager
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100 Roland Way, Suite 220
Novato, CA 94945

Fred Feizollahi
California American Water Company
P.O. Box 15468
Sacramento, CA 95851-0468

Sutter Medical Center
of Santa Rosa

Site Plan
For Reference Only

HGA
Architecture | Engineering | Planning

Appendix J2

Correction to Fire System Proposal Dated August 18, 2009 for the Sutter Medical Center of Santa Rosa

Brelje & Race
CONSULTING CIVIL ENGINEERS

September 2, 2009

Bob McIntyre, Fire Marshal
Department of Emergency Services
2300 County Center Drive, Room A221
Santa Rosa, CA 95403

Fire Chief Doug Williams
Rincon Valley Fire District
91 Middle Rincon Road
Santa Rosa, CA 95409

Subject: **Correction to Fire System Proposal Dated August 18, 2009 for the Sutter Medical Center of Santa Rosa**
50 Mark West Springs Rd, Santa Rosa
Assessor's Parcel Numbers 58-040-058 and 059

B&R File No. 3231.08

Gentlemen:

Following the publication of our letter of August 18, 2009, it was noted that Item 7. contained a typographical error relative to the type of construction proposed for the Physician's Medical Center (PMC). The statement should have read as follows:

7. The proposed future PMC (100,000 SF; 3 stories) will be of **Type I-B** Construction rather than Type III-B as allowed by the California Building Code, providing superior fire resistant construction.

Type I-B is a more fire resistant type of construction than the incorrectly indicated Type II-A in the letter of August 18, so this error does not adversely impact the proposal for fire flow and duration. We apologize for any inconvenience this error may have caused.

Very truly yours,

BRELJE & RACE

Thomas R Jones

Thomas R. Jones

REGISTERED PROFESSIONAL ENGINEER
THOMAS R. JONES
No. 30129
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Sacramento, CA 95851-0468

APPENDIX K

TRAFFIC TECHNICAL REPORTS

Traffic Impact Study
Application Submittal (August 2009 Revised Submittal)

Sutter Santa Rosa Medical Center
Hospitals and Medical Office Building
50 Mark West Springs Road
Larkfield-Wikiup Community

Prepared by **Dowling Associates, Inc.**

Project Manager: Steven B. Colman, PTP
(510) 839-1742 ext. 121
scolman@dowlinginc.com
Dowling Project P04-065.5

For Sponamore Associates
Environmental Planning

August 24, 2009

Abbreviations that are frequently used in this report:

ADA	Americans with Disabilities Act
ADT	Average Daily (24 Hour) Traffic—generally refers to a weekday, unless noted.
APN	Assessor's Parcel Number
AASHTO	American Association of State Highway & Transportation Officials
AWSC	All-Way Stop Control
EVA	Emergency Vehicle Access
GSF	Gross Square Feet (building floor area)
HCM	Highway Capacity Manual
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
KSF	Thousand square feet
LF	Linear Feet
LT	Left Turn
LOS	Level of Service
MOB	Medical Office Building
MUTCD	Manual on Uniform Traffic Control Devices
MV	Million Vehicles
PDO	Property Damage Only
PRMD	Permit and Resource Management Department, County of Sonoma
PTP	Professional Transportation Planner
RT	Right Turn
SCT	Sonoma County Transit
SF	Square feet
TAZ	Traffic (Travel) Analysis Zone
TWLTL	Two-Way Left Turn Lane
V/c	Volume to Capacity ratio
VPH	Vehicles per Hour
WFC	Wells Fargo Center, formerly, Luther Bank Center for the Performing Arts

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Executive Summary

Scope

The scope of this study encompasses the relocation of the existing Sutter Hospital from its existing site on Chanate Road in the City of Santa Rosa, along with a new medical office building and a joint venture (JV) hospital. The existing Chanate Road facilities would be re-used, possibly for family medicine, but are not part of this study. The present study includes a phased development of the site:

2010-2012	Site preparation; import of up to 100,000 cubic yards (CY) of fill via truck
2010-2013	126,000 square foot (sf) Sutter hospital 100,000 sf joint-venture hospital 80,000 sf medical office building
2014 or later	36,000 sf hospital addition

Description of the Proposed Development

The project would consist of a variety of uses on an approximately 53-acre site located in the southeast quadrant of the US 101/Mark West Springs-River Road interchange. These include a medical center complex, including a hospital and medical office building and associated parking. However, no significant changes in the Wells Fargo Center (WFC) operations are proposed, at least in so far as they affect the traffic generation of the site.

Summary of Traffic Generated

The existing Wells Fargo Center currently generates approximately 1,250 trips on a non-event day[1]. The proposed medical center (hospitals and MOB combined) would generate approximately 4,600 (rounded) weekday vehicle trips at completion of Phase II, and 4,950 at completion of Phase III. The traffic generated by the WFC operations would vary considerably depending on the events planned. A major event day at WFC could generate more than 2,800 vehicle trips over 24 hours.

In the morning commute period, the medical center project Phase II (both hospitals and MOB) would generate 302 trips at completion. Most special events at the WFC would not occur in the morning, although it is possible that a conference or banquet event could overlap with the AM peak hour.

In the evening commute, typically 4:30-5:30 PM, the phase II medical center would generate 444 trips at completion.[2] WFC traffic would depend on the nature of the events held; currently, most large events on weekdays begin between 7 and 8 PM, with most traffic traveling inbound to the site and departing some two to three hours later.

---

[1] This data was from 2004, but has not significantly changed since then, since it is limited by the physical facilities at WFC. Crane Transportation Group (CTG) did a count on 5/14/08 (Wednesday) that arrived at a lower count—531 trips in and out of the site, total.

[2] This excludes operations of the Wells Fargo Center.

Description of Primary Access Routes

The site is accessed primarily from Mark West Springs Road. Because of its proximity to the US 101 freeway, however, most of the traffic generated is expected to use the US 101 Mark West Springs Road-River Road interchange, which is less than a quarter-mile from the site entrance. Other access routes are Old Redwood Highway, and to the east Mark West Springs Road becomes Petrified Forest Road, with connections to northern Napa and Lake Counties.

Description of Access Points

The existing property includes two access points: the main driveway at Mark West Springs Road, approximately 200 feet east of Lavell Road; and a secondary access (used mainly by an existing private school on the WFC campus) which is off East Fulton Road. The project proposes to add an additional one-way entry point, for emergency vehicles only, on Mark West Springs Road approximately 250 feet east of the US 101 northbound off-ramp.

Description of the Study Area

The study area includes Mark West Springs-River Road and Old Redwood Highway in the vicinity of the project, between River Road/Fulton Road on the west, and Mark West Springs/Old Redwood Highway on the east. The study area extends down Old Redwood Highway to the northbound US 101 ramps at Old Redwood Highway/Mendocino Avenue, about two miles south.

Description of the Study Area Land Use and Zoning

The project is described in detail in the project application. The Wells Fargo Center is currently within the "PQP" (public/quasi-public) land use category and within the "PF" zoned district. It is also designated PQP in the Larkfield-Wikiup Area Plan. No change in zoning is contemplated.

Surrounding land uses are varied, including agricultural/vineyard uses to the south and west; residential uses to the north and east, along with existing commercial uses near the intersection of Mark West Springs Rd./Old Redwood Highway. There are several public and private schools in the area.

Key Findings, Mitigations and Recommendations of the Study

Mitigations are proposed depending on the project phase and the timing of improvements to the US 101 Mark West Springs-River Road interchange. In summary, the interim improvements necessitated by the project would include:

- Signalization of the Main WFC entry on Mark West Springs Road, with interconnect installed to the two adjacent signals (US 101 northbound off-ramp and Old Redwood Highway).

- Widening of Mark West Springs Road, as shown conceptually in drawings prepared by

Brelje & Race. This provides for an additional eastbound thru travel lane, plus a right turn only lane into the WFC, a bike lane (Class II), and a shoulder area (minimum of 8') between the US 101 northbound off ramp and the emergency vehicle access (EVA) on Mark West Springs Road

- Addition of a second right turn only lane northbound off-ramp from US 101 northbound off-ramp to Mark West Springs Road.

This traffic study anticipates that all of these projects are completed and open to traffic by the time the proposed project is occupied.

In addition to the interim improvements, the ultimate improvements, based on the County's General Plan 2020 and other transportation plans, would include:

- Widening of the River Road-Mark West Springs Road/101 overcrossing to four lanes

- Widening of US 101 to six lanes, with the two inside lanes reserved for high occupancy vehicles (HOVs) during peak periods. This is under construction and expected to be completed by 2012.

- Widening River Road to four lanes between from Brickway Extension (now Laughlin Road) and US 101, along with traffic control improvements at the River/Laughlin intersection.

- Widening Fulton Road to four lanes from the Santa Rosa City limits north to Airport Blvd.

The ultimate improvements shown above are consistent with the *Sonoma County General Plan 2020* and plans by the Sonoma County Transportation Authority (SCTA) and Caltrans. The proposed mitigations are more detailed than, but do not conflict with, the transportation plans of any of these other agencies. These projects are primarily necessitated by cumulative traffic growth in the Larkfield-Wikiup and Airport communities, and northern Santa Rosa.

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1. INTRODUCTION/STUDY PARAMETERS

A. Description of the Proposed Development

1. Project Location

The proposed development is located north of the City of Santa Rosa in the Larkfield-Wikiup community. It includes approximately 53 acres, of which 15 acres near the US 101 northbound off-ramp at River Road/Mark West Springs Road are proposed for use as a medical center, and the remainder of the site by the existing Wells Fargo Center (WFC). Figure 1 on the following page shows the roadways in the immediate vicinity.

2. Existing Uses

Existing uses surrounding the site include US 101 freeway, residential uses to the east and north; vineyards, and the WFC. WFC currently has approximately 140,000 gross square feet of building floor area consisting of:

- The Person Theater (1,668 person capacity, including standees)
- Carston Cabaret (225 seats)
- Fireside Room (multipurpose/banquet room, 150 seats)
- Merlo/East Wing Theater (380 seats)
- East Wing Classrooms (Santa Rosa Christian School, 235 students) and playfields
- Conference facility (50,000 square feet)
- Mechanical structures and wastewater treatment plant
- Ancillary office space for WFC staff
- Approximately 903 paved surface parking spaces

3. Project Description

The project is described in detail in the proposed application materials, along with the purposes of the project. Sutter's project purpose is to provide a new, modern medical facility near Santa Rosa that would comply with the Hospital Seismic Safety Act (SB 1953), and would permit location of doctors' offices close to the hospital in a medical office building (MOB).

There would be three project phases: the first phase between approximately 2010 to 2012, and the second phase before the end of 2013, and the last and final phase undetermined, but in 2014 or later. The components in each phase, described below, could proceed independently, however.

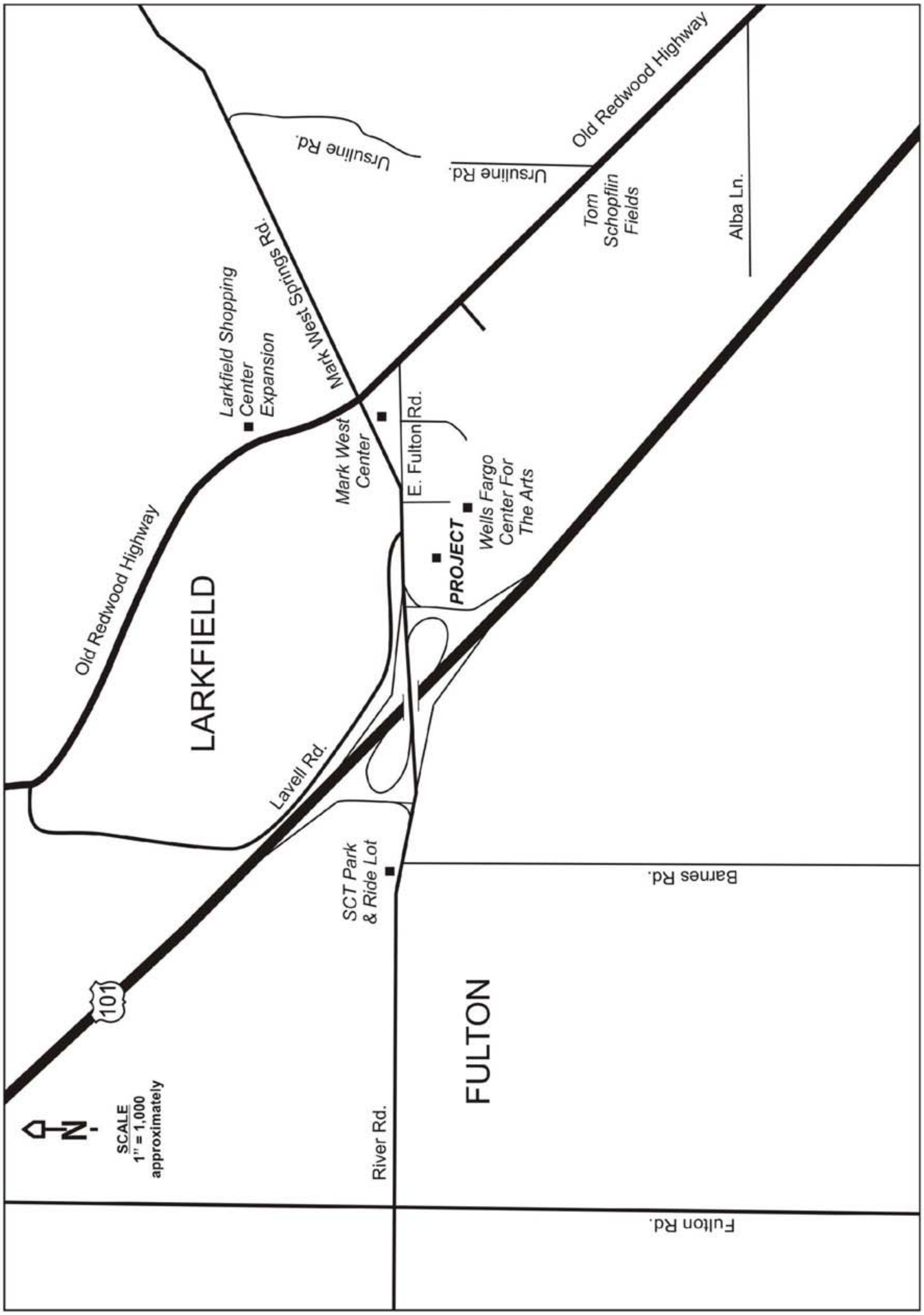


Figure 1

Site Vicinity and Approved Developments

Dowling Associates, Inc.

4. Project Components

Phase I is primarily site preparation. The Medical Center construction begins in Phase II, and relocates and modernizes the existing Chanate Road facility. Sutter's facility would consist of a hospital with a 70-bed acute inpatient facility and 126,000 square feet. A MOB would include 80,000 square feet, including 50 physician offices with approximately 200 supporting staff (total of 250 employees). A joint-venture hospital adjacent to Sutter's would include up to 100,000 square feet of floor space, with 28 hospital beds. An expansion project, if undertaken, would add 29 hospital beds in Phase III. Parking and road improvements are planned as well, as described in this report. Existing administrative and accounting functions would remain at the Warrack hospital location.

The existing WFC has 903 parking spaces. Sutter would add 943 parking spaces to this total in the Phase II development. In Phase III, 44 spaces would be lost due to construction of a new building area and consequent loss of parking, reducing the Sutter-provided parking to 899 spaces. Sutter would share some of its parking, in designated areas, with WFC for event parking after 5 pm. The shared parking area would be on the east side of the main driveway.

The proposed project would share its principal driveway with WFC, but WFC does not intend to operate all of their facilities simultaneously at their capacity; therefore, the concept of a "design day" has been used to better suit their actual operating practices. It is likely that traffic and parking constraints will act as the control on the maximum utilization of the site.

5. Site Plan

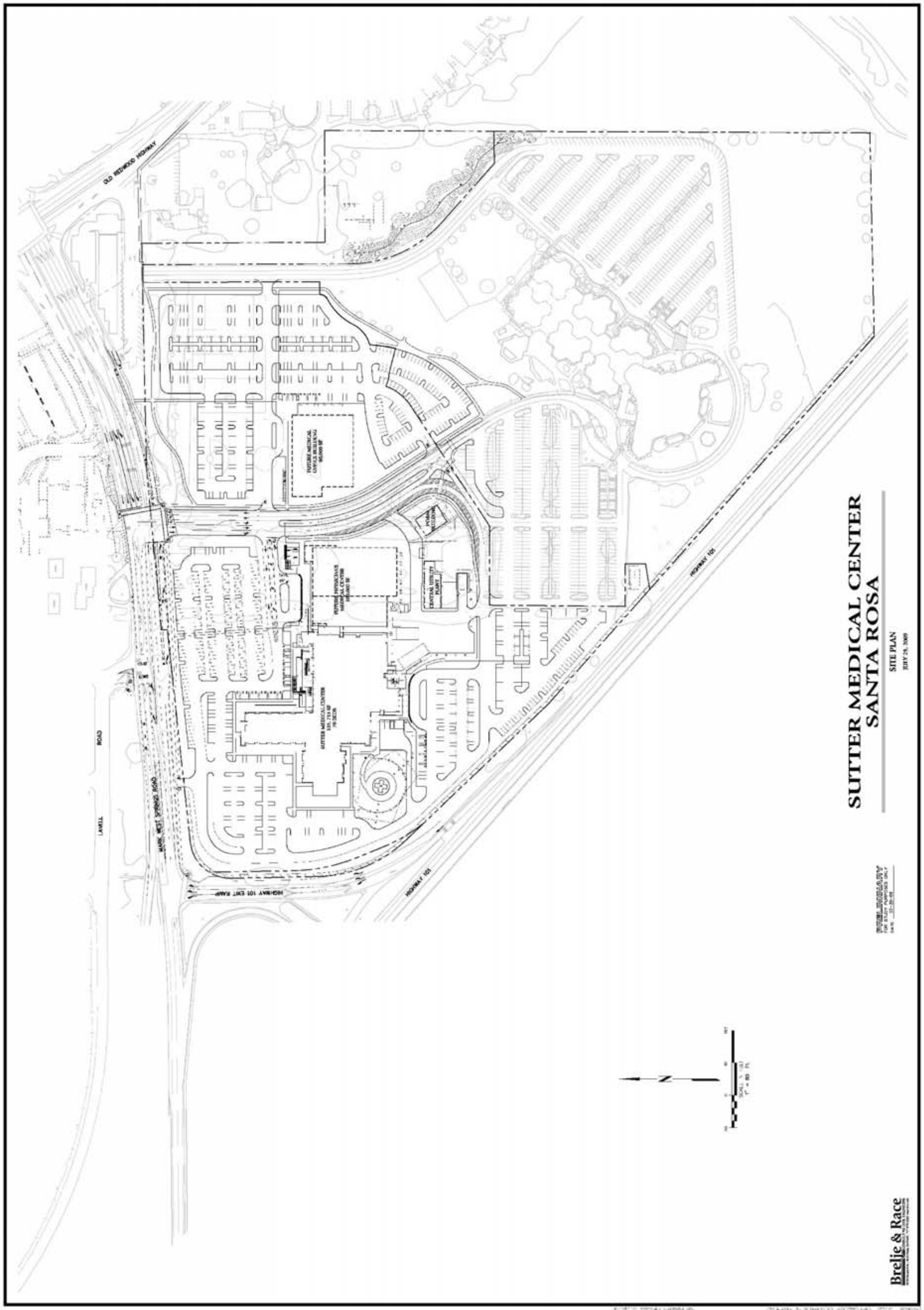
The site plan has not been fully designed at this point, so only a conceptual layout can be used for this traffic study. A dimensioned site plan is shown in Figure 2 on the next page. Because of the scale of the plan, it is difficult to show pedestrian access and circulation. A general description of the pedestrian access is as follows:

- A standard-width sidewalk would be provided along the south side of Mark West Springs Road. There is an existing sidewalk on the south side of the US 101 bridge.
- Pedestrians (and cyclists) can access the medical center facilities using a path located at the proposed EVA on Mark West Springs Road.
- Pedestrian access to Old Redwood Highway (including the transit stops located on it) would be provided either at the old E. Fulton Road (east) entrance, or the main (signalized) driveway. A standard-width sidewalk would be included on at least one side of all major internal roadways.

B. Study Area, Circulation Network and Land Uses

1. Study Area Limits

The study area was shown in Figure 1. The study area includes these intersections:


SUTTER MEDICAL CENTER
SANTA ROSA
SITE PLAN
HIGHWAY 101
HIGHWAY 101 EXIT RAMP
MARK WEST SPRINGS ROAD
OLD REDWOOD HIGHWAY
Brelje & Race

- River Road/ Fulton Road (signalized)
- River Road/Barnes Road (two-way stop on Barnes)
- River Road/US 101 southbound off ramp (two-way stop on ramp—signal under construction)
- Mark West Springs Road/US 101 northbound ramp (signalized)
- Mark West Springs Road/Lavell Road (two-way stop on Lavell)
- Mark West Springs Road/Wells Fargo main entry drive (two way stop on drive)
- Mark West Springs Road/Old Redwood Highway
- E. Fulton Road (Mark West Center)/ Old Redwood Highway

The study area limits were chosen to include the major signalized intersections within 1.25 road miles of the proposed site.[3] Important unsignalized intersections (as noted above) were also included in the analysis. Another reason for choosing this study area is that a large portion of the project traffic (59%) is expected to use US 101 to or from the site from the north or south, because of good freeway access. This is further documented in the traffic distribution assumptions, in Section 2.C.2.

2. Study Area Map and Access to State and Local Roadways

Figure 1 showed the study area map. The main access to the project site would be via the existing private driveway intersecting Mark West Springs Road east of Lavell Road. As part of the project, this roadway would ultimately be widened to two inbound and three outbound lanes, and the intersection signalized. A full width shoulder (8-10 feet wide) would be added in the inbound direction. Presently there is a stop control on the driveway, and no control on Mark West Springs Road, with one inbound and two outbound lanes. The outbound lanes would ultimately be striped for dual left turns and one right turn only lane.

An existing access at East Fulton Road (which is a stub street off Old Redwood Highway) provides a secondary driveway access to the site, used primarily by activities on the east side of the property. As part of the Mark West Center commercial project, E. Fulton Road has been altered to be westbound only between the WFC's secondary driveway and Mark West Springs Road, with a mandatory right turn at Mark West Springs Road. E. Fulton Road and Old Redwood Highway (ORH) would continue to permit all turn movements. The secondary access would continue to be primarily for WFC uses; today, it is used primarily by the Santa Rosa Christian School.

Old Redwood Highway is presently a two-lane roadway with shoulders. Within the Santa Rosa city limits, there are Class II on-street bike lanes, and a posted speed limit of 40 mph. North of the city limits, in unincorporated county territory near the project site, there are shoulders but no bike lanes, and a posted speed limit of 45 mph.

Mark West Springs Road and River Road form a continuous route. Both provide one travel lane in each direction, with left turn pockets at major intersections. Both "flare" out to four travel lanes at the major signalized intersections of Fulton Road on the west, and Old Redwood Highway on the east. The site generally has good access and good visibility from the US 101 freeway. US 101 is designated as a route in the federal National Highway System (NHS), but is not part of the

[3] The intersections of Old Redwood Highway at Lavell Road, and Mark West Springs Road at Ursuline Road, were not included because field observations indicated that they are not subject to congestion.

Federal Interstate system. It was constructed in the 1950s and early 1960s to the rural freeway standards of that era, and is two lanes in each direction.

Freeway access from the south is provided via the existing northbound diagonal off-ramp at River Road-Mark West Springs Road. This intersection is currently signalized and has separate left and right turn lanes. Mark West Springs Road is two lanes (one in each direction) in this area, although it widens to four lanes near ORH. There are left turn lanes at Lavell Road and the WFC main drive. The proposed primary entrance to the project would be approximately 800 feet east of the freeway ramp. Returning to the south involves a left turn out of the site, proceeding west on Mark West Springs road over the two-lane bridge over 101, then using the existing on-loop (a slight right hand turn) to 101 southbound. From the north, freeway access is provided by the unsignalized diagonal off-ramp at River Road, and the return is provided by the diagonal on-ramp from Mark West Springs Road.

The River Road-Mark West Springs Road interchange is a partial cloverleaf ("par-clo") with on-ramp loops in the northwest and southeast quadrants. Although constructed in the mid-1960s, par-clos are still considered a good interchange design and can carry significant traffic volumes, even with the two-lane bridge over US 101.

Mark West Springs Road to the east becomes Petrified Forest Road, and then Calistoga Road. It serves not only rural Northeast Santa Rosa, but also northern Napa County as well as Lake County trips.

3. Zoning Map

A zoning map is shown in Figure 3.

4. Existing, Approved, and Proposed Development in Study Area

The following was supplied by PRMD staff [4] (see Figure 1 for a map of project locations).

Table 1
Nearby Projects - Approved but Not Yet Built

Larkfield Shopping Center Expansion – Old Redwood Highway/Pacific Heights Drive
(retail and drugstore with drive-thru window)
+31,500 square feet to existing center

Other uses represented by growth factors, as follows[5]:

River Road	½ % per year
Mark West Springs Road	1% per year west of Old Redwood Highway
	2% per year east of Old Redwood Highway
Old Redwood Highway	1% per year

[5] Growth factors provided by David Wallace, Transportation and Public Works Department, 9/20/05.

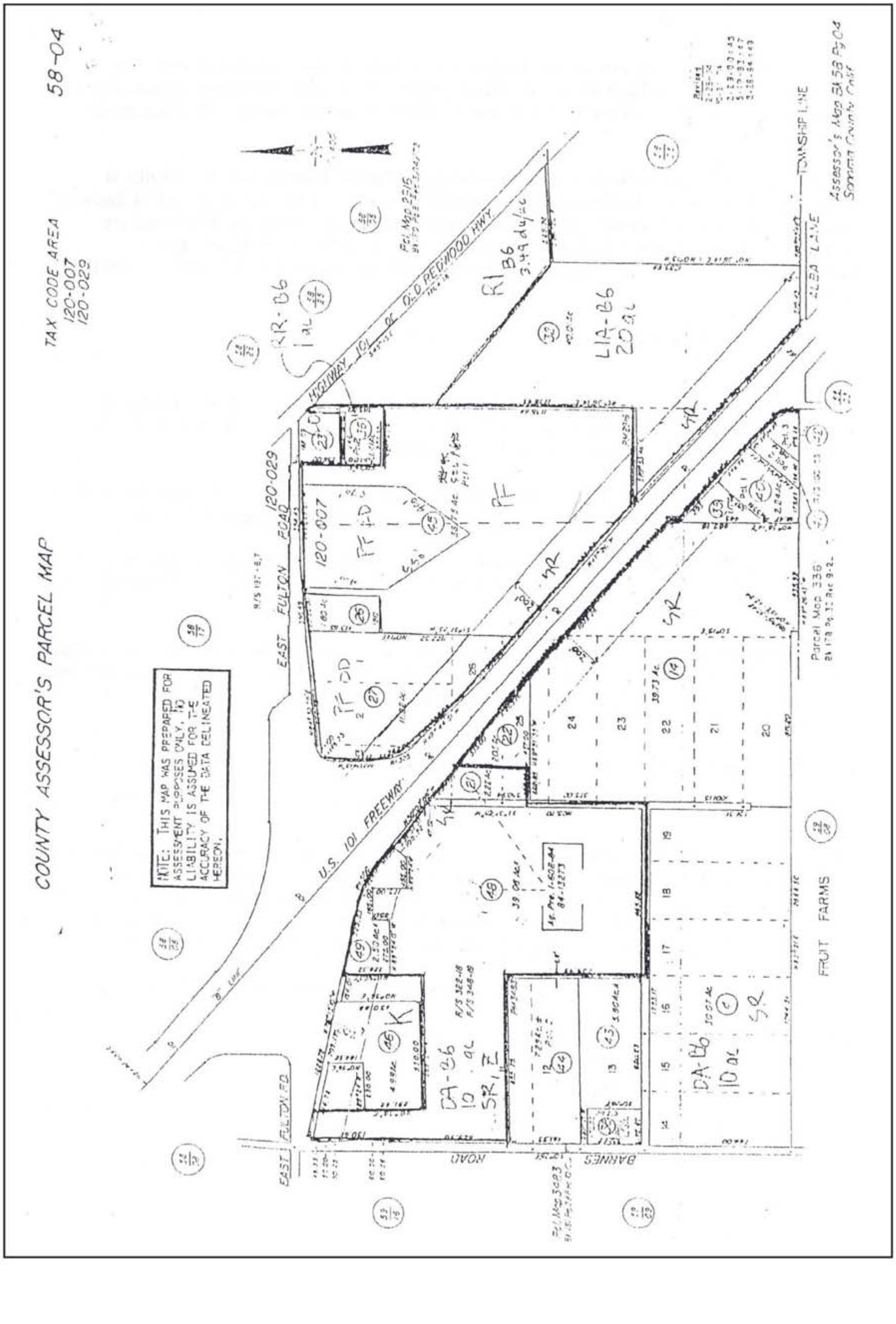


Figure 3
Zoning Map

Dowling Associates, Inc.

The growth factors represent historic trends, and should represent traffic from some projects that have not been individually studied in this report, such as the proposed Spring Hills Community Church at River and Fulton Roads. That project would generate fairly small volumes during weekday PM peak hour—22 inbound and 21 outbound vehicle trips (see W-Trans, 2006, page 13). With the recent major economic recession, the growth factors probably overstate the near-term traffic growth on the study roadways.

There are many approved but not yet built projects in the Airport Industrial area (over a million square feet of industrial/ office). Kaiser Health Plan completed construction of a new MOB to their existing complex on Old Redwood Highway approximately 1.5 miles south of the project site.

There are several schools in the immediate vicinity. The Ursuline High School, St. Rose School, and Cardinal Newman gym are located approximately one-half mile south of the site at 4300 Old Redwood Highway. The school operates classes from 8:15 am-2:15 p.m. Mark West Elementary School is located just over a half mile north of the site, at 4600 Lavell Road. Riebli Elementary School is at 315 Mark West Springs Road, approximately 0.7 miles east of the project site.

5. References to Other Traffic Studies

- Dowling Associates. "Traffic Study and Alternatives Analysis Report – Kaiser Santa Rosa Medical Office Building North." Prepared for Kaiser Foundation Health Plan, Inc. and the City of Santa Rosa, June 19, 2002.
- Dowling Associates. "Traffic Impact Study Application Submittal—Sutter Santa Rosa Hospital Relocation-Luther Burbank Center Master Plan," January 3, 2005.
- Parsons Harland Bartholomew and Associates, "Wells Fargo Center for the Arts 25-Year Master Plan – Final Traffic Analysis." Prepared for Wells Fargo Center for the Arts, February 25, 2000.

Other recent traffic studies done in the general area are in the Airport Industrial area, which focused mostly on the Airport Blvd/Hwy 101 interchange.

C. Operating Scenarios and Hours Studied

1. Description of Operating Scenarios Studied

The operating scenarios studied were the relocation of the existing Sutter Hospital from its existing site on Chanate Road in the City of Santa Rosa, along with new medical office facilities, and a long-term master plan for the development of uses at the Wells Fargo Center. The existing Chanate Road facilities would be re-used, probably for family medicine, but are not part of this study. The present study includes a phased development of the site:

2010-2012 Site preparation; import of up to 100,000 cubic yards (CY) of fill via truck

2010-2013 126,000 square foot (sf) Sutter hospital
100,000 sf joint-venture hospital
80,000 sf medical office building

2014 or later 36,000 expansion of hospital use

Two analysis scenarios of Phase II and III have been done: a near-term scenario assuming the growth factors from Table 1, and a cumulative scenario that uses traffic volumes projected by the latest SCTA Sonoma County Travel Model (SCTM/07). This report also considers an Interim Improvements scenario, assuming the existing two-lane overcrossing (bridge) at US 101-River-Mark West Springs Road; and an ultimate improvements scenario, which assumes that the improvements are made to the interchange structures. These, along with the operating hours, represented reasonable breaks in the volume of traffic and improvements needed.

2. Hours of Operation Studied

The hours of operation studied have been:

- AM Peak Hour (generally, 7:30-8:30) on a weekday
- PM Peak Hour (generally, 4:30-5:30) on a weekday

3. Phasing Plan

The phasing plan is described in detail in the project application materials.

D. Description of Methodologies and Assumptions

1. Conformance to Caltrans Guidelines

The methods used in this study conform to those in Caltrans, "Guide for the Preparation of Traffic Impact Studies." The current version posted on the website is December 2002. The TRAFFIX® software package has been used to analyze intersection and arterial level of service. TRAFFIX® is one of Caltrans' approved software packages and faithfully implements the *2000 Highway Capacity Manual* (HCM) methods for intersections and urban arterials.

2. Assumptions/Rationale for Land Use Projections and Road Improvements

Land use data have been obtained from the current SCTA travel model land use database for 2005 and 2035. New road improvements have been assumed as noted, consistent with the County's General Plan. Consistent with the *Sonoma County General Plan 2020*, it is assumed that in the 2035 scenario, River Road and Mark West Springs Road would be improved to a four-lane facility between Laughlin Road (Brickway Extension) and Old Redwood Highway. Improvements to the freeway interchange (River-Mark West Springs Road), and widening 101 to six lanes with peak period HOV lanes was assumed in the ultimate/year 2020 scenario.

3. Assumptions Used in Calculating Level of Service (LOS)

The 2000 HCM was used for calculating traffic level of service. Mark West Springs Road and Old Redwood Highway were both treated as Urban Street Class II, per the 2000 HCM Exhibit 15-2. For signalized intersection analyses, the following assumptions have been used:

- Five seconds minimum green for each phase
- Three seconds per phase loss time (to a maximum of 12 seconds)
- Maximum 115 second cycle length (sum of max time for actuated signals)
- Actuated signals with no progression (unless explicitly stated)

E. Operating Standards

1. LOS Thresholds of Significance

For state-owned facilities, Caltrans endeavors to maintain a target LOS at the transition between LOS "C" and "D", however, Caltrans acknowledges that this may not always be feasible. The County LOS standard for intersections is LOS D or better. The Project would have a significant traffic impact if the project's traffic would cause an intersection currently operating at an acceptable LOS (D or better) to operate below the standard (i.e., LOS E or F). The County criteria apply to all signalized, all-way stop controlled (AWSC), and side street controlled intersections with *project* traffic volumes over 30 vehicles per hour (vph) per approach or per exclusive left-turn movement.

The County calls for roadway operations to maintain LOS for C for specific roadway segments. The project would have a significant traffic impact if the project's traffic would cause a road currently operating at an acceptable LOS to operate at an unacceptable level (i.e., LOS D, E, or F).

2. Projected Horizon Years for Assessment

The projected horizon years used existing and approved traffic and 2020. Year 2020 is the horizon year for the *Sonoma County General Plan 2020*.

3. Roadway Capacity Criteria

Roadway capacity is based on the values in the 2000 HCM, namely, an ideal capacity of 1,900 vph per lane per hour of green time for signalized intersections, and 2,350 vph per lane for freeways. The maximum freeway flow rate would be is 1,680 vph per lane at LOS C/D.

4. Volume to Capacity Ratios

The transition between C and D corresponds on freeways to a volume to capacity (v/c) ratio of 0.71, as specified by Caltrans "Guide for the Preparation of Traffic Impact Studies," Appendix "C".

2. TRAFFIC AND TRANSPORTATION ANALYSIS

A. Existing Conditions

1. Existing Surrounding Development

The proposed Project is located in travel analysis zone (TAZ) 127 in the Sonoma County Travel Model 2007 (SCTM/07). This zone is generally bounded by US 101, Old Redwood Highway, Mark West Springs Road, and Ursuline Road, and is known as Wikiup South. TAZ 98 is north of Mark West Springs Road, and is bounded by US 101, Old Redwood Highway, and Airport Blvd.; it is known as Larkfield South. TAZ 110 is east of Old Redwood Highway, and is bounded on the south by Mark West Springs Road and to the north by Airport Blvd. SCTA estimates the 2005 land use for these zones had the following land uses (excluding the WFC):

Table 2
Estimated Year 2005 Land Uses, by SCTM/07 Travel Analysis Zone

Land Use	TAZ 127	TAZ 98	TAZ 110
Single family units	230	574	906
Attached & multi-family units*	76	347	86
Office (sq. ft.)	42,800	34,900	69,400
Strip/highway retail (sq. ft.)	2,200	32,300	96,900
Shopping center retail (sq. ft.)	0	0	64,300
Light industrial (sq. ft.)	0	54,950	0
Warehouse-storage (sq. ft.)	0	110,000	0
School (students)	729	440	1,287

Source: Dowling Associates, and SCTA..
* Includes senior units. Values rounded.

2005 data are shown above for informational purposes, because they represent the year for which the SCTM/07 was calibrated, and there are no major additional projects (land uses) believed to have been added in the area. The 2005 data are not used for analyzing existing conditions. For existing conditions analysis and the short-term (through 2014), the analysis is based on 2008 traffic counts, which the SCTA travel model being used only for longer-term projections.

2. List of Prior Studies

This was covered in Section 1.B.5.

3. Traffic Circulation System and Controls

The circulation system with existing traffic control is shown in Figure 4 on the following page. Additional circulation discussion is provided in Section 1.B.2.

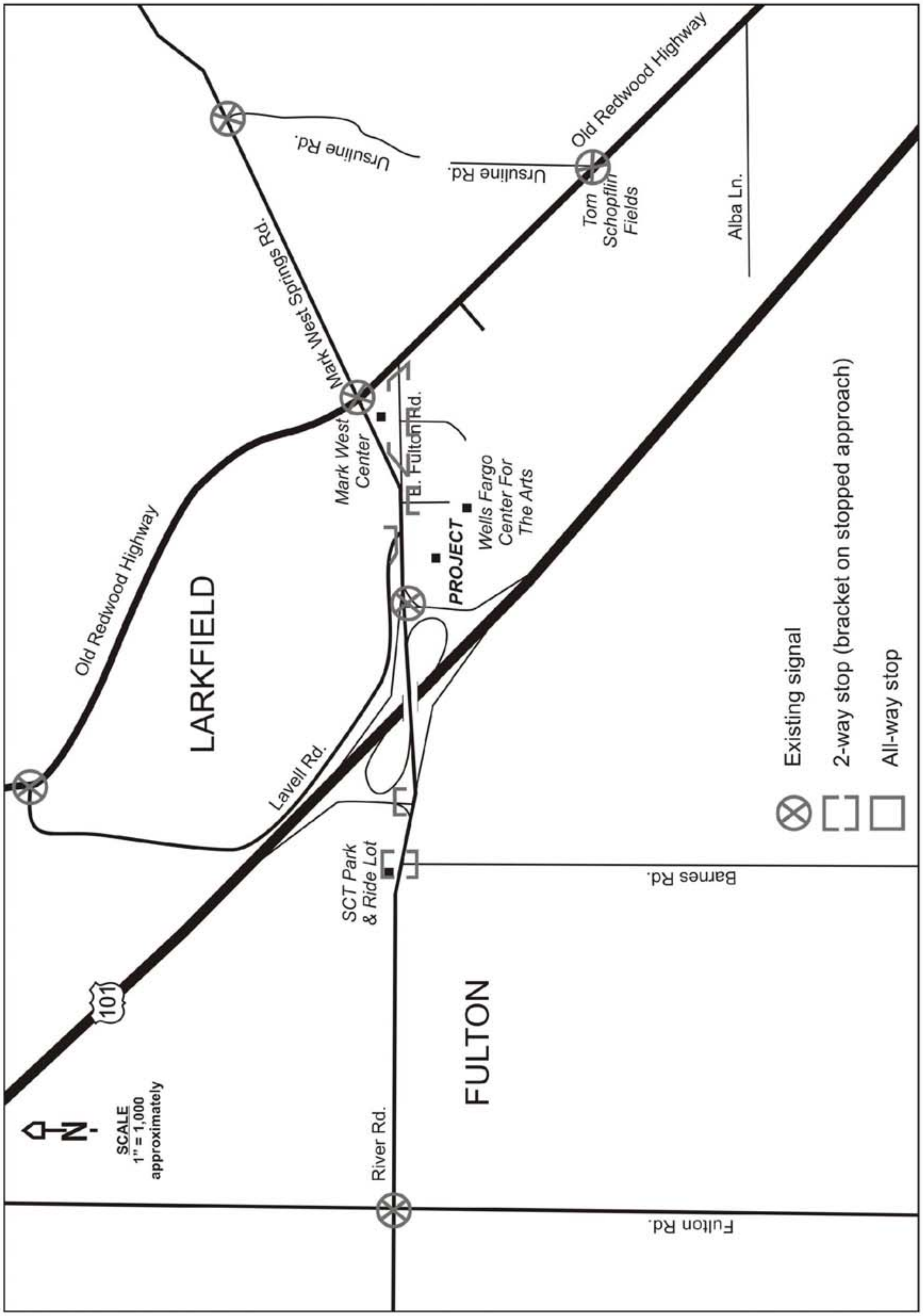


Figure 4
Traffic Circulation System and Controls

Dowling Associates, Inc.

4. Key Road Geometric Features

US 101 Interchange: This par-clo interchange has a two-lane overcrossing with a sidewalk on the south side only. The northbound ramp (east side of the freeway) is a signalized T-intersection, with a left and right turn only lanes. The current storage lengths are 415' for the left turn and 415' for the right turn lane, excluding the shared 'throat' area. The southbound off-ramp is currently a two-way stop controlled intersection, with left and right turn lanes; the southbound right turn lane has YIELD control. The storage lengths here are more than 500'. The signal is under construction as part of the HOV lane additions to US 101 in the vicinity.

Mark West Springs Road: This road has one travel lane in each direction, a left turn pocket at Lavell Road, and a continuous two-way left turn lane (TWLTL) until Old Redwood Highway. There are dual left turns eastbound at this intersection with Old Redwood Highway (570' each, for a total of 1,040 L.F.), and U-turns are prohibited by signage on all approaches. At the WFC main entry, the westbound left provides for 280' of left turn storage, from Mark West Springs Road into the Wells Fargo Center.

It has been assumed that additional lanes on Mark West Springs Road would be constructed toward the south (i.e., the northern curb line is set). This road is classified as a Rural Principal Arterial in the *Sonoma County General Plan 2020*.

River Road: Mark West Springs Road becomes River Road west of US 101 and also has two lanes. Left turn lanes are provided at Barnes Road and at Fulton Road. The intersection of River/Fulton Roads "flares" out to provide an additional travel lane in each direction, which quickly merges back to one lane. There are shoulders on River Road, and it is classified as a Rural Principal Arterial.

Old Redwood Highway: Old Redwood Highway generally has one lane in each direction with left turn lanes at key intersections, such as Mark West Springs Road and E. Fulton Road. Old Redwood Highway is classified as an Urban Principal Arterial.

WFC Main Entry: This private road currently has one inbound and two outbound lanes. The two outbound lanes are more than 500' long, providing at least more than 1,000 L.F. of storage distance.

WFC East Driveway (Santa Rosa Christian School): This roadway extends south from E. Fulton Road. There is one inbound and two outbound lanes (a left and a right turn lane).

Existing site access is further described in Section 1.B.2. Diagrams of existing intersection geometrics are provided in the Appendix to this report.

5. Existing Road Deficiencies

The primary road deficiency is that both Mark West Springs Road and Old Redwood Highway carry high traffic volumes during peak hours relative to their capacity. Vehicle queues during peak field visits were observed to extend nearly the entire distance between the two signalized intersections of Mark West Springs at US 101 and Old Redwood Highway. The congestion and queuing problem is particularly acute, albeit short-lived, when there is a major event at WFC.

6. Posted Speed Limits

US 101: Mainline posted speed 65 mph.

Mark West Springs Road: 40 mph between 101 and Pacific Heights Drive; increases to 45 mph east of Pacific Heights. A school zone (25 mph when children present) exists between Lambert Dr. and near Quiet Water Road.

River Road: 35 mph within the community of Fulton, increasing to 50 mph between Fulton and southbound US 101 off-ramp. The speed on the overcrossing is 40 mph due to sight-distance limitations on the vertical curve on the overcrossing structure.

East Fulton Road: No posted limit.

Lavell Road: 30 mph from Mark West Springs Road to about 500' northwest; then 45 mph.

Old Redwood Highway: 45 mph from the Santa Rosa city limits to about 500' south of East Fulton Rd., where it drops to 35 mph. It continues at 35 mph to Airport Blvd. There are school zones (25 mph) near Alba Lane, Ursuline Road, and Lavell Road.

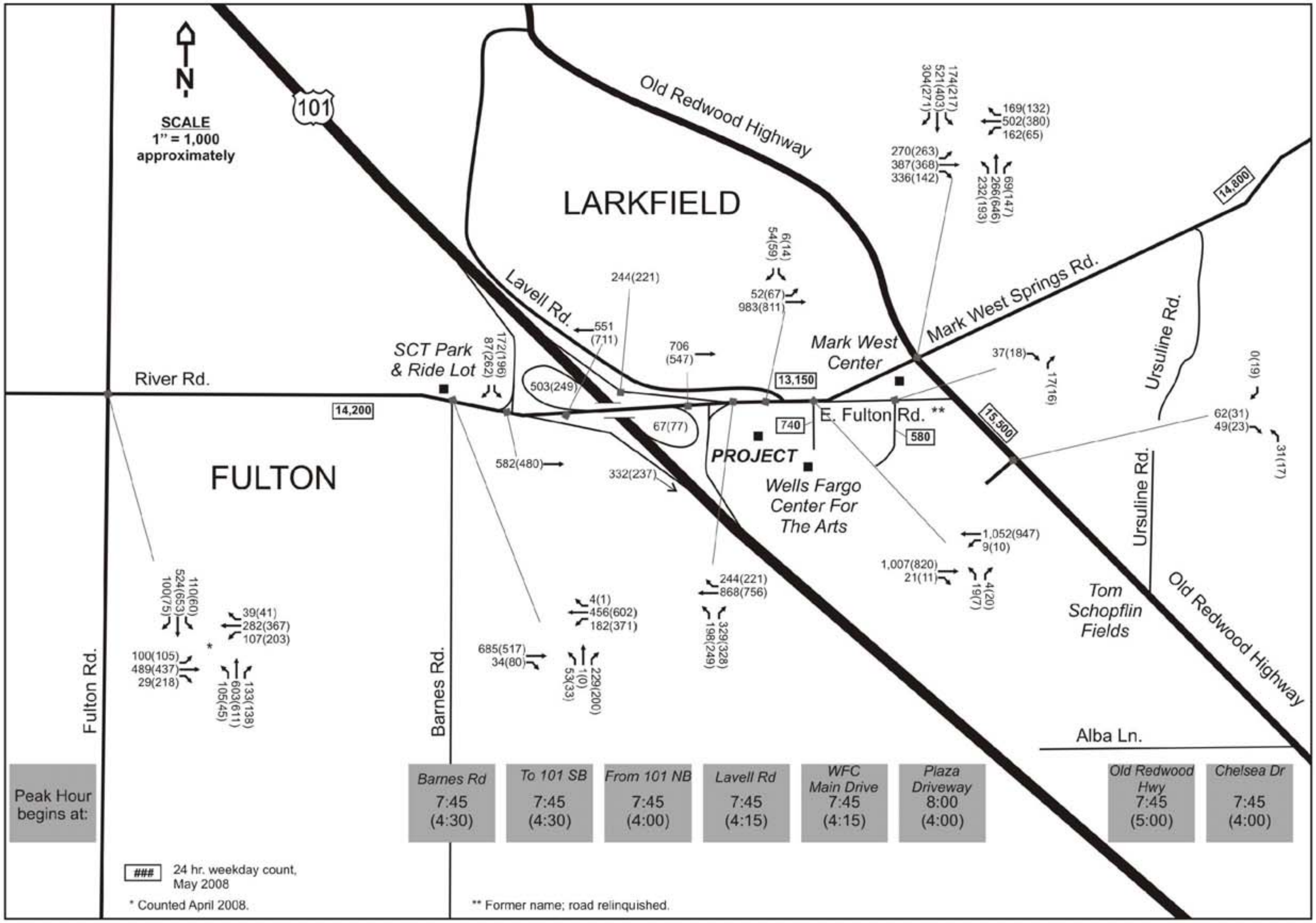
7. Existing Daily Traffic Counts

Existing daily traffic counts were collected for this project in May 2008, as well as on September 30, October 1, and October 2, 2004. These counts are shown in Figure 5. Freeway and freeway ramp data came from Caltrans, based on *2007 Traffic Volumes*.

Turning movements at key intersections used in the analysis were counted from 7-9 AM and 4-6 PM in May 2008 by Crane Transportation Group; additional counts were made by Dowling Associates on November 25 and 24, 2008. Because of the volume of the turning movement information, it is included in the Appendix.

8. Trip Generation for the Site (Existing WFC Uses)

On an average, non-event weekday, traffic counts done Thursday, 9/30/04 indicate WFC generates 1,250 vehicle trip ends. No major changes in use are foreseen, so this information is still considered valid. In the AM peak hour, there are 125 inbound and 68 outbound trips. Much of the traffic is related to the existing school between 7:30-8:30 AM. The afternoon peak is staggered because of the Academy; the peak was 3:30-4:30 PM at the east WFC drive. The outbound volume during the 'traditional' 4:30-5:30 PM peak hour is actually quite small, totaling only 50 vehicles (22 on the main drive and 28 on the east/Sonoma Academy drive). Volumes fluctuate due to sports and related after school activities.



Dowling Associates, Inc.

Figure 5
Daily and Peak Hour Traffic Counts – 2008
AM(PM)

9. Roadway Segment Traffic Counts

These are shown in Figure 5.

10. Intersection Traffic Counts at Key Intersections

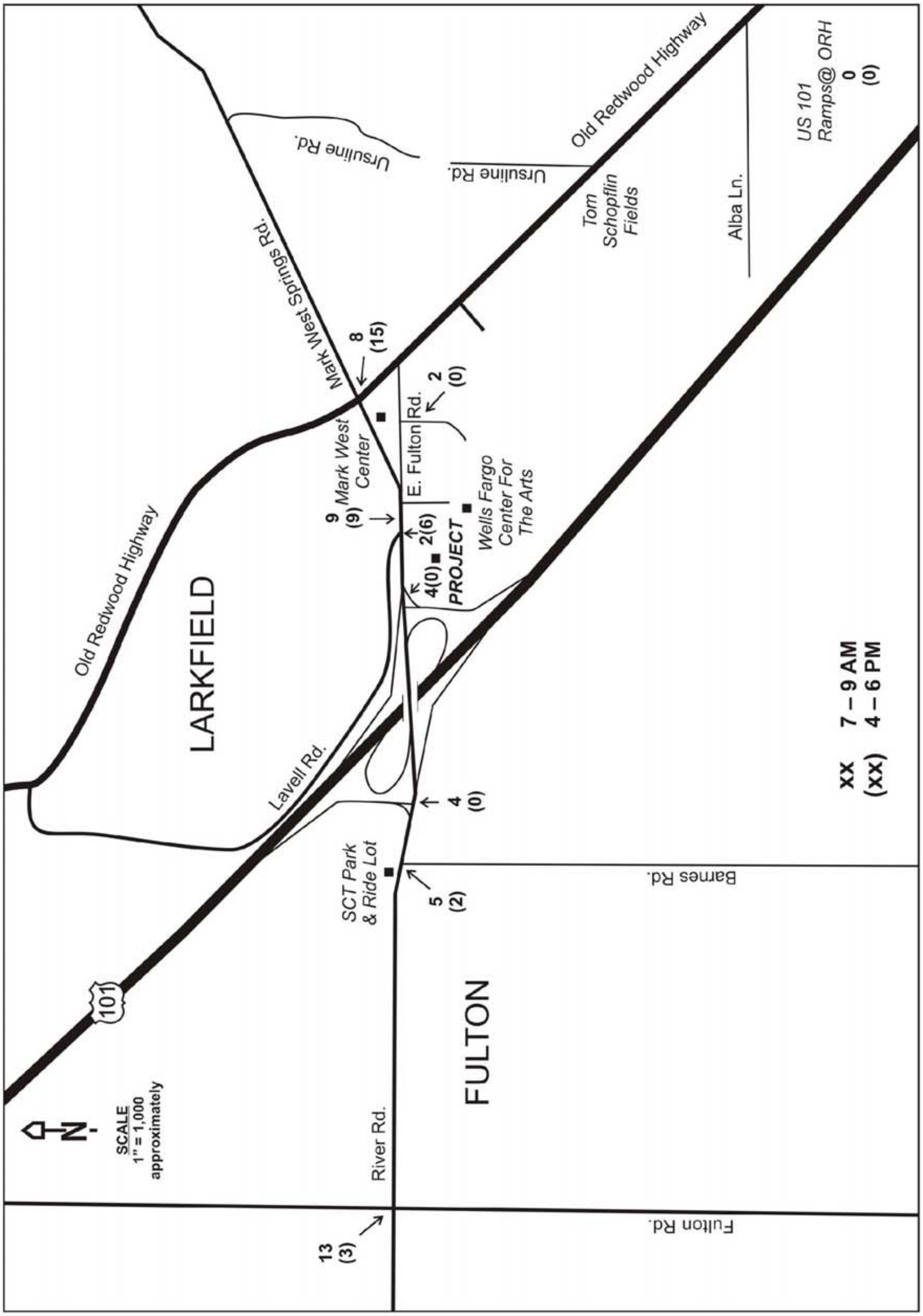
This information is provided in the Appendix and summarized in Figure 5. Turning movement counts were conducted in mid-May and late-November 2008. This was a non-event day for WFC, in order to provide a baseline.

11. Pedestrian Activity and Sidewalks

Pedestrians, like vehicles, were counted 7-9 AM and 4-6 PM. The total pedestrian crossings for each two-hour peak period are summarized in Figure 6. Detailed crossing information by 15-minute intervals and intersection leg is provided in the Appendix. The volumes are fairly low, with the highest volumes experienced at River/Fulton Roads in the AM (13 total), and Mark West Springs Road/Old Redwood in the PM (15 crossings). The corner of River/Fulton Roads has a market and is a place where day laborers sometimes wait for work in the morning. The school peak pedestrian activity probably occurs earlier than the PM count was taken. There are several schools in the area, including Mark West Elementary and John Riebli Elementary schools.

Currently there is very limited availability of sidewalk along Mark West Springs Road on the north side west of the intersection with Lavell Road. On the south side, pedestrians must use a bermed asphalt path and dirt paths. The project applicant proposes to improve this situation by adding a continuous sidewalk between the northbound off-ramp of US 101 and the Mark West Center retail center. This would link to the existing sidewalk that is provided on the south side of the River Road-Mark West Springs Road overcrossing of US 101. Although the application does not anticipate adding any pedestrian pathway on the north side of Mark West Springs Road, the provision of a new traffic signal at WFC's main driveway would include a crosswalk and pedestrian push button, and so would permit more convenient and safer crossings by pedestrians of Mark West Springs Road. Pedestrians could cross Mark West Springs Road to access the proposed sidewalk on the south side of that roadway. Pedestrian improvements to the north side of Mark West Springs Road would be the responsibility of development on that side of the roadway.

Information on pedestrian accessibility to bus stops is provided in Section 13 below.



Dowling Associates, Inc.

Figure 6
Peak Period Pedestrian/Crossing Counts
at Intersections

12. Bicycle Activity

Bicycles, like vehicles, were counted 7-9 AM and 4-6 PM. The total bicycle approach volumes for each two-hour peak period are summarized in Figure 7. Detailed information by 15-minute interval and intersection leg is provided in the Appendix. The volumes are fairly low, with the highest volumes experienced at River/Fulton Roads (6 bicycles in each two-hour peak), and Mark West Springs Road/Old Redwood in the PM (10 in each two-hour peak). In the AM, 12 bicycles were counted in the AM peak period at the northbound hook ramps at 101/Mendocino Avenue, about two miles to the south of the Project. Note that some of the school peak bicycle activity probably occurs earlier than when the PM count was taken.

13. Transit Services

Sonoma County Transit (SCT) provides service to the area, but does not have recent passenger activity by stop available. SCT operates three existing bus routes near the site (see Figure 8 for map):

- **Route 20- River Express** operates on Old Redwood Highway and Mark West Springs Road, and along with Route 62, is the closest public transit to the proposed project (there is a stop on both sides of Mark West Springs Road at Lavell Road). However, the 20X operates only one trip a day in each direction (eastbound AM, westbound PM), timed to meet commuter schedules; the eastbound (traveling toward Santa Rosa) bus currently arrives at approximately 7:21 AM, and westbound at 6:00 PM.

- **Route 60- Cloverdale/Healdsburg** operates on Old Redwood Highway, with a bus stop at Mark West Springs Rd. and Old Redwood Highway. Route 60 provides transit service between the downtown Santa Rosa Transit Mall on 2nd Street, and Windsor, Healdsburg, and Cloverdale. There are 18 trips each weekday in each direction. Because of the higher frequency of service on this line, it is likely that most transit passengers traveling between Santa Rosa and the proposed medical center would use it as the preferred route to the SSRMC.

- **Route 62** provides service between Santa Rosa and Sonoma County/ Charles Schulz Airport and downtown Windsor. Route 62 travels directly adjacent to the site on Mark West Springs Road and operates seven trips per weekday in each direction.

The travel time from the Santa Rosa downtown transit center to the site would be approximately 13 minutes using Route 60, which compares to 13-27 minutes (to/returning) using CityBus Route 1 to the existing Chanate hospital. This is for 'in vehicle' time only (i.e., riding on the bus).

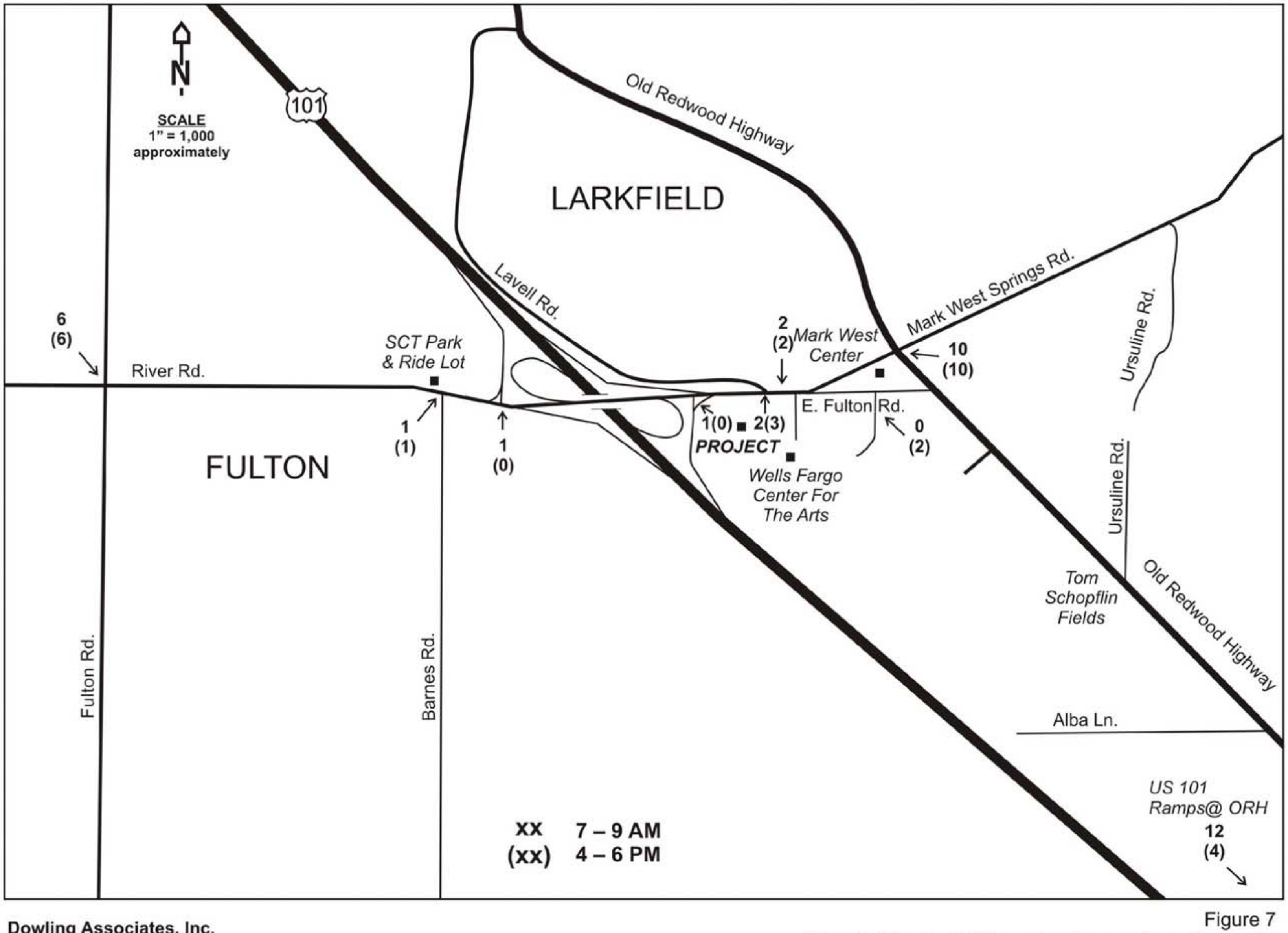


Figure 7
Peak Period Bicycle Crossing Counts at Intersections

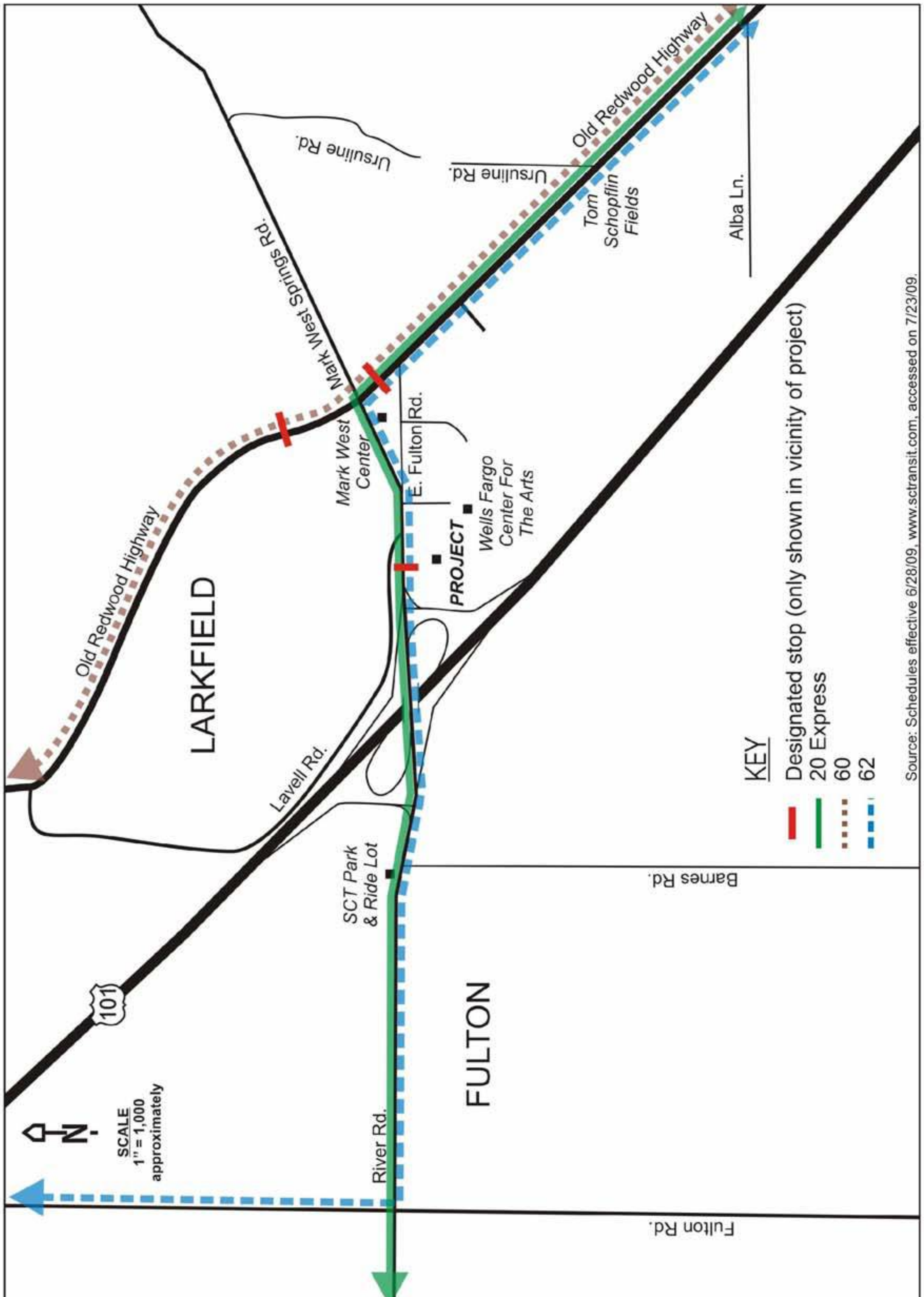


Figure 8
Existing Sonoma County Transit (SCT)
Scheduled Bus Services

Dowling Associates, Inc.

There is a major committed future transit improvement nearby. In November 2008, Marin and Sonoma County voters approved a sales tax increase to pay for a commuter rail service between Larkspur and Cloverdale. Service is anticipated to start in 2014-2015. However, no nearby stations are planned; the closest stations to the project would be Jennings Avenue (Santa Rosa) and downtown Windsor.

Both dependency on transit service (those with no car available for their trip) as well as reliance on county-supported medical services is likely to be a function of income. Although low-income residents live throughout Sonoma County, the greatest concentrations are likely to be south Santa Rosa (e.g., Roseland), the Lower Russian River area, and Sonoma Valley (e.g., The Springs area). These areas are served by existing SCT transit routes (see above), but access from the Sonoma Valley (Route 30) and Lower River (Route 20) and Roseland would be via at least one transfer, typically at the downtown Santa Rosa transit center (2nd & B Streets). Outside peak hours, most access would probably occur via a connection to Routes 60/64, which operate on Old Redwood Highway and have stops nearby to the proposed project site. Route 62 stops directly north of the site near the WFC main driveway; a new traffic signal at this location would facilitate safe pedestrian crossing of Mark West Springs Road. Roseland had a recent "community-based transportation plan" prepared by SCTA[6] which recommended improvements to transit services in that area. The following paragraph has been excerpted from pages 32-33 of that report.

Residents unable to use regular fixed-route buses due to a disability can access paratransit services through the City of Santa Rosa (if a city resident) or SCT. The City of Santa Rosa provides curb-to-curb dial-a-ride paratransit services within the Santa Rosa city boundaries and the unincorporated areas of Roseland. Passengers must be certified as ADA eligible to use this service. Service hours mirror those of CityBus fixed route services. The CityBus paratransit fare is $2 for any one-way trip within Santa Rosa. SCTA contracts for operation of an inter-city ADA paratransit service within a .75 mile corridor of its fixed routes. Trips must begin and end within these corridors. Designated transfer points have been established to enable passengers to transfer to and from other regional paratransit services, such as CityBus. SCT paratransit operates Monday-Friday between 5 AM and 11 PM and weekends from 7AM to 9 PM. Paratransit fares are zone-based, with a base fare of $2.60 and 55 cents for each additional zone.

Sutter's existing Chanate Campus is currently served by a single bus route (CityBus Route 1) that travels on Mendocino Avenue but makes a one-way loop up Parker Hill Road and out Fountaingrove Parkway, which creates a significant amount of "out of direction" travel for riders, taking approximately 30 minutes to reach the downtown transit center. Buses run every 30 minutes until about 8PM. Many Route 1 buses continue as Route 19 to Roseland after a five-minute pause at the Transit Center; others require a transfer at the 2nd Street Transit Center.

14. Queuing Analysis

An analysis of the existing 95th percentile queue lengths at key intersections is provided in Table

[6] SCTA (May 2007). "Roseland Community-Based Transportation Plan," approved May 14, 2007. Available on SCTA's website at *scta-info.org*.

3 on the following page. It is based on HCM methods and assumes that an average stopped vehicle takes up 25 feet. Both the analysis as well as field observation indicate that the principal queuing problem is the westbound thru traffic at the northbound US 101/Mark West Springs Road intersection (signal). Here, westbound queues have been observed backing up to, or beyond, the WFC driveway (in a some cycles to Old Redwood Highway). The calculated queue length in the AM peak is roughly a quarter mile, and in the PM, more than 800 feet.

How to interpret Table 3: distances (in feet) are shown for the 95th percentile queue length. A dash indicates that either the movement does not stop or does not exist at the intersection. A double dash across several turn movements indicates that the movements all share one lane. A zero indicates that the volume is so low on an approach that the queue length is virtually zero. Available queuing space is measured either as the striped tangent length of a lane (for left and right turn lanes), or the distance to the next intersection (for thru lanes). Distances are in lineal feet of total queue, so for a two lane approach, should be divided by two. Available distance is to the nearest intersection, for example, at the 101 interchange the distance is measured from the diagonal intersections back to the point where the upstream on-loop becomes blocked.

Table 3
Queuing Analysis of Existing Traffic Volumes, in feet
Bold indicates 95th percentile queue exceeds storage space

		Northbound			Southbound			Eastbound			Westbound		
Intersection		L	T	R	L	T	R	L	T	R	L	T	R
River Road/ US 101 SB (assumes signal u/c)	AM	-	-	-	377	-	204	-	480	-	-	323	-
	PM	-	-	-	335	-	230	-	283	-	-	501	-
	Avail	-	-	-	>500	-	150	-	300	-	-	400	-
Mark West Springs Rd./ Old Redwood Highway	AM	383	284	303	549	553	467	252	464	550	401	443	292
	PM	338	353	285	467	411	373	256	392	244	226	455	227
	Avail	200	1000	50	975**	975	100	300	700	50	225	1400	50
Mark West Springs Rd./ US 101 NB	AM	204	-	466	-	-	-	-	753	-	-	696	-
	PM	300	-	524	-	-	-	-	595	-	-	771	-
	Avail	415	-	415					1,300			475	
River Rd./ Fulton Road	AM	274	747	121	263	889		172	715	29	183	326	40
	PM	107	1,049	147	143	1,435		259	1,090	362	435	439	41
	Avail	100	265	100	75	>1000		620**	1,320	660		>1000	
River Rd./ Barnes Rd.	AM	152	-	214	-	-	-	-	-	-	19	-	-
	PM	176	-	93	-	-	-	-	-	-	40	-	-
	Avail	>1000											
Mark West Springs Rd./ Lavell Road	AM	-	-	-	17	-	67	17	-	-	-	-	-
	PM	-	-	-	109	-	49	63	-	-	-	-	-
	Avail				60		-	140					
Mark West Springs Rd./ WFC Main Entry	AM	164	-	73	-	-	-	-	459	-	81	250	-
	PM	105	-	41	-	-	-	-	189	-	57	191	-
	Avail	575	-	>1,000	-	-	-	-	860	-	175	700	-
E. Fulton Rd./ Old Redwood Hwy.	AM		5		-	-	-		31		-	-	-
	PM		4						17		-	-	-
	Avail		--80--						--625--				
East Fulton Rd./WFC East Drive	AM	1	-	5	-	-	-	-	-	-	2	-	-
	PM	1	-	3	-	-	-	-	-	-	2	-	-
	Avail	900	-	-	-	-	-	-	-	-	200	-	-

Note: table assumes average stopped vehicle requires 25 feet of storage space.
* Distance measured to the point where upstream traffic to the loop on-ramp would be blocked.
**This storage distance includes some blockage of private driveways.

15. Existing Level of Service

The traffic level of service (LOS) was calculated from the recent count information. Traffic LOS is a measure of the quality of service provided to motorists, in terms of delay, maneuverability, safety, and convenience. The traffic level of service ranges from A (best) to F (worst), although F does not necessarily imply gridlock— rather, it means that motorists experience significant delay. Tables 3 through 5 explain LOS for different types of facilities.

Table 4
Level of Service Definitions - Signalized Intersections

Level of Service	Control Delay (secs.)	Description
A	≤10	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.
B	10.1 – 20.0	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles.
C	20.1 - 35.0	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted.
D	35.1 – 55.0	**Approaching Unstable/Tolerable Delays:** Drivers may have to wait through more than one red signal indication. Queues may develop but dissipate rapidly, without excessive delays.
E	55.1 – 80.0	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection.
F	> 80.0	**Excessive Delays:** Represents long delays, but not necessarily "gridlock". Intersections operate below capacity with low volumes. Queues may block upstream intersections.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000.

Table 5
Level of Service Definitions for Stop Sign Controlled Intersections
Average vehicle delay in seconds

Level of Service	Control Delay
A	0-10
B	10.1-15
C	15.1-25
D	25.1-35
E	35.1-50
F	> 50

- -
Source: *2000 Highway Capacity Manual,* Exhibit 17-2, Transportation Research Board, Washington, DC, 2000.

Table 6
Urban Street Level of Service Definitions by Class (HCM Chapter 15)
Speeds in MPH

Source: *2000 Highway Capacity Manual,* Exhibit 15-2, Transportation Research Board.

NOTE: The only Class I street is River Road east of Fulton to the US 101 southbound ramps.

Level of Service	Class I	Class II	Class III	Class IV
Typical range of free-flow speeds	*45-55 mph*	*35-45 mph*	*30-35 mph*	*25-35 mph*
A	> 42	> 35	> 30	> 25
B	>35-42	>28-35	>24-30	>19-25
C	>27-34	>22-28	>18-24	>13-19
D	>21-27	>17-22	>14-18	>9-13
E	>16-21	>13-17	>10-14	>7-9
F	≤ 16	≤ 13	≤ 10	≤ 7

Source: *2000 Highway Capacity Manual,* Exhibit 15-2, Transportation Research Board.

Table 6c
Basic Freeway Segments at 65 miles per hour

Level of Service	Maximum Density	Minimum Speed	Maximum v/c	Max. Service Flow Rate
Units	*pc/mi/ln*	*mph*		*pc/hr/ln*
A	11	65.0	0.30	710
B	18	65.0	0.50	1,170
C	26	64.6	0.71	1,680
D	35	59.7	0.89	2,090
E	45	> 52.2	1.00	2,350
F	>45	< 52.2	> 1.00	undefined

Source: Caltrans

Table 7
2008 Intersection Levels of Service

Intersection	AM Peak Hr.	PM Peak Hr.
River Road/Fulton Road (45)	D (40.3)	E (55.3)
River Road/Barnes Road* -right turn (46) -left turn	F (56.6) F (>100)	C (21.5) F (>100)
US 101 Southbound Off-ramp/ River Road (4) (assumes signal under construction)	B (15.0)	B (12.8)
US 101 Northbound Off-ramp/ Mark West Springs Road (10)	B (17.0)	B (16.3)
Mark West Springs Road/ Lavell Road* -right turn (50) - left turn	E (35.3) F (>100)	C (35.2) F (81.9)
Mark West Springs/ WFC Main Entry* - right turn (51) - left turn	D (25.2) F (>100)	D (49.1) E (56.0)
Old Redwood Hwy/ Mark West Springs Road (9)	C (32.1)	C (27.3)
E. Fulton Road/Old Redwood Highway* (53)	D (29.7)	C (18.1)

Method: *2000 Highway Capacity Manual* using TRAFFIX 7.9. Average control delay, in seconds, is shown in parentheses, rounded to nearest tenth second. "F>100" indicates that the calculated delay exceeded 100 seconds and cannot be reliably estimated.
Based on May 2008 counts supplied by Crane Transportation Group.

* Unsignalized intersection; level of service is shown for the STOP controlled movement.

Table 8
2008 Arterial LOS Analysis Results

Level of service – rounded speed in mph

Arterial Route and Direction	Class	Existing AM	Existing PM
River Rd.-Mark West Springs Rd. EB	II	C- 21.9	D- 20.3
River Rd.-Mark West Springs Rd. WB	II	C- 24.1	C- 24.3
Mendocino Ave-ORH NB	II	B- 31.1	B- 33.1
Mendocino Ave-ORH SB	II	D- 20.9	D- 19.5

The US 101 freeway is presently two mixed-flow travel lanes in each direction. Traffic volumes are shown in Figure 5. Based on Appendix "C" of the Caltrans "Guidelines for the Preparation of Traffic Impact Studies," the maximum flow rate (at LOS "E") is 2,350 vehicles per lane per hour. Both north and south of the River Road-Mark West Springs Road interchange, the freeway mainline operates at LOS C (LOS B southbound in the AM north of the interchange ramps). Recent widening through central Santa Rosa reduced the bottlenecking of traffic that frequently occurred to the south (through central Santa Rosa/Highway 12). However, congestion remains to the north (at the Airport/Fulton interchange) that creates queues that can extend into the vicinity of the interchange, and construction activity (e.g., narrowed lanes, lack of shoulders) is currently reducing the capacity of this section of freeway.

The freeway ramp volumes at the River/Mark West Springs Road interchange are generally well within their capacity. The highest volumes occur with the northbound diagonal off-ramp, where the PM peak has more than 700 vehicles/hour; and the southbound on-loop, which experiences a morning demand of more than 600 vehicles/hour.

Table 9
Existing (2002) Mainline Freeway Level of Service
Note: This table includes single occupant and high-occupancy vehicles. Other freeway tables shown later in this report includes single-occupant vehicles only.

Location	Direction	Volume (vph)	Capacity	V/c ratio	LOS
Between River Road ramps and Airport/Fulton Rd. ramps	NB	2,598 AM	4,700	.55	C
		1,816 PM		.39	B
	SB	2,170 AM	4,700	.46	B
		2,540 PM		.54	C
Between Mendocino/Hopper ramps and River Road ramps	NB	2,800 AM	4,700	.60	C
		2,234 PM		.48	B
	SB	2,911 AM	4,700	.62	C
		2,932 PM		.62	C

Note: table reflects the two-lane configuration in each direction that existed in 2008 and earlier years. Source: Parsons Transportation Group, *Highway 101 Widening and Improvements Project, Steele Lane to Windsor River Road, Traffic Operations Existing Conditions Report*, June 2004, Figures 2 and 3. The volumes are for the highest hour in the AM or PM peak period (6-9 AM and 3-6 PM).

B. Collision History Evaluation

An extensive collision history evaluation was provided in Dowling Associates' January 2005 report. Three years of collision data, from January 1, 2001 thru December 31, 2003 were evaluated. See that report for more detail. Safety history related to the Lavell Road/Mark West Springs Road intersection is discussed in Section D.9. More recent collision data covering the years 2006 thru 2008 were requested and received from the CHP. That data indicated a general decline in the number of reported collisions. For example, in the three year period there were 2 reported intersection collisions at Mark West Springs Road and Lavell Road, and 10 at Mark West/Old Redwood Highway. There were three reported crashes at E. Fulton/Old Redwood Highway. This decrease mirrors the decline found in recent years countywide (see *2009 Countywide Transportation Plan,* Appendix C). This may reflect reduced driving due to higher gas prices, more restrictive teenage driving laws, better enforcement (including more severe penalties for DUIs), and an older population.

C. Future Conditions

1. Project Generated Trips

This section covers items (a.) thru (d.) in the Guidelines for Traffic Studies.

The "project" used for traffic analysis would consist of the Sutter Medical Center and the WFC uses. The Sutter Medical Center would include (in its final phase) a 70 bed, 126,000 square foot hospital, and an 80,000 square foot medical office building. An adjacent Physician's Medical Center (PMC) joint-venture (JV) hospital would have 28 beds and approximately 100,000 square feet of floor area.

In the first phase of construction, there would be approximately 25 large trucks per hour in and out of the site, distributed roughly equally over an eight-hour workday, to import up to 100,000 cubic yards of surcharge material.

After completion and occupation of structures, during the morning (AM) peak hour, between 7:30 and 8:30 AM, the medical center (hospitals and MOB) would generate approximately 300 vehicle-trips (in and out) on a typical weekday. In the afternoon peak hour, from roughly 4:30 to 5:30 PM, the project would generate a total of 450 vehicle-trips. ITE recommends that the trip generation be performed based on number of employees, if that value is known. Employees tend to be a better reflection of actual activity levels at a medical center, and thus its traffic generating potential.

Projected build-out trip generation of the WFC facilities is more likely to vary from day to day, depending upon the size and nature of the events taking place. It is (assumed to be) unlikely that all of the facilities will be used to their capacity at the same time. The greatest impact of WFC events is likely to occur on a Saturday afternoon, because combined event and background traffic volumes would be highest then.

Tables 10 and 11 show the estimated trip generation for the medical center phases II and III.

Table 10
Trip Generation Analysis – Medical Center Phase II
(note: vehicle trips are shown in this table; values are rounded to two decimal places)

	Average Weekday	AM Peak Hour	PM Peak Hour
Medical Office Bldg., 80,000 square feet, 250 employees*			
Trip Generation Rate per employee*	6.94	0.53	1.01
Source: Trip Generation 8th edition, ITE land use 720, peak hour of adjacent street traffic, fitted curve equation if available			
Total Trips Generated (In and Out)	1,736	133	253
Directional Split of Trips (% inbound/ % outbound from site)	50/50	79/21	34/66
Peak Hour Trips Inbound TO Site	--	105	86
Peak Hour Trips Outbound FROM Site	--	28	167
Hospital 226,000 square feet, 98 beds (includes both Sutter and JV Hospitals), 486 employees*			
Trip Generation Rate per employee*	5.86	0.35	0.39
Source: Trip Generation 8th edition, ITE land use 610, peak hour of adjacent street traffic, fitted curve equation if available			
Total Trips Generated (In and Out)	2,848	169	191
Directional Split of Trips (% inbound/ % outbound from site)	50/50	72/28	31/69
Peak Hour Trips Inbound TO Site	--	122	59
Peak Hour Trips Outbound FROM Site	--	47	132
Totals for Medical Center			
Total Trips Generated (In and Out)	4,584	302	444
Peak Hour Trips Inbound TO Site	--	227	145
Peak Hour Trips Outbound FROM Site	--	75	299

Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*.

* Per ITE, the number of employees is the total of full- and part-time employees, over all shifts.

Trip generation for WFC events was estimated from a trip generation count done Friday, October 1, 2004, when there were three different shows beginning between 7 and 8 PM, with the main event beginning at 8 PM. Although this count was made several years ago, there are no changes to the physical facilities (e.g., seats) at the WFC that would have significantly changed these numbers. During the peak hour, 7:15-8:15 PM, there were 668 entries and 22 exits from the site. WFC staff reported 1,722 tickets distributed to these three events, leading to a rate of 0.38 peak hour vehicles per ticket inbound, and .01/ticket outbound. A small number of performers and staff are also present, but probably arrive before the peak hour. The machine traffic count data compared to the ticket sales also tends to confirm the assumption of approximately 2.0 persons per vehicle for show attendees for these events.

Table 11
Trip Generation Analysis – Medical Center Phase III
(note: vehicle trips are shown in this table; values are rounded to two decimal places)

	Average Weekday	AM Peak Hour	PM Peak Hour
Medical Office Bldg., 80,000 square feet, 250 employees*			
Trip Generation Rate per employee*	6.94	0.53	1.01
Source: Trip Generation 8th edition, ITE land use 720, peak hour of adjacent street traffic, fitted curve equation if available			
Total Trips Generated (In and Out)	1,736	133	253
Directional Split of Trips (% inbound/ % outbound from site)	50/50	79/21	34/66
Peak Hour Trips Inbound TO Site	--	105	86
Peak Hour Trips Outbound FROM Site	--	28	167
Hospital 262,000 square feet, 567 employees (includes both Sutter and JV Hospitals), * 127 beds			
Trip Generation Rate per employee*	5.65	0.34	0.38
Source: Trip Generation 8th edition, ITE land use 610, peak hour of adjacent street traffic, fitted curve equation if available			
Total Trips Generated (In and Out)	3,206	195	215
Directional Split of Trips (% inbound/ % outbound from site)	50/50	72/28	31/69
Peak Hour Trips Inbound TO Site	--	141	67
Peak Hour Trips Outbound FROM Site	--	55	148
Totals for Medical Center			
Total Trips Generated (In and Out)	4,942	328	467
Peak Hour Trips Inbound TO Site	--	245	152
Peak Hour Trips Outbound FROM Site	--	83	315

Source: Institute of Transportation Engineers, *Trip Generation, 8th Edition*.

* Per ITE, the number of employees is the total of full- and part-time employees, over all shifts.

WFC notes that some events—particularly those appealing to families—will have higher vehicle occupancies.

e. ADT Generated during Weekends

The Phase II Medical Center would generate an estimated 2,842 vehicle-trip ends on a Saturday, over 24 hours—2,125 from the hospitals and 717 from the MOB.[7] It should be

[7] ITE's Saturday trip rate for hospitals is 2.95*(employees)+691.43. For MOBs, it is 8.96(thousand square feet).

noted that the sample size (number of sites studied) for MOBs on a Saturday is small—just five sites. For Phase III, the total vehicle trip-ends generated would be 3,081—2,364 from the hospitals and 717 from the MOB. Sunday trip generation is lower, especially because medical office buildings have a very low level of operation on that day.

The weekend ADT for WFC facilities is more difficult to estimate, because it depends on the number and character of events being held. On a weekend, there could be day and evening events. Assuming a vehicle occupancy of 2.0 persons/vehicle, the ADT would be 0.5 times the number of attendees at the total of all events.

f. Peak Hour Trips Generated by Project During a Work Week

This was shown in Tables 8 and 9 above.

g. Peak Hour Trips During a Peak Weekend Day

The number of peak hour trips would depend on the events held. WFC does no propose to expand the number of patrons able to attend events.

h. Pass-By Traffic

No reduction in trips for pass-by traffic was assumed for project traffic. Pass-by traffic occurs mainly for retail uses.

i. Winery Tasting Room Traffic

No winery tasting room is planned, although it is possible that WFC might hold wine and food events.

j. Special Events Matrix

This information has been provided by Marc Hagenlacher of WFC and is included in Appendix F of this document.

k. Trip Generation Rates

The latest published Institute of Transportation Engineers (ITE) trip generation rates have been used throughout this report. ITE does not have good data on generators similar to WFC however (e.g., live performances, RV shows, etc.), so trip generation data were collected for this study.

l. Trip Generation Assumptions

Trip generation has been based on a “design day” involving the worst-case scenario for the WFC special events. Project staging (phasing) has been included in the analysis.

m. Truck Traffic

Sutter Health reports that the existing Chanate Road hospital receives 10 truck deliveries (i.e., 20 truck trip-ends, or one-way trips) on an average day. Six of these deliveries are scheduled, and four are unscheduled. Truck traffic during the project construction period would be heavier, as noted earlier, especially when the import of fill was occurring. However, this period would last only approximately two months, assuming the work occurs five days a week.

n. Peak Hour

Generally, counts have been made of peak period traffic, and the peak hour (i.e., peak 60 minutes based on quarter-hour counts) used for analysis.

o. Pass By Factors

No pass by factors were used for any of the project uses.

p. Internal Trip Reductions

For purposes of analysis, no internal trip reductions were made; this probably results in a somewhat conservative analysis. There are some potential favorable (i.e., trip reducing) interactions within the medical center and between the medical center and the WFC facilities. For example, doctors would be able to walk between their office and the hospital; a patient could have a lab test in the hospital after an appointment in the MOB, etc. Of lesser importance, but still noteworthy, is that the WFC conference facility could provide room for training, meetings, conferences, etc. for MOB/hospital workers.

q. Trip Generation from Known Future Developments within Study Area

Projects in the area were shown earlier in Table 1 and Figure 1.

r. Volume Projections for Background Traffic Growth

Background—essentially no project traffic for the future—was forecasted for the year 2035 using the SCTA's latest traffic model. This is described later in the text, and takes into account cumulative growth in the County, the City of Santa Rosa, and the region.

s. Maps

Relevant maps of the information presented are included in this report.

t. Parking Analysis

In this section, several terms are used with very specific meanings. "Code parking requirements" are the requirements set forth in the current Sonoma County Zoning Code, Article 86, as found at www.sonoma-county.org/prmd/docs/zoning. This code does not formally recognize shared parking, although apparently projects have been allowed to submit shared parking information in support of a reduced number of spaces in the past.

"Parking **demand**" refers to the average number of vehicle spaces actually occupied on a typical weekday. "Coverage" refers to the additional spaces required to reduce time-consuming "hunting" for parking spaces, and to allow for weekly and seasonal variations.

It is generally agreed that even in the peak hour of parking demand that no more than 85 to 90% of all parking spaces should be occupied; when exceeded, patrons will find parking inconvenient and will have to spend considerable amounts of their time looking for a space. Parking is typically a source of customer dis-satisfaction, and in a competitive business environment, may lead to them seeking other places of business. On the other hand, for special events (like a theatrical event), customers may "factor in" the additional inconvenience and expect to have to spend some time looking for spaces, so they may not be of as great a concern.

The term "Parking **Requirement**" is used to refer to the sum of parking demand plus the coverage, in other words, it is about 1.1 to 1.18 times the parking demand. Higher ratios provide more convenience at the expense of higher parking development (and maintenance) costs. For this analysis, we have assumed that the parking requirement would be 1.1 times the demand, except for special events at the WFC, where it was assumed that the spaces supplied should equal maximum demand.

Code Requirements

The parking code analysis has been done for informational purposes. This report shows later that, given the shared parking on the site, the code results in many more spaces than necessary. County code requires 4 spaces per thousand square feet (KSF) for hospitals, and 5 spaces/KSF for medical office building (MOB) uses. The code requirements for the medical facilities are shown in Table 10 below.

Table 12
Medical Center Parking Code Requirement, By Phase

Uses/Phase	Size	Code	Spaces Required
Phase II			
Medical Office Bldg.	80 KSF	5/KSF	400
Hospital	226 KSF	4/KSF	904
Total Phase II			1,304
Phase III			
Medical Office Bldg.	80 KSF	5/KSF	400
Hospital	262 KSF	4/KSF	1,048
Total Phase III			1,448

There are currently approximately 903 off-street parking spaces provided by the Wells Fargo Center in surface lots.[8]

[8] Information provided by Marc Hagenlacher, WFC Events Coordinator, telecommunication, 12/29/08.

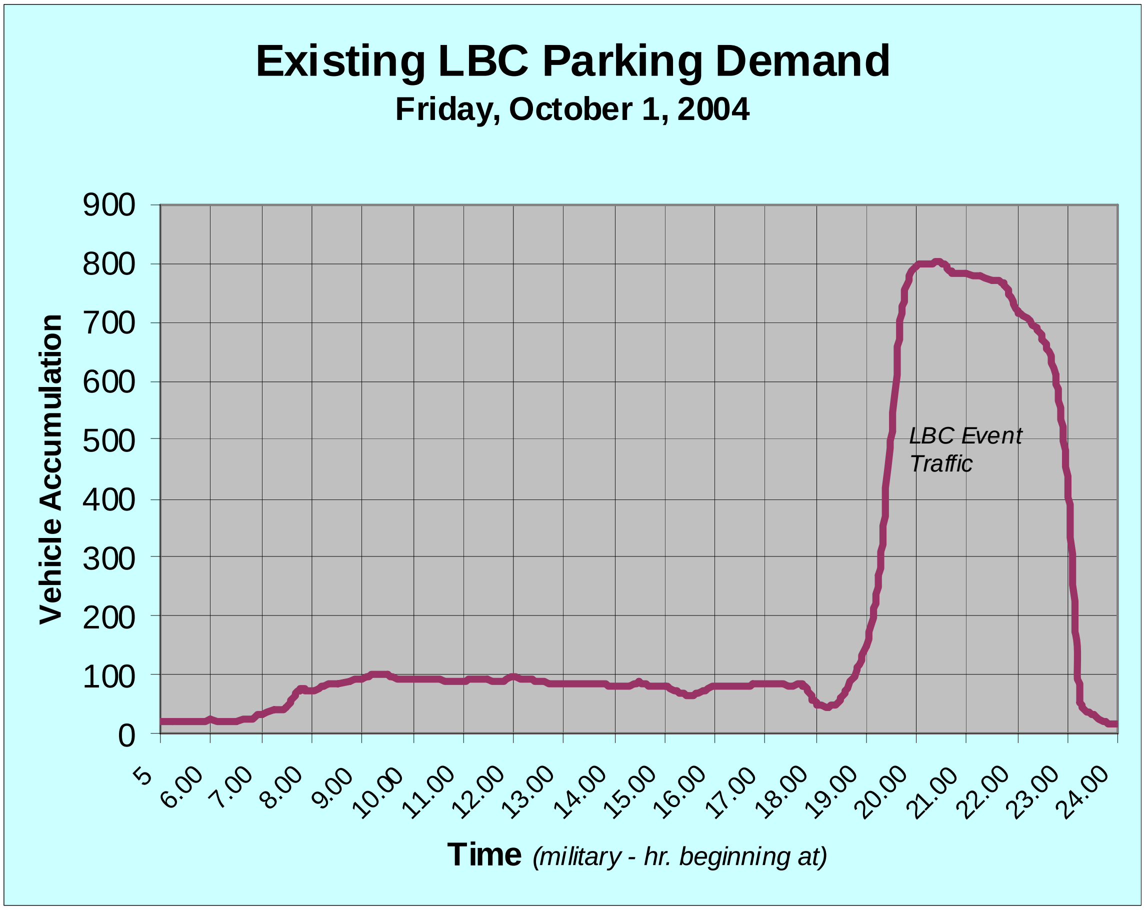


Figure 9. Existing WFC Parking Demand on an Event Weekday

Shared Parking Analysis

No shared parking is currently proposed. The Sutter Medical Center and WFC would each attempt to meet their own parking needs. However, available information on Sutter's event day parking demand has been provided in Figure 9 above.

The parking analysis made the following assumptions:

- The peak occupancy (**demand**) for the hospital would be 0.83 spaces per employee, per ITE's Parking *Generation 3rd Edition*, occurring around 3 PM (at the nursing shift change). This based on ITE's land use code 610 (the Appendix contains copies of the relevant pages). As used in this ITE publication, "employees" mean full- or part-time workers on all shifts on a weekday (hospitals operate three shifts daily).

- The peak occupancy for the MOB would be 3.49 spaces per ksf, per ITE's fitted curve equation, and would occur around 11 AM, based on ITE land use code 720.

The peak parking demand for the Sutter Medical Center is straightforward to calculate (see Table 11 below). In Phase II, there would be a peak demand for approximately 791 spaces at between 1-3 PM. With coverage (reserve) of 10%, the parking requirement would be 760 spaces in Phase II, but 943 spaces would be provided. In Phase III, the peak parking demand would be 751 parking spaces, with a requirement of a total of 835 spaces required to provide for coverage, but 899 parking spaces would be provided.

Table 13
Medical Center Parking, Peak Parking Demand, By Phase (spaces actually occupied at the peak demand hour—assumes no coverage/reserve)

Uses/Phase	Size	ITE Rate (Parking Generation)	Spaces Demanded
Phase II			
Medical Office Bldg.	80 KSF	3.49 /KSF	280
Hospitals	486 emp.	0.83 /employee	404
Total Phase II			684
Phase III (Total)			
Medical Office Bldg.	80 KSF	3.49 /KSF	280
Hospitals	567 emp.	0.83 /employee	471
Total Phase III			751

Note: Fractional values are rounded upwards; e.g., 80 ksf x 3.49 = 279.2, which is rounded to 280 spaces in the table above. Spaces demand is actual number of spaces occupied. Employee counts are totals, over all shifts.

WFC's parking requirements are more complicated, because of the possible combination of different events that may occur on a given day. In summary, it can be said that the Sutter Medical Center would (in the absence of a major WFC event) determine the maximum *daytime* demand, and WFC events would determine the maximum *night and weekend* demands. When demand can fluctuate significantly depending on circumstances, the concept of a "design day" is often used, for example, in airport planning, where there is a considerable difference in passenger traffic between a Tuesday in January and a Friday in August.

In these calculations, we have assumed that two large events occur on a weekday evening, with starting times between 7 and 8 PM:

- a sold-out event at the Person theater (1,668 attendees)
- Carston Cabaret, 225 persons
- Fireside Room, 150 attendees banquet/multi-purpose

This totals, rounding up slightly, to 2,050 people. At an average vehicle occupancy of 2.0-2.2, these events together result in a WFC-generated parking demand of between 932 and 1,025 spaces for event patrons. Add to these 30 spaces for WFC non-event needs (e.g., staff), and approximately 262 spaces demanded for Sutter (staff and visitors), and the total number of spaces occupied required is approximately 1,256 spaces between 8 and 9 PM, in Phase II.[9] This

[9] This is the actual number of spaces demanded (occupied). The hospitals may want to have additional spaces—

assumes that 100% occupancy of the WFC event spaces is acceptable. It would probably be necessary to control Sutter's spaces (e.g., coning off the parking area and monitoring by a security guard) in order to assure sufficient spaces for evening visitors.

Figure 10 shows the parking demand for Phase II with both Sutter Medical Center and a major WFC event as per the "design day" described above. The (blue) dashed line indicates Sutter's demand, and the difference between it and the solid burgundy line is the projected WFC demand. Sutter's Phase II demand is essentially the dashed line; the difference between it and the solid line represents Phase III demand. At 6 AM, there are fewer than 200 cars parked, mainly for the night shift workers and hospital patients. The night shift at the Chanate and Warrack hospitals currently averages 185 employees, according to data provided by Sutter and based on their payroll records. The parking accumulation quickly rises until about 10-11 AM, as workers and patients arrive on the site. Demand is relatively constant until approximately 3 PM, when there is a small upward "bump" because of the nursing shift change, then demand begins to fall until about 5-6 PM, when would pick up as a result of WFC events. The peak demand, as shown in Figure 11, would occur between about 8-9 PM. The difference between the dashed solid and dashed lines show most of this is due to WFC, although a few hundred spaces are still needed by the medical center during these hours. Figure 11 shows the Phase III parking demand.

It is unlikely given the combined available spaces in both the Sutter and WFC facilities that an evening event would exceed the parking capacity of the combined lots.

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at least 14 or so—vacant to reduce "hunting" and make parking more convenience. However, for large special events, as noted, it's assumed that WFC spaces can be 100% occupied.

Figure 10. Shared Parking Demand for Phase II

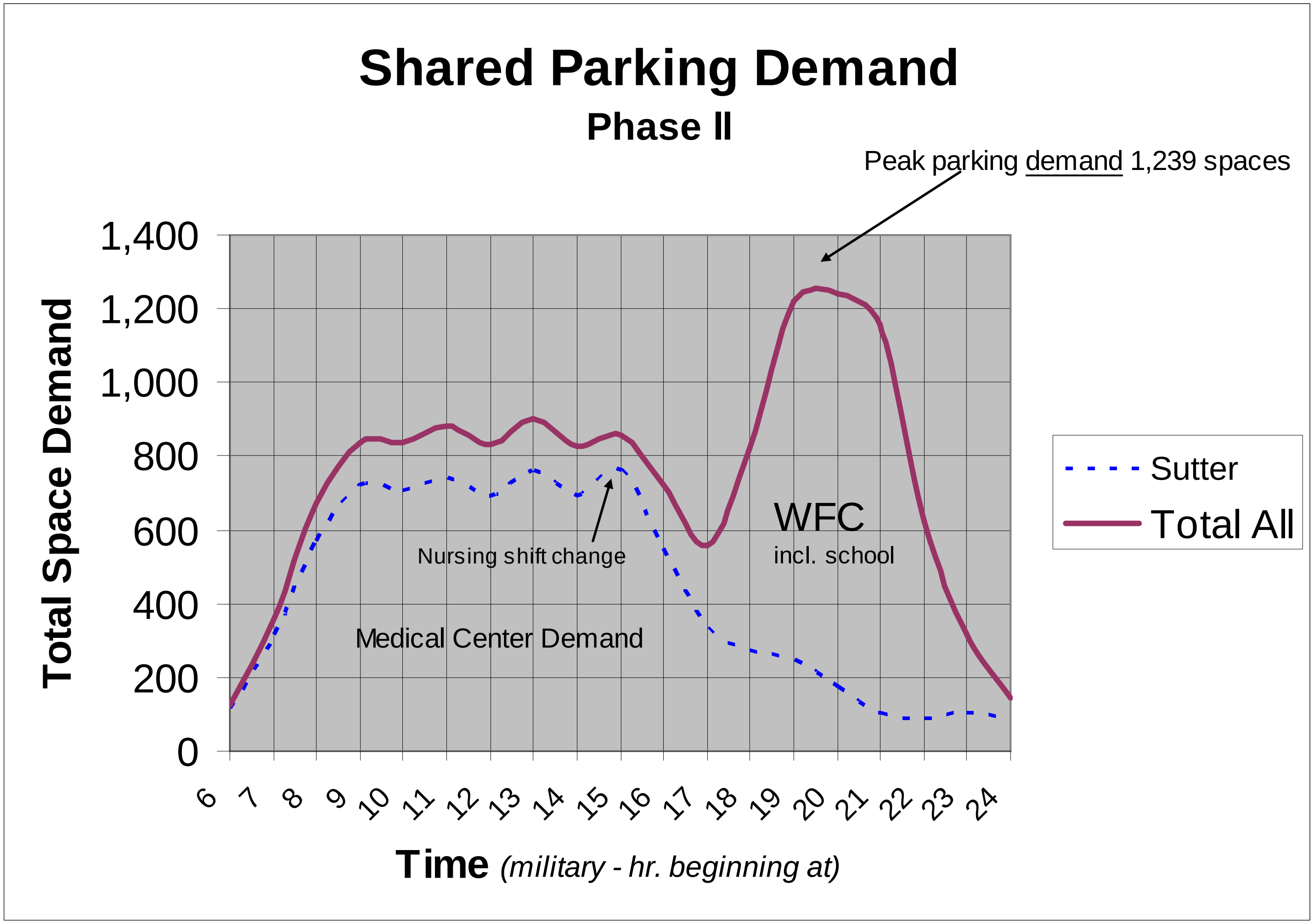
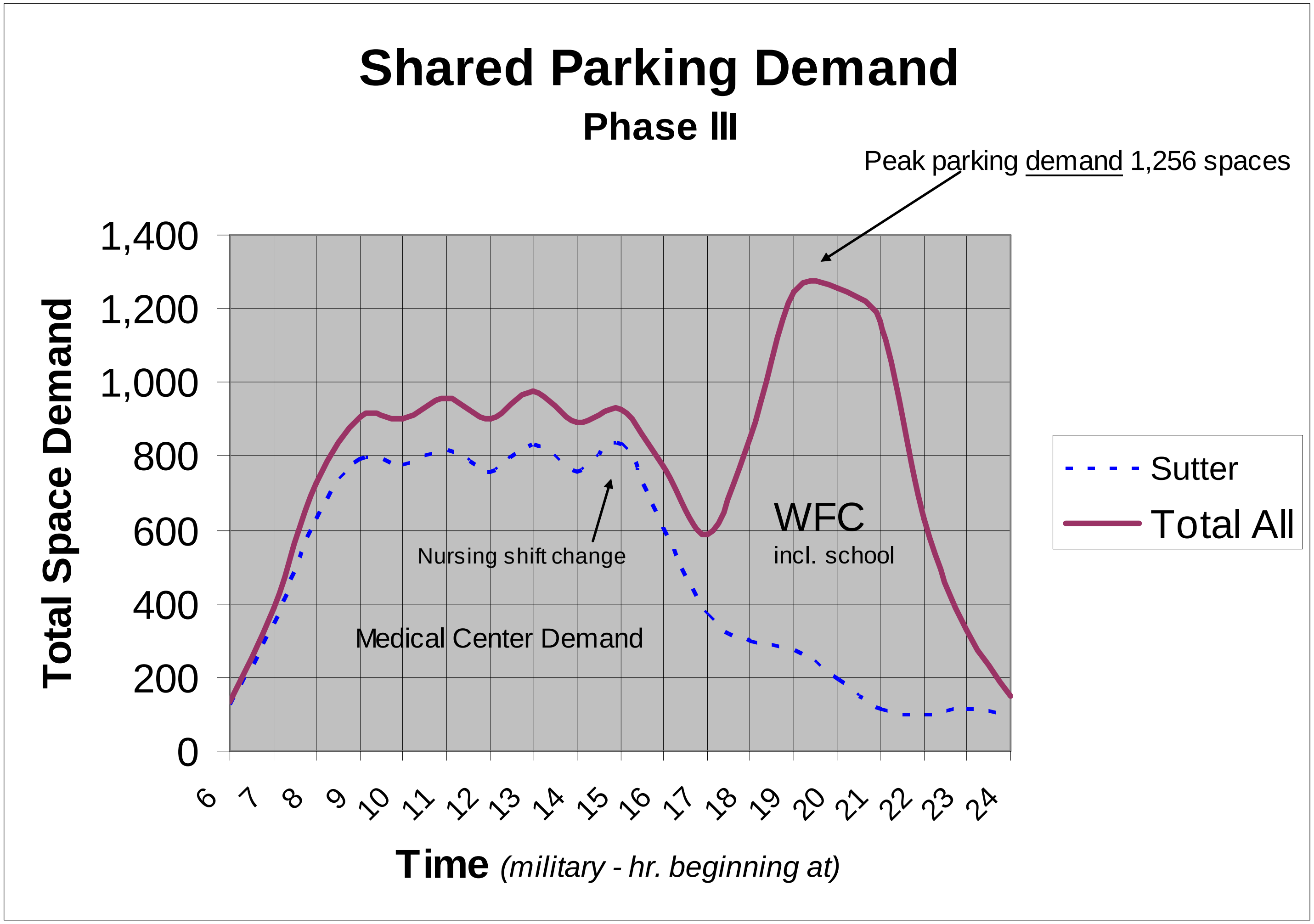


Figure 11. Shared Parking Demand Phase III



u. Truck Operations

Only a modest number of trucks are likely to service the site on an individual day. The hospital will need linen, food service, and other similar types of deliveries, as well as solid waste collection. The WFC has trucks hauling stage equipment (props, amps, etc.) a few hours before and after events. There is no excessive wear and tear associated with such traffic, beyond normal levels that would occur with most uses.

2. Project-Generated Trip Distribution

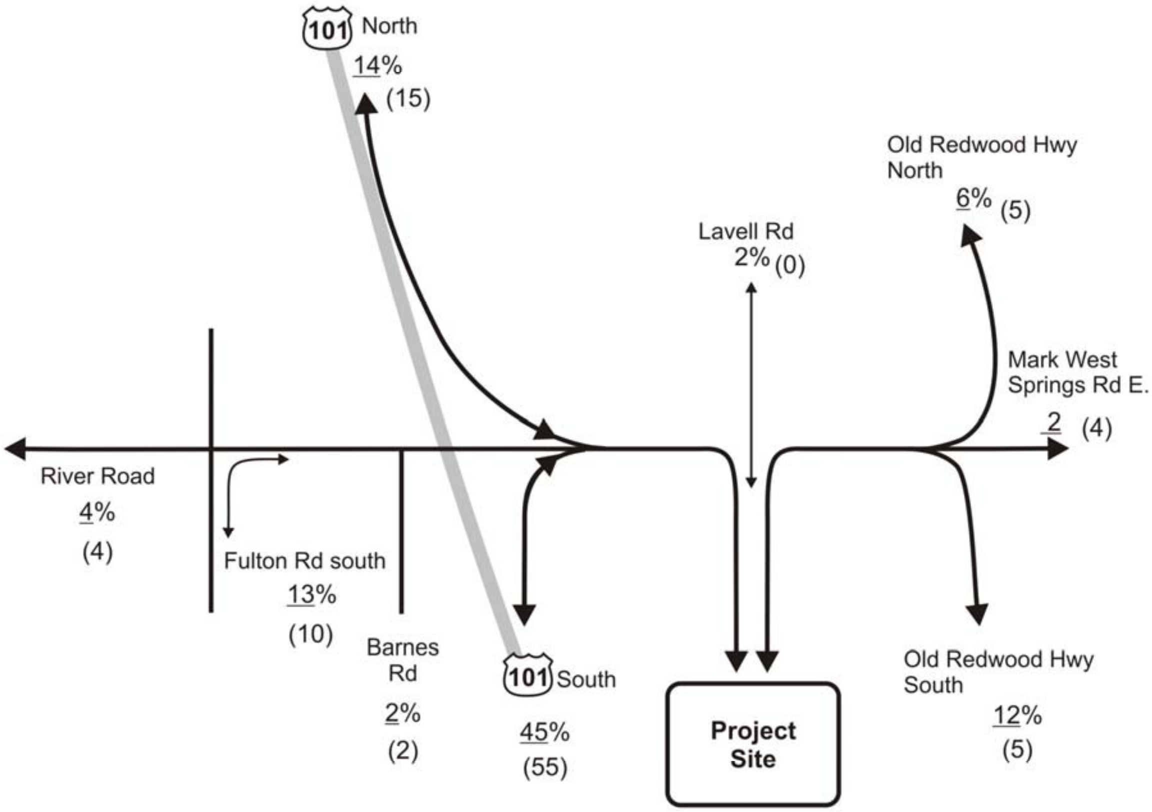
The project related trip distribution was developed from several sources: Sutter Santa Rosa provided zip code information on employees (approximately 1,200 valid home zip codes of Sutter employees), and this information was combined with a trip distribution determined by using the Sonoma County Travel Model (SCTM/02). It was also checked against trip distribution data from employees at the Kaiser Medical Office Building on Old Redwood Highway, and tempered with some professional judgment. For example, some motorists avoid congestion on US 101 by using Fulton Road as an alternative route, especially when their origin or destination is in east Santa Rosa or parts of the West County. This ultimately led to the following proposed distribution of trips, which is also shown graphically in Figure 12.

This distribution corresponds with the general population distribution of Sutter's service area. No data were available on the distribution of the attendees of events, however, for analysis purposes, it seemed reasonable to assume that the distribution would be similar to the general population distribution of Sonoma County, and because most WFC events are not held at peak commuter traffic hours, there would be more use of the 101 freeway.

Table 14
Trip Distribution of Traffic

Route / Gateway	Office Space/ Medical Center	WFC Event
US 101 South	45	55
River Road west of Fulton	4	4
Fulton Road south of River Rd.	13	10
Barnes Road south	2	2
US 101 North	14	15
Old Redwood Hwy North	6	5
Mark West Springs Rd East	2	4
Old Redwood Highway South	12	5
Lavell Road North	2	0
TOTAL	100%	100%

Figure 12
Sutter Medical Center & LBC Event Traffic
Trip Distribution



xx = Final recommended distribution after considering zip codes of employees

(xx) = LBC Event traffic

Observations of traffic made by Dowling Associates, Inc. on October 1, 2004 for a major event to confirm this distribution. Absent any better data, it was assumed that the distribution of traffic was symmetric, i.e., that the inbound and outbound traffic would be the same.

2. Existing and Project Conditions

The existing and project condition uses the existing traffic, plus traffic estimated to be generated from the approved developments, plus the Phase I project traffic.

a. Projected Traffic Volumes and Traffic Queues

There are two scenarios considered here: Phase II medical center operations, and Phase III with expansion of either the Sutter or JV hospital. The details of the Phase I construction activity are still being developed, and can probably best be addressed by a construction/truck management plan that specifies times and routes of delivery. At the time of writing, it appears that the most likely scenario will involve a right turn in/right turn out access on Mark West Springs Road, between the northbound freeway off-ramp and the main WFC entry drive.

There are several road improvements that would be completed prior to the opening of the facility (i.e., Phase II). These include what are referred to as the Interim Transportation Improvements, including the following:

- Signalization of the Main WFC entry on Mark West Springs Road, with interconnect installed to the existing signal at Old Redwood Highway.
- Signalization of the southbound US 101 off-ramp at River Road, which is now under construction as part of the HOV lane addition to the freeway
- Widening of Mark West Springs Road, as shown in the diagram on the following page. This provides for an additional eastbound thru travel lane, plus a right turn only lane into the WFC, a bike lane (Class II), and a shoulder area (minimum of 8', with 10' desirable) between the US 101 northbound off ramp and the emergency vehicle access (EVA) on Mark West Springs Road
- Addition of a green arrow (right turn overlap) at the northbound 'hook' off ramp at Mendocino Avenue/Old Redwood Highway

The Interim Improvements have been selected because they can be constructed by the time Phase II is occupied, and because they do not rely on widening the US 101 overcrossing (bridge) at River/Mark West Springs Road. Some work will be required in state (Caltrans) right-of-way with minimal dedication of property for widening.

The actual turning movement volumes, because they take many pages to print out, are included in the Appendix to the report. Queuing summary tables are provided in Appendix G.

b. Projected Level of Service and Signal Warrant Analysis

The LOS results for the near-term (2014) analysis are shown in Table 15 on the following page.

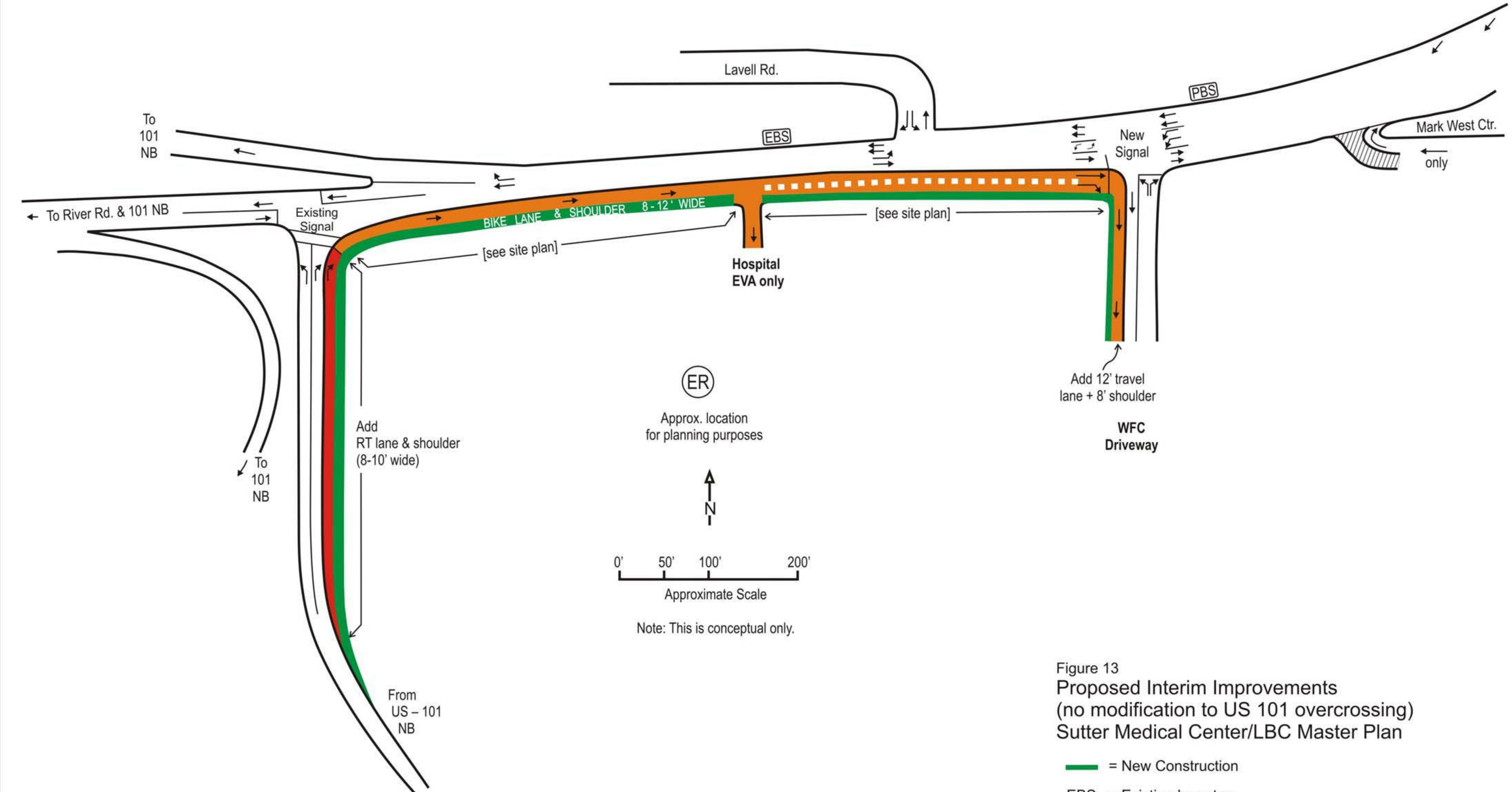


Figure 13
Proposed Interim Improvements
(no modification to US 101 overcrossing)
Sutter Medical Center/LBC Master Plan

Table 15
Intersection Levels of Service Comparison—2008 and 2014 without and with Project

	Existing (2008)		2014 No Project		2014 w/ Project Phase II	
Intersection	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
River Road/Fulton Road (45)	D (40.3)	E (55.3)	D (49.9)	F (82.0)	E (57.0)	F (95.3)
River Road/Barnes Road* -right turn (RT) (46) -left turn (LT)	F (56.6) F (>100)	C (21.5) F (>100)	F (95.7) F (>100)	D (25.9) F (>100)	F (>100) F (> 100)	D (28.9) F (>100)
US 101 Southbound Off-ramp/ River Road (4)	B (15.0)	B (12.8)	B (15.0)**	B (13.1)**	B (16.5)**	B (14.0)**
US 101 Northbound Off-ramp/ Mark West Springs Road (10)—assumes dual NB right turn	B (17.0)	B (16.3)	B (12.4)	B (15.6)	B (16.5)	B (19.2)
Mark West Springs Road/ Lavell Road* - RT (50) - LT	E (35.3) F (>100)	C (35.2) F (81.9)	E (42.3) F (>100)	D (27.1) F (>100)	F (53.0) F (>100)	F (57.8) F (>100)
Mark West Springs/ WFC Main Entry* - RT (51) - LT	D (25.2) F (>100)	D (49.1) E (56.0)	A (3.9)**	A (3.4)**	B (11.2)**	B (18.2)**
Old Redwood Hwy/ Mark West Springs Road (9)	C (32.1)	C (27.3)	D (38.3)	C (33.0)	D (42.5)	C (34.3)
E. Fulton Road/Old Redwood Highway* (53)	D (29.7)	C (18.1)	E (35.9)	C (20.8)	E (43.6)	F (85.4)

Method: *2000 Highway Capacity Manual* using TRAFFIX 7.9. Average control delay, in seconds, is shown in parentheses, rounded to nearest tenth second. "F>100" indicates that the calculated delay exceeded 100 seconds and cannot be reliably estimated.
* Unsignalized intersection; level of service is shown for the STOP controlled movement.
** Overall intersection with signalization; delay is reduced in future by assumed signal in this scenario.

Signal warrants analysis were done for the unsignalized intersections in the study area—at the Mark West Springs intersections with Barnes Road and Lavell Road, and at E. Fulton/Old Redwood Highway. The peak hour warrant (MUTCD Warrant 3) was used for this purpose. Of the three intersections, the Mark West Springs/Barnes Road intersection does meet the warrant in the PM peak hour. However, there are two factors that should be considered in deciding whether to signalize this intersection: its close proximity to the US 101 southbound ramp (where a signal is under construction and may help to create additional gaps in traffic for Barnes Road traffic); and the possibility that Barnes Road traffic may be largely a function of congestion on 101. Barnes Road volumes could, conceivably, drop once US 101 is widened and some of the freeway mainline congestion alleviated.

c. Projected Impact of Project on Key Intersections

The Project would have varying effects depending on the intersection and the mitigations that are made. The two intersections proposed for signalization (south 101 ramp at River Road, and the main WFC entry) improve in LOS, at least for the minor street approaches. The Mendocino Avenue/Old Redwood Highway northbound ramps also improve in level of service, due to provision of the right-turn overlap signal and phasing. At some of the unsignalized intersections, the left turn out of the side street experiences poor LOS, but the volume is not large. Mark West Springs Road/Lavell Road is an example of this; although consideration was given to signalizing this intersection, it is very close to the WFC Main entry, and could create problems due to queuing distance. It may also be that the left turn delay at this intersection is overestimated, because it does not take into account new gaps in traffic that would be created by the Mark West/WFC signal. Further discussion of this topic is provided in Section D (9.).

d. Impact on Key Roadway Segments

The impact on the two major roadways, Mark West Springs-River Road, and Old Redwood Highway, is shown in the table below:

Table 16-
2014 Project Phase II Arterial LOS Analysis Results With Interim Mitigations

Level of service – rounded speed in mph

	No Project		With Project Phase II	
Arterial Route and Direction	AM	PM	AM	PM
River Rd.-Mark West Springs Rd. EB	C- 23.3	D- 20.1	C- 22.9	E- 15.7
River Rd.-Mark West Springs Rd. WB	C- 25.5	C- 23.6	C-24.2	C- 22.2
Mendocino-ORH NB	B- 31.6	B- 32.8	B-32.5	B- 32.1
Mendocino-ORH SB	C- 22.7	C- 22.1	C-21.6	C- 24.7

e. Volume to Capacity Ratios

Intersection v/c ratios are shown in the Appendix for all study intersections. The freeway LOS tables are shown below.

Table 17
Near-Term (2014) No Project Freeway Level Of Service – Mixed Flow Lanes, with freeway widening now under construction

Location	Direction	Volume (mixed flow lanes)	Capacity	V/c ratio	LOS
Between River Road ramps and Airport/Fulton Rd. ramps	NB	3,272 AM	4,700	.70	C
		3,212 PM		.68	C
	SB	3,487 AM	4,700	.74	D
		3,855 PM		.82	D
Between Mendocino/Hopper ramps and River Road ramps	NB	3,338 AM	4,700	.71	D
		3,364 PM		.72	D
	SB	4,058 AM	4,700	.86	D
		3,822 PM		.81	D

Note: this table does not include HOV volumes, HOV lanes are expected to operate at LOS C or better. These are demand volumes; constrained volumes could be lower.

Table 18
Near-Term (2014) With-Project Freeway Level of Service – Mixed Flow Lanes, with freeway widening now under construction

Location	Direction	Volume (mixed flow lanes)	Capacity	V/c ratio	LOS
Between River Road ramps and Airport/Fulton Rd. ramps	NB	3,283 AM	4,700	.70	C
		3,254 PM		.69	C
	SB	3,519 AM	4,700	.75	D
		3,875 PM		.82	D
Between Mendocino/Hopper ramps and River Road ramps	NB	3,440 AM	4,700	.73	D
		3,429 PM		.73	D
	SB	4,092 AM	4,700	.87	D
		3,957 PM		.84	D

Note: this table does not include HOV volumes, HOV lanes are expected to operate at LOS C or better. Volumes include project traffic from Phase II medical center (MOB and hospitals).

Table 19
Future (2035) No Project Freeway Level of Service – Mixed Flow Lanes, with widening now under construction

Location	Direction	Volume (mixed flow lanes)	Capacity	V/c ratio	LOS
Between River Road ramps and Airport/Fulton Rd. ramps	NB	3,845 AM	4,700	.82	D
		3,910 PM		.83	D
	SB	4,008 AM	4,700	.85	D
		4,667 PM		.99	E
Between Mendocino/Hopper ramps and River Road ramps	NB	4,017 AM	4,700	.85	D
		4,021 PM		.86	D
	SB	4,501 AM	4,700	.96	E
		4,363 PM		.93	E

Note: this table does not include HOV volumes, HOV lanes are expected to operate at LOS C or better. Values represent Parsons' 2030 volumes increased by 7.56% growth, which is ABAG's forecast of job growth in Sonoma County between 2030 and 2035.

Table 20
Future (2035) With-Project Phase III Traffic Freeway Level of Service – Mixed Flow Lanes, with widening now under construction

Location	Direction	Volume (mixed flow lanes)	Capacity	V/c ratio	LOS
Between River Road ramps and Airport/Fulton Rd. ramps	NB	3,857 AM	4,700	.82	D
		3,954 PM		.84	D
	SB	4,042 AM	4,700	.86	D
		4,688 PM		1.00	E
Between Mendocino/Hopper ramps and River Road ramps	NB	4,127 AM	4,700	.88	D
		4,089 PM		.87	D
	SB	4,538 AM	4,700	.97	E
		4,505 PM		.96	E

Note: this table does not include HOV volumes, HOV lanes are expected to operate at LOS C or better. Values represent Parsons' 2030 volumes increased by 7.56% growth, which is ABAG's forecast of job growth in Sonoma County between 2030 and 2035. All table values are rounded to the nearest digit, e.g., the v/c ratio for the PM peak hour between River and Fulton Roads is actually .997 but is shown as 1.00 in the table above. Because the v/c is <1.00, the LOS as shown as E.

f. Adequacy of On-Site Parking

A parking analysis of the Project is provided in Section 2.C.1.t. It shows that onsite parking is proposed is greater than the parking demand of both the Sutter Medical Center and JV Hospital and the medical office building.

g. Pedestrians, Bicycles, Emergency Access, and Loading Areas

The site has not been fully designed at this time, however, the following comments can be made at this stage of the project's development.

Pedestrian Circulation: Pedestrian circulation will occur primarily (in order of magnitude) between:

- Parking areas and buildings
- MOB/hospital and WFC
- Transit stops on Mark West Springs Road and Old Redwood Highway

The pedestrian paths from parking areas could include raised walkways to act as speed humps to deter vehicles speeding on longer tangent sections of the parking lots. In general, any tangent parking aisle longer than 200' long should have either a speed hump or stop sign to deter excessive vehicle speeds. Sidewalks should be provided on at least one side of all internal roadways, at least in so far as they would be used to walk between buildings.

Bicycles: Bicycle circulation is assumed to be similar to vehicular circulation on site. Bicycle parking would be provided as per County code. Bicycle parking should be located as near to building entrances as practical. The wide shoulder area on the main inbound WFC driveway could be used as a bike lane, as could the pedestrian access path adjacent to the EVA on Mark West Spring Road.

Transit: As noted earlier, several County transit routes run by the site. Presently there is a stop for the 20X and 62 buses on Mark West Springs Road near Lavell Rd. The signalization of Mark West Springs Road and the WFC Main drive will provide a safer location for crossing. It may therefore be desirable to relocate the westbound stop to the far side of the Mark West Springs Road/WFC intersection, although it may add some distance to the walking distance to the medical center buildings. Bus stop changes should be coordinated with Sonoma County Transit.

Emergency Vehicle Access (EVA): This has been provided for by providing an additional EVA on Mark West Springs Road between the northbound 101 off-ramp and the WFC main driveway. Also, the project proposes to add wide shoulders to the 101 off-ramp and Mark West Springs Road eastbound in order to facilitate emergency vehicles bypassing vehicle queues, even during a major WFC event. First response fire protection would be provided by the existing fire station to the north on Old Redwood Highway near Lark Center Drive. The primary fire access routes would be via the main WFC drive, or via Old Redwood Highway to E. Fulton, then in the east WFC drive.

3. Cumulative 2035 Conditions without Project

a. Approved and Reasonably Foreseeable Future Developments

Projections prepared by SCTA for its SCTM/07 model update, based on ABAG *Projections 2007* information indicate these land uses for 2035:

Table 21
Forecast Year 2035 Land Uses, by SCTM/07 Travel Analysis Zone

Land Use	TAZ 127	TAZ 98	TAZ 110
Single family units	230	574	788
Attached & multi-family units*	76	143	41
Office (sq. ft.)	43,000	35,000	69,700
Strip/highway retail (sq. ft.)	2,200	31,200	62,200
Shopping center retail (sq. ft.)	0	0	41,300
Light industrial (sq. ft.)	0	54,800	0
Warehouse-storage (sq. ft.)	0	110,000	0
School (students)	648	396	1,145
Hotel Rooms	12	0	0

Source: Dowling Associates, and SCTA.
* Includes senior units. Values rounded.

b. Trip Generation from Anticipated Future Developments

Trip generation was forecasted using the latest SCTA travel forecasting model for 2035 conditions. As was done with the general plan forecasts, model volumes were adjusted by adding the model-projected traffic increase (between 2005 and 2035) to the existing counts.

c. Projected Daily Traffic Volumes without Project

The Sonoma County Travel Model (SCTM/07) provides AM and PM peak hour traffic volumes, but not daily volumes.

d. Traffic Volume Projections for Background (No Project) Traffic Growth

The peak hour traffic forecasts for 2020 AM and PM turning volumes are shown in the Appendix, for the no project condition. These have been developed from the SCTM/07 forecasts, using the post-model adjustment process used for all the General Plan forecasts.

e. Potential Impacts on Key Intersections

The 2020 No Project level of service is shown in Table 17. This table also shows the LOS and v/c ratios for the entrances to the site.

f. Potential Impact on Key Roadway Segments

The 2035 No Project and Project (Phase III) level of service for roadway segments is shown in that table below. Note that all of the roadways (after improvement called for in the General Plan) would operate within the County's LOS D or better standard, except eastbound Mark West Springs Road-River Road during the PM peak. This occurs with or without the proposed project.

Table 22 -
2035 Project Phase III Arterial LOS Analysis Results With Ultimate Mitigations

Level of service – rounded speed in mph

	No Project		With Project Phase III	
Arterial Route and Direction	AM	PM	AM	PM
River Rd.-Mark West Springs Rd. EB	D-19.6	**E- 16.9**	D- 18.8	**E- 15.9**
River Rd.-Mark West Springs Rd. WB	D- 19.6	D- 20.7	D- 18.6	D- 19.7
Mendocino-ORH NB	B-31.6	C- 27.2	B-31.6	C- 26.5
Mendocino-ORH SB	D- 19.3	C- 23.3	B-18.6	C- 22.8

Freeway impacts have been based on the traffic volumes developed for the Sonoma US 101 Project Approval/Environmental Documentation project, which is now under construction. These forecasts were originally done for 2030, but have been factored up to 2035 using ABAG *Projections 2007*. These volumes assume addition of an HOV lane in each direction, which would be effective during the peak periods. The No Project traffic volumes, v/c ratios, and LOS are shown in Table 17 below. Under the No Project conditions, Caltrans' objective (v/c ≤ .71) would not be met, even with the added HOV lanes on the freeway.

g. Impact on Volume-to-Capacity Ratios

V/c ratios are shown in the Technical Appendix for this condition.

Table 23 -
2035 No Project Intersection Levels Of Service
Average weekday (includes approved projects and WFC traffic, but no special WFC events; mitigations as noted)

Intersection	AM Peak Hr.	PM Peak Hr.
River Road/Fulton Road *(45) assumes 4L on River & Fulton Roads*	E (53.3)	D (47.2)
River Road/Barnes Road* -right turn from Barnes	C (15.5)	C (15.9)
(46) -left turn from Barnes	F (>78.2)	F (>100)
US 101 Southbound Off-ramp/ River Road *(4) assumes signal and 4L on overcrossing (bridge) and River Road*	B (11.1)	B (16.5)
US 101 Northbound Off-ramp/ Mark West Springs Road *(10)* *Assumes second right turn lane northbound*	B (17.9)	C (21.3)
Mark West Springs Road/ Lavell Road* *(50)* – Right turn	F (75.1)	C (20.3)
Left turn	F (>100)	F (>100)
Mark West Springs/ WFC Main Entry *(51)* (Signal)	A (4.5)	A (3.8)
Old Redwood Hwy/ Mark West Springs Road *(9)*	E (70.7)	E (62.6)
E. Fulton Road/Old Redwood Highway* *(53)—this is for the eastbound left turn into Old Redwood Hwy northbound.*	F (>100)	F (>100)

Method: *2000 Highway Capacity Manual.* Average control delay, in seconds, is shown in parentheses, rounded to nearest tenth second. "F>100" indicates that the calculated delay exceeded 100 seconds and cannot be reliably estimated. Small number in parentheses is the TRAFFIX network node number.

* Unsignalized intersection; level of service is shown for the STOP controlled movement.

4. Cumulative (2035) Conditions with Project

a. Projected Daily Traffic Volumes with Project

Projected cumulative daily traffic volumes with the project were shown in Figure 14. Turning movements are included in the Technical Appendix. Lane geometrics and traffic controls are shown in Figure 17 with ultimate improvements.

b. Traffic Volume Projections for Background Growth

This information was provided previously in Sections 4c and 4d.

c. Potential Impact on Key Intersections

The 2035 cumulative traffic level of service is shown in Table 19 for the AM and PM peak hour, with the Phase III Sutter medical center project at full occupancy.

d. Potential Impact on Key Roadway Segments

The potential impact on roadway level of service is shown in Table 24.

Table 24 -
2035 with Project Phase III Traffic-- Intersection Level of Service
Average Weekday (includes approved projects per *Sonoma County General Plan 2020*, and WFC traffic but no special WFC events; mitigations same as in Table 18)

Intersection	AM Peak Hr.	PM Peak Hr.
River Road/Fulton Road *(45)*	E (57.6)	D (54.1)
River Road/Barnes Road* -right turn *(46)* -left turn	C (16.3) F (>91.2)	C (16.6) F (>100)
US 101 Southbound Off-ramp/ River Road *(4)* (Signal)	B (12.4)	B (16.1)
US 101 Northbound Off-ramp/ Mark West Springs Road *(10)*	C (21.7)	C (23.9)
Mark West Springs Road/ Lavell Road* *(50)* – Right turn – Left turn	C (87.9) F (>100)	D (28.0) F (>100)
Mark West Springs/ WFC Main Entry *(51)* (Signal)	A (6.3)	B (11.5)
Old Redwood Hwy/ Mark West Springs Road *(9)*	E (77.5)	E (67.4)
E. Fulton Road/Old Redwood Highway* *(53)*	F (>100)	F (>100)

Method: *2000 Highway Capacity Manual.* Average control delay, in seconds, is shown in parentheses, rounded to nearest tenth second. "F>100" indicates that the calculated delay exceeded 100 seconds and cannot be reliably estimated. Small number in parentheses is the TRAFFIX network node number.

* Unsignalized intersection; level of service is shown for the STOP controlled movement.

e. Volume-to-Capacity Ratios

V/c ratios are included in the Technical Appendix. Freeway v/c ratios are shown in Table 17.

D. Site Access Evaluation

1. Requirements for Access to the Development

The project would use but modify the two existing entrances to the WFC, off Mark West Springs Road and East Fulton Road. An additional inbound-only lane would be added at the main project driveway, as well as a shoulder area (which could also be used as a bike lane), to facilitate EVA. The EVA-only entrance would be added on Mark West Springs Road approximately opposite Lavell Road. The main entrance to WFC would be signalized to provide protected left turns into the site.

2. Impact of Access to the Project on Adjoining Neighborhoods

All of the proposed access is via arterial streets, and therefore the impact on adjoining neighborhoods would be minimal. There could be a small amount of traffic using Lavell Road to cut through that neighborhood to (or from) Old Redwood Highway north, but this is expected to be minimal provided that Lavell Road is unsignalized. A proposed mitigation is to prohibit left turns out of Lavell Road (into Mark West Springs eastbound); this would create some inconvenience for a very small number of vehicles presently making this movement, although alternative access is possible and is discussed in this report. See further discussion under Item #9 (below).

3. Left Turn Ingress

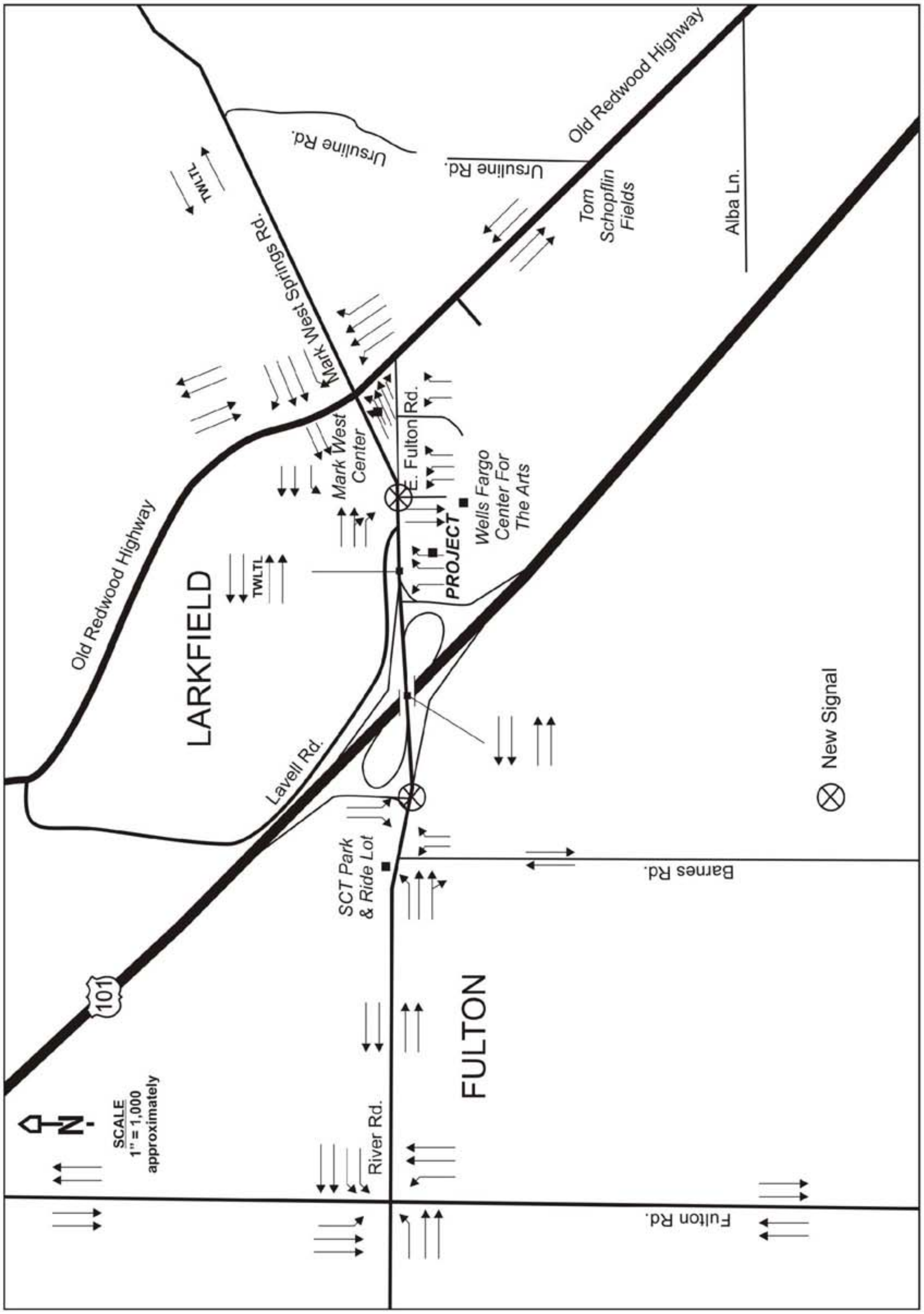
Most inbound traffic would make left turns using the existing left turn pocket on Mark West Springs Road westbound, with the project adding a second left turn lane. The queuing analysis showed this pocket was of sufficient length. The left turn ingress at the E. Fulton Road entrance has no opposing movements, so should suffer no queuing at the unsignalized entry.

4. Right Turn/Deceleration Lane Ingress

The only right turn into the site is at the main WFC driveway, where a right turn only/deceleration lane is proposed.

5. Left Turn Egress Acceleration Lane

Left turns out of the main WFC driveway will be signalized (split phasing) and therefore not require an acceleration lane. Left turns from E. Fulton eastbound into Old Redwood Highway northbound could be permitted, but an acceleration lane here is not feasible because it would conflict with the northbound left turn lane on Old Redwood Highway at Mark West Springs Road.



Dowling Associates, Inc.

Figure 14
Ultimate Proposed Lane Geometries
and Traffic Controls

6. Right Turn Acceleration Lane Egress

Given heavy traffic flows on Mark West Springs Road, it was (conservatively) assumed that all right turns into the project would have to be included in the green time for the left turn out of the project. Right turn acceleration lanes are more often used for unsignalized intersections with higher speed arterials. For the unsignalized right turn from E. Fulton Road into Old Redwood Highway southbound, vehicles would have to accelerate from a stop condition to the 35 mph posted speed. An acceleration lane here would probably not be justified here because of the proximity of the Mark West Springs Road signal just to the north. Also, the Sutter generated traffic makes very little use of this driveway.

7. Sight Distance

Sight distances in the study area are generally not a problem because most of the roadways are relatively tangent. The one exception is the sight distance limitation due to the vertical curvature of the overcrossing of US 101. This may not meet current Caltrans or AASHTO standards and is currently posted at 40 mph.

8. Modern Roundabout at Mark West Springs Road and Old Redwood Highway

At the request of County staff, the potential for replacing the existing signalized control of Mark West Springs Road/Old Redwood Highway with a modern roundabout was investigated. Modern roundabouts have been introduced recently to the United States, although they have been used extensively in other countries for several decades. The three key differentiating factors between modern roundabouts and older style 'traffic circles' or 'rotaries' are:

- YIELD control on entry (vehicles circulating in the roundabout have priority)
- Deflection of entering traffic (traffic must slow to make a turning movement into the roundabout)—this is usually accomplished with a 'splitter island'
- Appropriate geometric curvature to slow speeds within the roundabout

The following are preliminary conclusions based on a planning-level analysis of the potential for a roundabout at this location:

a. Dual (2) entry lanes on all approaches would be required to meet traffic demand in 2020 and beyond. The inscribed circle diameter for an urban roundabout is typically 150 to 180 feet.[10]
b. The exact amount of additional right of way required (compared to the existing intersection) would need to be determined in design work, but it appears that the roundabout could fit within the existing right of way with minimal right of way takes. Design should also include standard (five foot) bike lanes on all approaches.
c. The level of service, as defined by delay, would be poorer with a roundabout than with a traditional traffic signal; using 2035 traffic demands, the signalized average delay would be 67-78 seconds/vehicle, but with a roundabout would be 118 seconds or more.

[10] Federal Highway Administration. *Roundabouts: An Informational Guide.* June 2000.

The relative performance of a roundabout compared to a signalized intersection depends on many factors, including the turning volumes and traffic that conflicts with them; the ability to overlap signal phases, and other factors. Because the roundabout would operate at LOS F in the AM peak hour, with significant queues that might potentially block other driveways/intersection (e.g., the AM southbound queue is projected to be >1,700 feet), a roundabout has not been recommended at this location.

9. Access Changes at Mark West Springs/Lavell Road Intersection

Also at the request of County staff, modification to the Lavell Road intersection has been evaluated. The five options identified would be, 1) to do nothing, but widen Mark West Springs Road; 2) permit right turns in and out to/from westbound Mark West Springs, as well as left turns into Lavell from eastbound Mark West Springs Road; 3) allow right turn in/out only from westbound Mark West Springs; 4) close the intersection entirely; 5) provide a traffic signal at the intersection. Each of these is discussed below:

Lavell-1 Do Nothing. In its earlier traffic study (2005), Dowling Associates reviewed three years of collision data for this intersection. There were 10 reported collisions at the intersection (within 100') in three years, and three more that occurred between 101' and 200' of the intersection. Nine were in or east of the intersection. Most of these were rear-end crashes, but five were broadside (indicating a turning movement). Three involved injury to one or more motorists. None involved pedestrians or cyclists. The calculated collision rates were 1.47 per million entering vehicles in total, and 0.19 per million entering vehicles, if only injury-collisions are concerned. Both of these are significantly above the statewide averages for this type of roadway and intersection control (which are 0.44 for injury and .08 for injuries). Because this is well above the state average, the Do Nothing option is not desirable. With the added lanes on Mark West Springs Road and added traffic, the number of collisions would be likely to increase in the future absent any remedial action. Extremely long delays are projected for left turning vehicles out of Lavell during peak hours with 2035 traffic volumes.

Lavell-2 Right In/Out Access with Left Turns Into Lavell: Because of the collision history, the County T&PW Department proposed that a raised median be provided on Mark West Springs Road that would prohibit left turns out of Lavell Road into Mark West Springs Road eastbound. The inconvenience created by this would be fairly minimal, as only 9 vehicles make this turn in the AM peak hour, and 14 vehicles in the PM peak hour. These vehicles would instead be required to use Lavell Road to the north, and then make a right turn at the Lavell Road/Old Redwood Highway intersection, and then travel south again. For most users, this is unlikely to add more than two minutes to their trip. Vehicles traveling to or from the freeway (US 101) would not be affected by this alternative, and there is no impact on emergency vehicle access.

Lavell-3 Right In/Right Out Only: This alternative is similar to 2 above, but prohibits left turns into Lavell Road from Mark West Springs Road with a raised median. The purpose would be to enhance safety by eliminating an uncontrolled turning movement, where left turning traffic must wait for acceptable gaps in the westbound traffic stream on Mark West Springs Road. It also eliminates the potential for a left turning vehicle not seeing an opposing through vehicle, e.g., if a large vehicle were driving westbound on the inside (median) lane, and another vehicle were proceeding in the adjacent outside lane. However, it should be noted that this type of collision can occur at any uncontrolled intersection between a multi-lane major street and a minor cross street.

Vehicles that formerly made this left turn would be required to make a U-turn (if allowed) at either the WFC main entry (proposed for signalization) or Mark West/Old Redwood Highway (currently signalized, but all U-turns prohibited). This would add to the left turning volumes and queuing distances at whichever intersection the U-turn is made at. However, unlike in alternative 2, there is a modest volume of traffic observed making this movement today: 79 vehicles in the AM peak hour and 163 vehicles in the PM peak hour. There would be minor EV access issues; although the first-response fire station is to the north (and thus wouldn't use this intersection), any secondary response (or first response from the freeway, such as sheriff's vehicle) would be required to make the same U-turn movement as non-emergency vehicles.

Lavell-4 Complete Closure of Lavell: This treatment would cul-de-sac (block) the intersection at Mark West Springs Road. Although this would provide the greatest degree of safety, it would also create the greatest inconvenience to neighborhood residents and visitors. The 92 southbound right turn vehicles in the AM peak hour, and 87 in the PM peak hour, would be diverted to/thru other intersections. It would have EV impacts similar to Lavell-3 above.

Lavell-5 Signalization: This would signalize the intersection, and could allow all turning movements (e.g., southbound lefts from Lavell into Mark West Springs), or just certain turning movements (e.g., eastbound left into Lavell from Mark West Springs). The primary disadvantage of this treatment is the close spacing between Lavell and the WFC main driveway; at least 280 feet of queuing in the eastbound direction would be required, just barely within the 290' of storage distance that would be available. Caltrans may also be concerned about the proximity of this signal to the northbound freeway off-ramp—the storage distance would be less than 500 feet. It is also difficult to provide coordination (synchronization) in both directions when traffic signals are closely spaced. A signal with left turns allowed out of Lavell would tend to encourage cut-thru traffic to avoid the Mark West Springs/Old Redwood Highway intersection. Southbound traffic on Old Redwood could turn right into Lavell Road and use it to reach Mark West Springs Road. Finally, there is the issue of added cost, for both construction as well as maintenance and operation of the signal in the future. Impacts on EVs would be minimal, depending on whether certain turn movements were physically prohibited.

10. Dual Right Turn Lanes at Northbound US 101 Off-Ramp at Mark West Springs Road

The northbound off-ramp of US 101 at Mark West Springs Road will be the project's most heavily used freeway off-ramp. It is currently signalized and has a signal left and right turn lane (two lanes total). One of the important project mitigations proposed for this project is a second right turn lane to accommodate and mitigate the delay impacts of the project. The second lane permits more green time to be allocated to the eastbound through movement, which is constrained by the existing one-lane approach eastbound. This will permit the project to operate prior to the rebuilding and improvement of the interchange, which is likely to be some years in the future.
In the morning peak, the adding a second right turn lane has the benefit of reducing overall

intersection delay from 34.5 seconds/vehicle (LOS C) to 16.5 seconds/vehicle (LOS B). In the afternoon peak, the single right lane results in overall average delay of 37.5 seconds/vehicle (LOS D), but with the second right turn lane, the delay is reduced to 19.2 seconds/vehicle (LOS B).

A right turn green arrow is also recommended as part of the signal modifications, along with a phasing modification that will allow northbound right turns to occur at the same time as westbound through traffic. Because it is uncertain whether Caltrans will allow this phasing modification to occur, this measure has not been assumed in the LOS analysis in the paragraph above.

An additional benefit of the second right turn lane is to increase the effective storage length for this movement, to minimize the possibility of traffic backups onto the mainline. Although backups are not foreseen as a problem on normal weekdays, large WFC events have been known to create backups onto the freeway mainline, and this mitigation would benefit WFC as well as Sutter traffic.

3. Summary of Conclusions

Table 25 presents a tabular summary of conclusions in terms of traffic impacts, mitigations, timing, and significance after mitigation. Table 21 provides a comparison of the intersection level of service for the existing, the 2035 No Project, and the 2035 Project build-out conditions.

Traffic mitigations have been proposed in two phases—Interim and Ultimate—that correspond to the two project phases, but are also tied to the widening of the US 101/River Road overcrossing. The ultimate project would include widening River Road-Mark West Springs Road overcrossing (O/C) of US 101 to two travel lanes in each direction. This project is included in SCTA's countywide transportation plan, but is currently unfunded and is not included in the US 101 widening project from Steele Lane to Windsor that is slated for completion around 2012.

The County's *General Plan 2020* also includes ultimately widening River Road to four lanes between Laughlin Road (Brickway Parkway Extension) and US 101, and Mark West Springs Road between 101 and Old Redwood Highway. Ultimately Fulton Road would be widened, from Old Redwood Highway to the Santa Rosa city limits (in Santa Rosa, Fulton is a four lane divided road south to Highway 12)

In the long-term (20-year) cumulative scenario, it is likely that traffic growth will create the need for additional improvements in the City of Santa Rosa. These improvements are based upon previous traffic studies that have been done in the area:

Mendocino Avenue/ Fountaingrove Pkwy/ 101 O/C

a. Overlap the westbound right turn movement with the southbound left turn

Table 25

Summary of Impacts and Mitigations LTS= Less than significant impact

Intersection or Facility	Impact	Mitigation	Triggered by	Mitigates to LTS?	When Needed
River Rd./Fulton Rd.	Increased delay	Add 2nd EB left turn lane; consider 2-lane modern roundabout if R/W permits	Project & cumulative traffic	N; roundabout may be Y	Project Phase II
River Rd/ Barnes Rd.	LT delay excessive	Signalize after evaluating effects of freeway widening and installation of new signal at southbound ramp	Project & cumulative traffic	Possibly	2020 see discussion
US 101 Southbound Ramp	Project adds to critical movement--SB LT	Signalize	Existing volumes warrant (delay warrant uncertain)	Y	Under construction by Caltrans.
US 101 Northbound Ramp Mark West Spgs Rd.	Increased delay	Add 2nd NB RT lane and widen Mark West Springs Rd.	Project phase II	Y	2014
Mark West Spgs./ Lavell Rd.	Increased delay, esp. for LT vehicles from Lavell	Channelize to permit right in/right out only at Lavell; left turn into Lavell from Mark West Springs Road eastbound.	Project and cumulative traffic	Y	Not applicable.
Mark West Spgs./ WFC Main Entry	Increased delay	Signalize entry; add lanes on Mark West Spgs. Rd., including EB thru and EB right turn only	Project, and to lesser extent cumulative traffic	Y	Project phase I (when heavy trucks access site)
E. Fulton Rd./WFC East Drive	Less than significant	No changes proposed other than for Mark West Center	N/a	Y	N/a
Old Redwood Hwy/ Mark West Spgs. Rd.	Increased delay; 2020 AM LOS E	Intersection physically constrained; add to length of right turn lanes where feasible; add SB RT overlap with EB LT (green RT arrow). Coordinate signal timing with signal at WFC main entry drive.	Project and cumulative traffic	N	2010-2012
E. Fulton Rd./ Old Redwood Hwy	Increased traffic & delay	Separate LT and RT lanes on exit from E. Fulton Road; or prohibit left turn out of E. Fulton Road and allow U-turns eastbound at Mark West/Old Redwood.	Mark West Ctr. circulation changes and cumulative traffic	N	2020
US 101 Northbound/Mendocino Av.	Increased delay	Add RT overlap for NB exit traffic and NB LT from Mendocino Av.	Project, Kaiser, cumulative traffic	Y shorterm N cumulative	2014

Table 26
Intersection Levels of Service Comparison

	Existing (2008)		2035 No Project		2035 w/ Project Phase III	
Intersection	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
River Road/Fulton Road (45)	D (54.3)	E (74.6)	E (75.0)	E (62.6)	F (88.1)	E (76.4)
River Road/Barnes Road* -right turn (RT) (46) -left turn (LT)	F (55.1) F (>100)	C (20.2) F (>100)	C (17.7) F (>100)	C (15.1) F (>100)	C (19.3) F (>100)	C (15.8) F (>100)
US 101 Southbound Off-ramp/ River Road* - RT (4) LT	C (13.7) F (>100)	F (58.6) F (>100)	B (13.7)**	B (17.7)**	B (15.4)**	C (20.6)**
US 101 Northbound Off-ramp/ Mark West Springs Road (10)	C (21.7)	B (19.7)	B (19.7)	B (18.6)	E (50.7)	D (42.8)
Mark West Springs Road/ Lavell Road* - RT (50) - LT	E (45.2) F (>100)	D (30.0) F (>96.6)	C (19.8) F (>100)	C (15.6) F (>71.4)	C (21.6) F (>100)	D (21.3) F (>100)
Mark West Springs/ WFC Main Entry* - RT (51) - LT	D (25.4) F (>100)	C (17.1) F (63.5)	A (3.2)**	A (2.9)**	A (5.2)**	B (12.4)**
Old Redwood Hwy/ Mark West Springs Road (9)	D (54.5)	D (36.7)	D (48.2)	D (48.4)	E (59.4)	D (53.9)
E. Fulton Road/Old Redwood Highway* (53)	E (41.5)	C (15.2)	F (>100)	F (>100)	F (>100)	F (>100)

Method: *2000 Highway Capacity Manual* using TRAFFIX 7.9. Average control delay, in seconds, is shown in parentheses, rounded to nearest tenth second. "F>100" indicates that the calculated delay exceeded 100 seconds and cannot be reliably estimated.

* Unsignalized intersection; level of service is shown for the STOP controlled movement.
** Overall intersection with signalization; delay is reduced in future by assumed signal in this scenario.

b. Add a 2nd westbound through lane (this has already been proposed as part of the ultimate widening of the overcrossing of 101 to four lanes.

Old Redwood Hwy (Mendocino Ave) / US 101 Northbound On-Ramp

a. Add a southbound through lane
b. Add a second northbound left turn lane

A discussion of some of potential impacts and mitigations is also provided in the text after the table.

River Road/Fulton Road: This intersection lies within the built-up portion of the small community of Fulton. There are limited options to improve its future LOS beyond the widening proposed in the *General Plan 2020*. The intersection operates below standard with or without the proposed Sutter/WFC project in 2014. The heaviest flow is in the north-south direction for vehicles using this as a freeway alternate, but there is no room to accommodate additional through lanes through the community. Adding a second (dual) westbound left turn lane appears physically possible (the northeast corner of the intersection is unbuilt), but would only improve the LOS from F to E. A modern roundabout is also a possibility at this location; it appears a roundabout could result in within-standard LOS. It would need to be a two-lane roundabout and there may not be sufficient right of way to accommodate it. However, further consideration of a roundabout might be given when Fulton or River Road are widened.

River Road/Barnes Road: Barnes Road serves both traffic from the neighborhood centered on San Miguel Road in Santa Rosa, and also freeway bypass traffic. Traffic in this area is constrained by the NWPRR (SMART) tracks to the west; San Miguel Road is the only public road crossing the railroad tracks between Piner Road and River Road. Although the intersection may warrant signalization by 2020, continued monitoring of this intersection is probably the best action. Its proximity to the US 101 interchange makes it an undesirable candidate for signalization; it may also be that gaps created by signalizing the adjacent southbound off-ramp of US 101 will create additional gaps in traffic, and thus reduce the delay for left turns out of this intersection. Left turns into Barnes and right turns out of it will operate acceptably.

US 101 Southbound Off-ramp: This intersection currently meets traffic volume warrants for signalization, but apparently not delay warrants. The intersection can operate well (LOS B) in the ultimate scenario, but until the overcrossing is widened, signalizing this intersection may create queuing problems due to the limited storage distance (only approximately 400 feet) to the upstream southbound on-loop. The southbound loop has moderately high volumes (>600 vph) in the AM peak hour that could create backups if there is only one westbound lane on the overcrossing. A short signal cycle length would minimize queuing, at the trade-off of not being able to coordinate this signal with other adjacent signals with longer cycle lengths.

US 101 Northbound Off-ramp: Without mitigation, this intersection operates at LOS C or D in 2014 with the project. Although this is within Caltrans and County LOS standards, adding a second right turn would improve the intersection delay to approximately the current (2008) delay conditions, and would minimize the potential for backups onto the freeway mainline.

Mark West Springs Road/Lavell Road: In the 2014 with-project scenario, right turns operate acceptably from this intersection but left turns would suffer long delays during peak hours. Signalizing this intersection is a possibility, but is probably undesirable due to its proximity to the main project entry. Southbound left turns from Lavell are currently very low volume, possibly due to the delays associated with such turns. A collision analysis indicated that this intersection is experiencing above-average crash rates. Prohibiting the left turn would result in minimal inconvenience, as motorists headed in the eastbound direction on Mark West Springs Road would have to detour north up to a half mile, but the number of vehicles affected is small.

Mark West Springs/WFC Main Entry: Improvements have been recommended, including signalization, which result in acceptable LOS (A in the AM, B in the PM) in the future with the project. If possible, this signal should be operational by the time large earth fill trucks begin to access the site.

Old Redwood Highway/ Mark West Springs Road: This intersection operates below County standard (LOS D or E) in the peak hours in with the project. There are limited options for adding capacity here due to the existing and approved property development on all four corners. Three mitigations that appear feasible include:

- Lengthening the right turn lanes
- Interconnecting and coordinating the signal with the WFC main drive signal
- Overlapping the northbound right turn with the westbound left turn movement

Nevertheless, this intersection would probably still operate below County standard in 2035, with or without the project.

4. Recommendations

The proposed mitigations include two sets of roadway improvements:

- Interim improvements to mitigate the first phase of project development, which do not require modification to the existing interchange overcrossing structure.

- A set of ultimate mitigations that is contingent upon widening the existing two-lane overcrossing structure to at least four lanes.

The interim improvements would include:

- Signalization of the Main WFC entry on Mark West Springs Road, with interconnect installed to the adjacent signals (Old Redwood Highway, and possibly US 101 northbound).

- Signalization of the southbound US 101 off-ramp at River Road

- Widening of Mark West Springs Road, as shown in the diagram on the following page. This provides for an additional eastbound thru travel lane, plus a right turn only lane into the WFC, a bike lane (Class II), and a shoulder area (minimum of 8') between the

US 101 northbound off ramp and the emergency vehicle access (EVA) on Mark West Springs Road

- Addition of a green arrow (right turn overlap) at the northbound 'hook' off ramp at Mendocino Avenue/Old Redwood Highway (requires Caltrans approval; this is a state-operated signal).

In addition to the interim improvements, the ultimate improvements would include:

- Addition of a second westbound lane on Mark West Springs Road, between Old Redwood Highway and the 101 interchange

- Widening of 101 overcrossing to four lanes

- Widening of US 101 to six lanes, which the two inside lanes reserved for high occupancy vehicles (HOVs) during peak periods

- Widening River Road to four lanes between from Brickway Extension (now Laughlin Road) to US 101

- Widening Fulton Road to four lanes from the Santa Rosa City limits north to Airport Blvd.
- Addition of a second northbound right turn lane, at the 101 northbound exit at Mark West Springs Road

Other Recommendations

Other recommendations of the traffic study are summarized here:

R1. The main entrance roadway on Mark West Springs Road should include two entry (southbound) lanes, and three exiting lanes (two left turn lanes, and a right turn only lane). This will require a curb-to-curb road width of at least 62 feet, plus any landscaping or median treatment. It should provide for two-way circulation (in and out of the site). A shoulder at least 8 feet wide should be provided inbound, to facilitate any emergency vehicles coming from the east and using this entry (although emergency vehicles could also make a left turn into the EVA farther west).

R2. A right turn deceleration lane is provided for traffic traveling eastbound on Mark West Springs Road and turning into the site.

R3. Adequate storage distance for queuing has been included for exiting vehicles, with no intersecting aisles. This queuing "throat" area is more than 800 feet for each of the left and right turn lanes.

R4. A traffic signal would be warranted at the main entry on Mark West Springs Road. This will facilitate left turns into and out of the site, thereby reducing delay; and will also facilitate the crossing of Mark West Springs Road by pedestrians using the westbound bus stop on Old Redwood Highway.

R5. Emergency helicopter operations may be a distraction to motorists, causing traffic to slow. This can be mitigated by providing visual screening of the helipad from US 101. It should be noted that in other areas (e.g., State Route 24, which is immediately adjacent to Oakland Children's Hospital, this has not proven to be a problem once motorists got used to the sight of the helicopters.

R6. The curb to curb width of Mark West Springs Road between US 101 and the project entry will likely need to be 84' to 86', which includes bike lanes and gutter pan. Between the project entry and Old Redwood Highway it can probably be 72'-74' between curbs. Additional right of way would be needed for sidewalks, parkway strip (landscaping), and any public utility easements. It appears that most, or perhaps all, of this widening will need to occur to the south of the existing pavement (i.e., on WFC's property).

R7. Accessible parking spaces should be located against the building so as to minimize the need to cross traffic.

R8. A paved sidewalk connects the building front entrance directly to the bus stop and to the signalized main project driveway, and along the EVA to connect to the bus stop near that location.

Other features proposed by the project sponsor include:

- A pedestrian drop-off next to the main building entry.
- A marked walkway leading directly to the building.
- A bus shelter meeting SCT standards for the bus stop on Mark West Springs Road for the convenience of transit passengers waiting for buses.

APPENDIX A: Data Collected for the Study

Machine Traffic Counts (September 29 thru October 2, 2004)
Peak Hour Turning Movements (2008)
Work Sheets (TRAFFIX outputs)—These also show lane configurations assumed, signal timing, and future turning movements

THIS INFORMATION IS BOUND SEPARATELY

APPENDIX B: Projected Land Use Assumptions

This information provided in text, Tables 2 and 22.

APPENDIX C: References

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APPENDIX D. Study Participants and Persons Contacted

Dowling Associates, Inc.
Steven B. Colman, PTP, Project manager

Nadin Sponamore, Sponamore Associates

Traffic Count Data: Wiltec (Turning movements)
Marks Traffic Data and NDS/ATD (machine counts)

Persons Contacted:

County of Sonoma
- Steve Dee
- Ken Ellison
- Dave Wallace

Wells Fargo Center
- Marc Hagenlacher

Sutter Health
- Tom Minard

APPENDIX E. Not Applicable to this Study

APPENDIX F. Special Events Trip Generation Form

DEFINED EVENTS ON WELLS FARGO CAMPUS BY PHASE

Location	Event Size	Type of Event	# of Events	Day of Week	Duration (# of Days or Weekends)	Time of Day	# of Vehicles/Day	Noise
WFS/East Lawn WFS/East Lawn North Parking Lot	0 - 200 people/day	Corporate Meeting Company Meeting Recycle/Fundraiser	1 1 1	Thursday Saturday Sunday	1 1 1	9 am - 2 pm 5:30 pm - 8:30 pm 9 am - 3 pm	20 50 30	
WFS/East Lawn	201 - 500 people/day	Fashion Show/Fundraiser Motorcycle Group Meeting	1 1	Friday Saturday	1 1	10:30 am - 2:30 pm 9 am - 4 pm	200 160	Yes
WFS/East Lawn	501 - 1,000 people/day	Guitar Festival/Tradeshow Church BBQ Bike Tour/Fundraiser Bike Tour/Fundraiser Foreign Car Club Show Open Heart Symposium High School Graduation	1 1 1 1 1 1 1	Fri - Sun Sunday Saturday Sunday Saturday Sunday Saturday	3 1 1 1 1 1 1	11 am - 6 pm 9:30 am - 1 pm 9 am - 10 pm 4:30 am - 9 pm 10 am - 3 pm 4 pm - 6 pm 10:30 am - 12:00 pm	400 400 320 320 280 280 280	
WFS/East Lawn	1,001 - 1,800 people/day	Corporate BBQ	1	Monday	1	1:30 pm - 4 pm	560	
WFS/East Lawn	2,300 Flow	Bike Rally	1	Saturday	1	4:30 am - 6:30 pm	920	
South Lawn	201 - 500 people/day							
South Lawn	501 - 1,000 people/day	none						
South Lawn	1,001 - 1,800 people/day	P.D. Garage Sale	1	Saturday	1	9 am - 4 pm	1,000	

Note: If there were sound mitigation, WFC would add 6-10 receptions on the East Lawn in addition to the events listed above. Those events would fall between May - October with attendances of 150 - 400 people. Saturday and Sunday would be the most popular days with the events taking place in the afternoons/evenings. These events would generate 75 - 200 cars on campus.

L:\ Sutter \ WORD \ LBC Defined Events WFC \ 9/27/07 \ 4:35 PM

APPENDIX G. Queuing Analysis Summary Tables

2014 No Project			Northbound			Southbound			Eastbound			Westbound		
Node	**Intersection**		**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
4	River Road/ US 101 SB	AM	--	--	--	275	--	*183*	--	*390*	--	--	368	--
		PM	--	--	--	345	--	*237*	--	*338*	--	--	*586*	--
		Avail	--	--	--	975	--	150	--	300	--	--	400	--
9	Mark West Springs Rd./ Old Redwood Highway	AM	*534*	207	*129*	308	507	*672*	*322*	327	*711*	*427*	407	*280*
		PM	*308*	330	*257*	453	373	*362*	251	359	*223*	209	424	*236*
		Avail	200	1,000	50	975*	975	100	300	700	50	225	1,400	50
10	Mark West Springs Rd./ US 101 NB	AM	836			--	--	--	--	88	--	--	134	--
		PM	914			--	--	--	--	264	--	--	377	--
		Avail	1,365			--	--	--	--	1,300	--	--	475	--
45	River Rd./ Fulton Road	AM	*251*	*825*	*127*	*285*	710	97	175	709	29	*182*	329	40
		PM	*103*	*1,160*	*153*	*146*	1,007	70	275	1,197	374	*478*	460	42
		Avail	100	265	100	75	2,735	100	620*	1,320	--	150	1,000	--
46	River Rd./ Barnes Rd.	AM	230	230	230	--	--	--	--	--	--	30	--	--
		PM	183	183	95	--	--	--	1	--	--	41	--	--
		Avail	>1000	--	--	--	--	--	--	--	--	75	--	--
50	Mark West Springs Rd./ Lavell Rd.	AM	--	--	--	23	--	35	11	--	--	--	--	--
		PM	--	--	--	*111*	--	51	65	--	--	--	--	--
		Avail	--	--	--	60	--	--	110	--	--	--	--	--
51	Mark West Springs Rd./ WFC Main Entry	AM	46	--	18	--	--	--	--	302	12	30	211	--
		PM	34	--	30	--	--	--	--	205	6	23	186	--
		Avail	575	--	>1000	--	--	--	--	860	--	200	700	--
53	E. Fulton Rd./ Old Redwood Hwy.	AM	5	--	--	--	--	--	146	146	146	--	--	--
		PM	5	--	--	--	--	--	23	23	23	--	--	--
		Avail	80	325	--	--	--	--	--	626	--	--	--	--
56	East Fulton Rd./ WFC East Drive	AM	--	--	2	--	--	--	--	--	--	2	2	--
		PM	0	0	3	--	--	--	--	--	--	2	2	--
		Avail	900	--	--	--	--	--	--	--	--	--	200	--

Note: Queue lengths are in feet per lane, and assume improvements documented in traffic report (such as lane additions).

* Left-turn storage extends into two-way left-turn lane provided for mid-block private driveways

2014 With Project			Northbound			Southbound			Eastbound			Westbound		
Node	**Intersection**		**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
4	River Road/ US 101 SB	AM	--	--	--	471	--	*210*	--	*645*	--	--	*409*	--
		PM	--	--	--	395	--	*234*	--	*367*	--	--	*694*	--
		Avail	--	--	--	975	--	150	--	300	--	--	400	--
9	Mark West Springs Rd./ Old Redwood	AM	*466*	280	*306*	574	588	*561*	266	440	*685*	*463*	459	*310*
		PM	*398*	328	*256*	448	397	*407*	275	368	*314*	213	442	*242*
		Avail	200	1,000	50	975*	975	100	300	700	50	225	1,400	50
10	Mark West Springs Rd./ US 101 NB	AM	1,102			--	--	--	--	558	--	--	431	--
		PM	*848*			--	--	--	--	182	--	--	*546*	--
		Avail	1,385			--	--	--	--	1,300	--	--	475	--
45	River Rd./ Fulton Road	AM	*231*	*1,238*	*180*	*337*	645	91	192	907	31	*247*	352	42
		PM	*105*	*849*	*165*	*146*	1,037	71	276	1,293	385	*607*	471	41
		Avail	100	265	100	75	2,735	100	620*	1,320	--	150	1,000	--
46	River Rd./ Barnes Rd.	AM	214	214	366	--	--	0	0	--	--	24	--	--
		PM	202	202	105	--	--	1	--	--	--	44	--	--
		Avail	>1000	--	--	--	--	--	--	--	--	75	--	--
50	Mark West Springs Rd./ Lavell Rd.	AM	--	--	--	*62*	--	98	21	--	--	--	--	--
		PM	--	--	--	*159*	--	95	109	--	--	--	--	--
		Avail	--	--	--	60	--	--	110	--	--	--	--	--
51	Mark West Springs Rd./ WFC Main Entry	AM	196	--	84	--	--	--	--	523	312	184	345	--
		PM	297	--	101	--	--	--	--	484	165	133	531	--
		Avail	575	--	>1000	--	--	--	--	860	--	200	700	--
53	E. Fulton Rd./ Old Redwood Hwy.	AM	6	--	--	--	--	--	49	49	49	--	--	--
		PM	6	--	--	--	--	--	142	142	142	--	--	--
		Avail	80	325	--	--	--	--	--	626	--	--	--	--
56	East Fulton Rd./ WFC East Drive	AM	1	1	5	--	--	--	--	--	--	5	5	--
		PM	1	1	7	--	--	--	--	--	--	3	3	--
		Avail	900	--	--	--	--	--	--	--	--	--	200	--

Note: Queue lengths are in feet per lane, and assume improvements documented in traffic report (such as lane additions).

* Left-turn storage extends into two-way left-turn lane provided for mid-block private driveways

2035 No Project			Northbound			Southbound			Eastbound			Westbound		
Node	**Intersection**		**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
4	River Road/ US 101 SB	AM	--	--	--	244	--	150	--	183	--	--	331	--
		PM	--	--	--	254	--	*289*	--	245	--	--	362	--
		Avail	--	--	--	975	--	150	--	300	--	--	500	--
9	Mark West Springs Rd./ Old Redwood Highway	AM	*789*	306	*135*	523	*1,323*	*601*	*382*	457	*681*	*836*	1,183	*354*
		PM	*538*	*1,166*	*352*	991	526	*537*	*421*	*1,012*	*248*	*468*	774	*382*
		Avail	200	1,000	50	975*	975	100	300	700	50	225	1,400	50
10	Mark West Springs Rd./ US 101 NB	AM	645			--	--	--	--	237	--	--	*508*	--
		PM	775			--	--	--	--	*474*	--	--	*551*	--
		Avail	1,365			--	--	--	--	280	--	--	475	--
45	River Rd./ Fulton Road	AM	*234*	*990*	*990*	*436*	564	*564*	96	741	741	*700*	221	221
		PM	*260*	*1,131*	*1,131*	*270*	619	*619*	109	684	684	*617*	333	333
		Avail	100	265	100	75	2,735	100	620*	1,320	--	150	1,000	--
46	River Rd./ Barnes Rd.	AM	46	46	41	--	--	--	--	--	--	26	--	--
		PM	320	320	69	4	--	--	0	--	--	52	--	--
		Avail	>1000	--	--	--	--	--	--	--	--	75	--	--
50	Mark West Springs Rd./ Lavell Rd.	AM	--	--	--	*64*	--	134	38	--	--	--	--	--
		PM	--	--	--	59	--	50	27	--	--	--	--	--
		Avail	--	--	--	60	--	--	110	--	--	--	--	--
51	Mark West Springs Rd./ WFC Main Entry	AM	28	--	36	--	--	--	--	408	29	17	*741*	--
		PM	27	--	28	--	--	--	--	652	5	19	252	--
		Avail	575	--	>1000	--	--	--	--	860	--	200	700	--
53	E. Fulton Rd./ Old Redwood Hwy.	AM	0	0	0	--	--	--	0	0	0	--	--	--
		PM	0	0	0	--	--	--	0	0	0	--	--	--
		Avail	80	325	--	--	--	--	--	626	--	--	--	--
56	East Fulton Rd./ WFC East Drive	AM	0	--	0	--	--	--	--	--	--	0	--	--
		PM	0	--	0	--	--	--	--	--	--	0	--	--
		Avail	900	--	--	--	--	--	--	--	--	--	200	--

Note: Queue lengths are in feet per lane, and assume improvements documented in traffic report (such as lane additions).

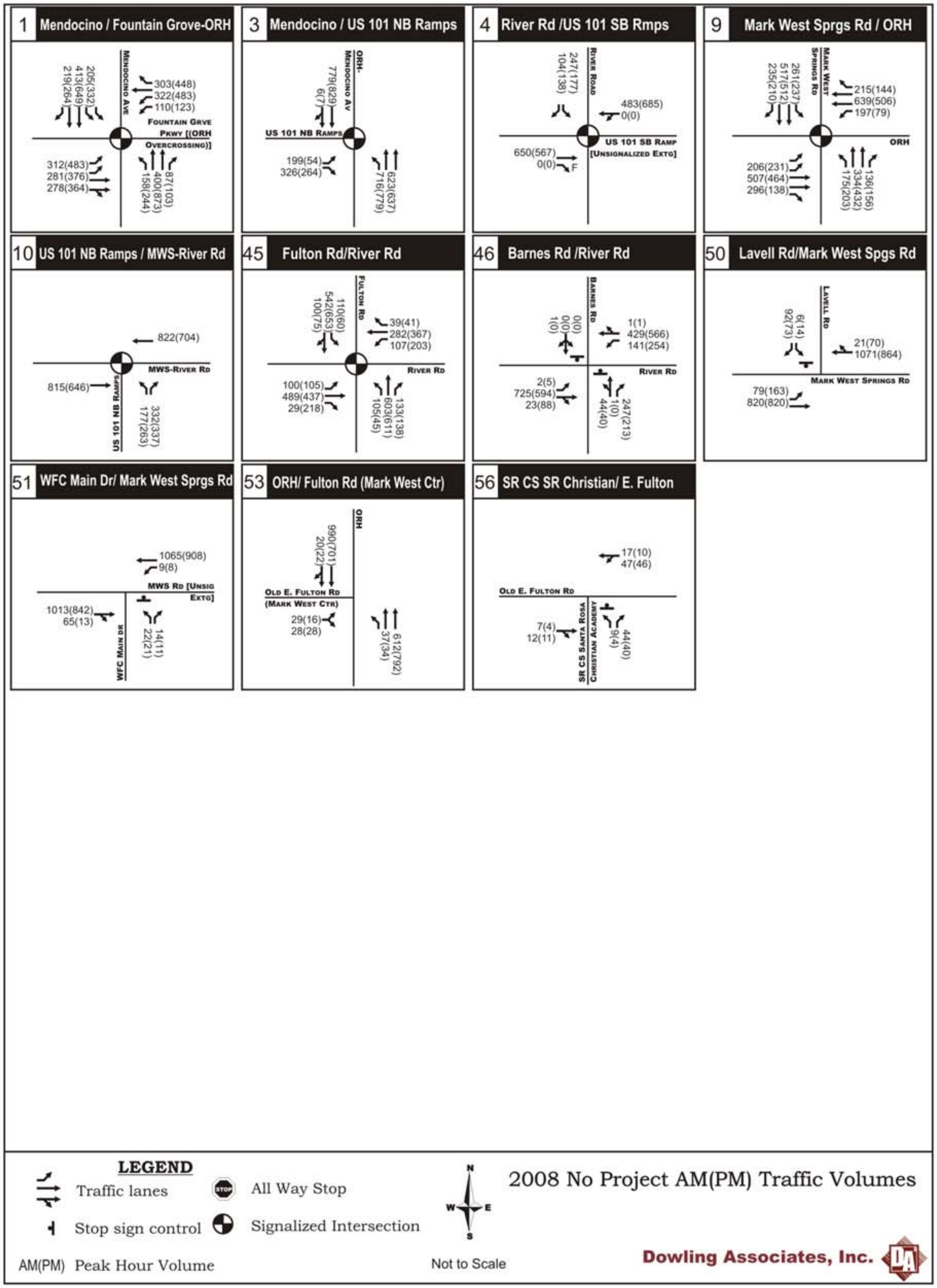
* Left-turn storage extends into two-way left-turn lane provided for mid-block private driveways

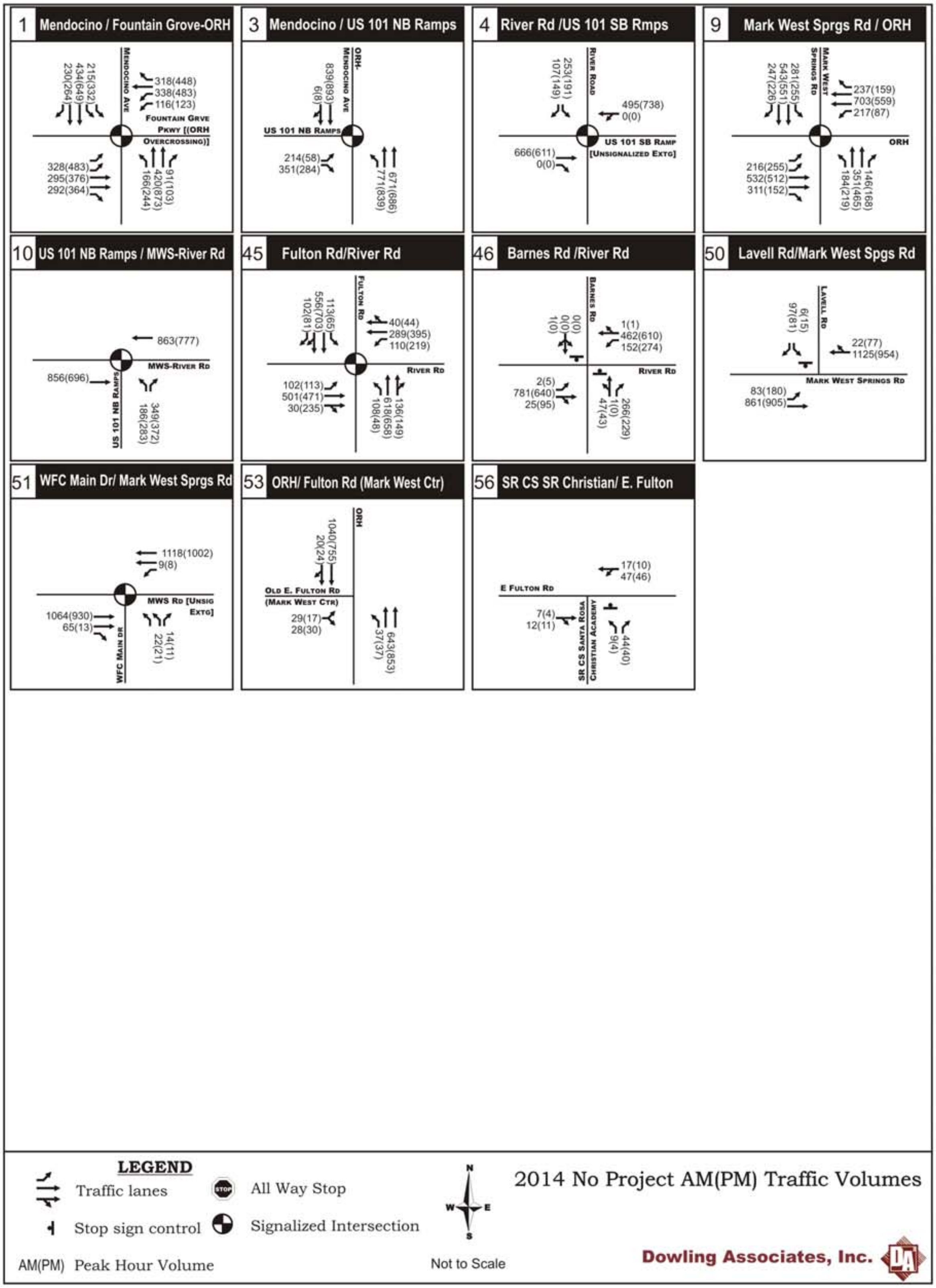
2035 With Project			Northbound			Southbound			Eastbound			Westbound		
Node	**Intersection**		**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**	**L**	**T**	**R**
4	River Road/ US 101 SB	AM	--	--	--	292	--	141	--	229	--	--	380	--
		PM	--	--	--	297	--	*301*	--	251	--	--	389	--
		Avail	--	--	--	975	--	150	--	300	--	--	500	--
9	Mark West Springs Rd./ Old Redwood Highway	AM	*908*	317	*138*	542	*1,438*	*682*	*394*	423	*825*	*893*	1,169	*367*
		PM	*667*	*1,202*	*354*	1,041	557	*625*	*481*	*1,039*	*339*	*475*	825	*433*
		Avail	200	1,000	50	975*	975	100	300	700	50	225	1,400	50
10	Mark West Springs Rd./ US 101 NB	AM	1,149			--	--	--	--	*328*	--	--	*640*	--
		PM	1,359			--	--	--	--	*491*	--	--	*716*	--
		Avail	1,385			--	--	--	--	280	--	--	475	--
45	River Rd./ Fulton Road	AM	*234*	*1,060*	*1,060*	*450*	563	563	97	781	781	*746*	225	225
		PM	*266*	*1,237*	*1,237*	*273*	634	634	109	737	737	*731*	343	343
		Avail	100	265	100	75	2,735	1,000	620*	1,320	--	150	1,000	--
46	River Rd./ Barnes Rd.	AM	52	52	46	--	--	--	--	--	--	29	--	--
		PM	337	337	73	6	--	--	0	--	--	56	--	--
		Avail	>1000	--	--	--	--	--	--	--	--	75	--	--
50	Mark West Springs Rd./ Lavell Rd.	AM	--	--	--	*97*	--	148	42	--	--	--	--	--
		PM	--	--	--	*90*	--	75	41	--	--	--	--	--
		Avail	--	--	--	60	--	--	110	--	--	--	--	--
51	Mark West Springs Rd./ WFC Main Entry	AM	138	--	89	--	--	--	--	427	131	122	*751*	--
		PM	327	--	154	--	--	--	--	*898*	68	110	393	--
		Avail	575	--	>1000	--	--	--	--	860	--	200	700	--
53	E. Fulton Rd./ Old Redwood Hwy.	AM	0	3	--	--	1	5	0	--	--	--	--	--
		PM	0	3	--	--	3	4	4	--	--	--	--	--
		Avail	80	325	--	--	--	--	--	626	--	--	--	--
56	East Fulton Rd./ WFC East Drive	AM	0	--	1	--	--	--	--	--	--	4	--	--
		PM	0	--	4	--	--	--	--	--	--	1	--	--
		Avail	900	--	--	--	--	--	--	--	--	--	200	--

Note: Queue lengths are in feet per lane, and assume improvements documented in traffic report (such as lane additions).

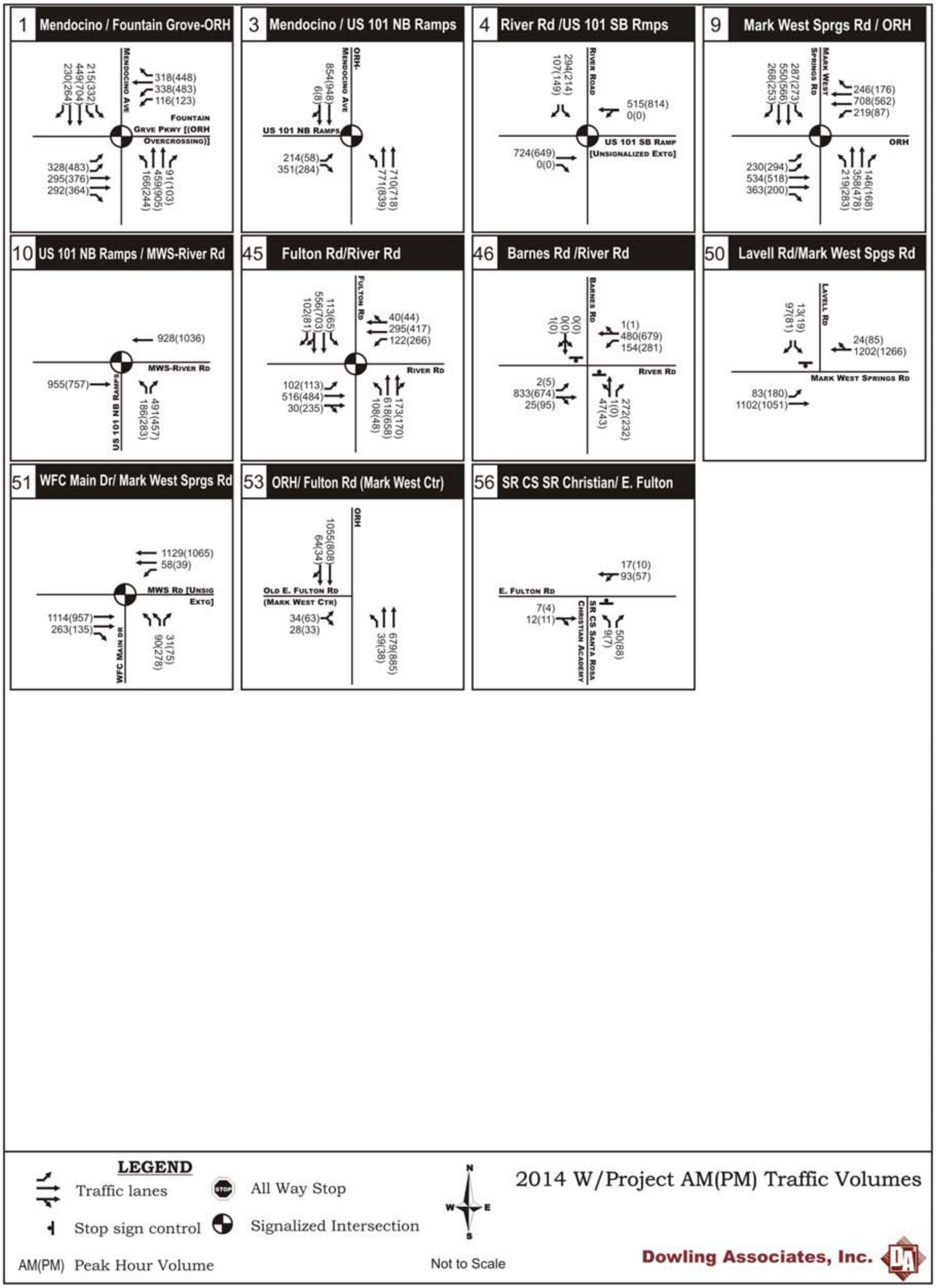
* Left-turn storage extends into two-way left-turn lane provided for mid-block private driveways

APPENDIX H. Traffic Volume Diagrams





1 Mendocino / Fountain Grove-ORH
3 Mendocino / US 101 NB Ramps
4 River Rd /US 101 SB Rmps
9 Mark West Sprgs Rd / ORH
10 US 101 NB Ramps / MWS-River Rd
45 Fulton Rd/River Rd
46 Barnes Rd /River Rd
50 Lavell Rd/Mark West Spgs Rd
51 WFC Main Dr/ Mark West Sprgs Rd
53 ORH/ Fulton Rd (Mark West Ctr)
56 SR CS SR Christian/ E. Fulton
LEGEND
Traffic lanes
All Way Stop
Stop sign control
Signalized Intersection
AM(PM) Peak Hour Volume
Not to Scale
2014 No Project AM(PM) Traffic Volumes
Dowling Associates, Inc.



1 Mendocino / Fountain Grove-ORH
3 Mendocino / US 101 NB Ramps
4 River Rd /US 101 SB Rmps
9 Mark West Sprgs Rd / ORH
10 US 101 NB Ramps / MWS-River Rd
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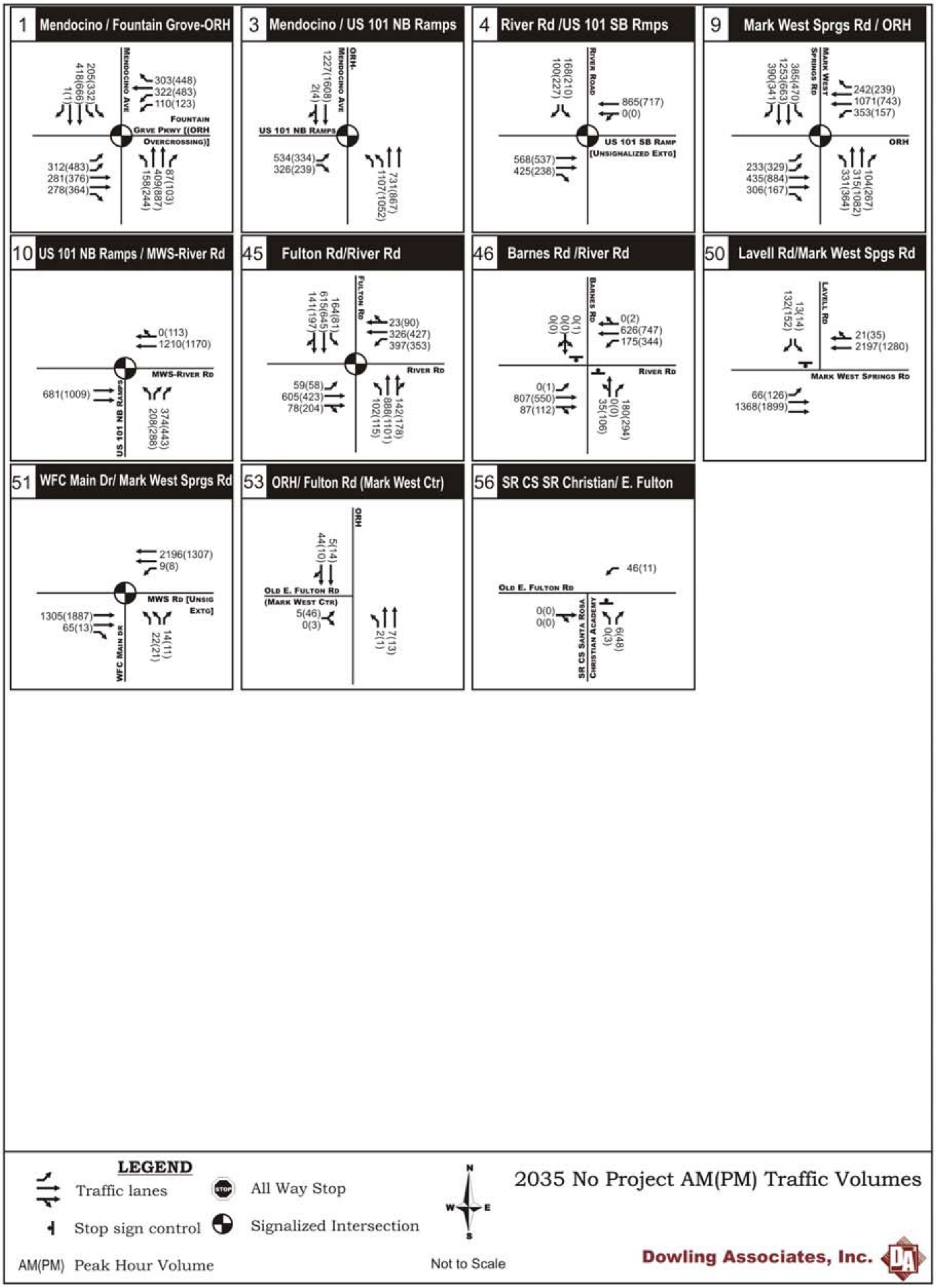
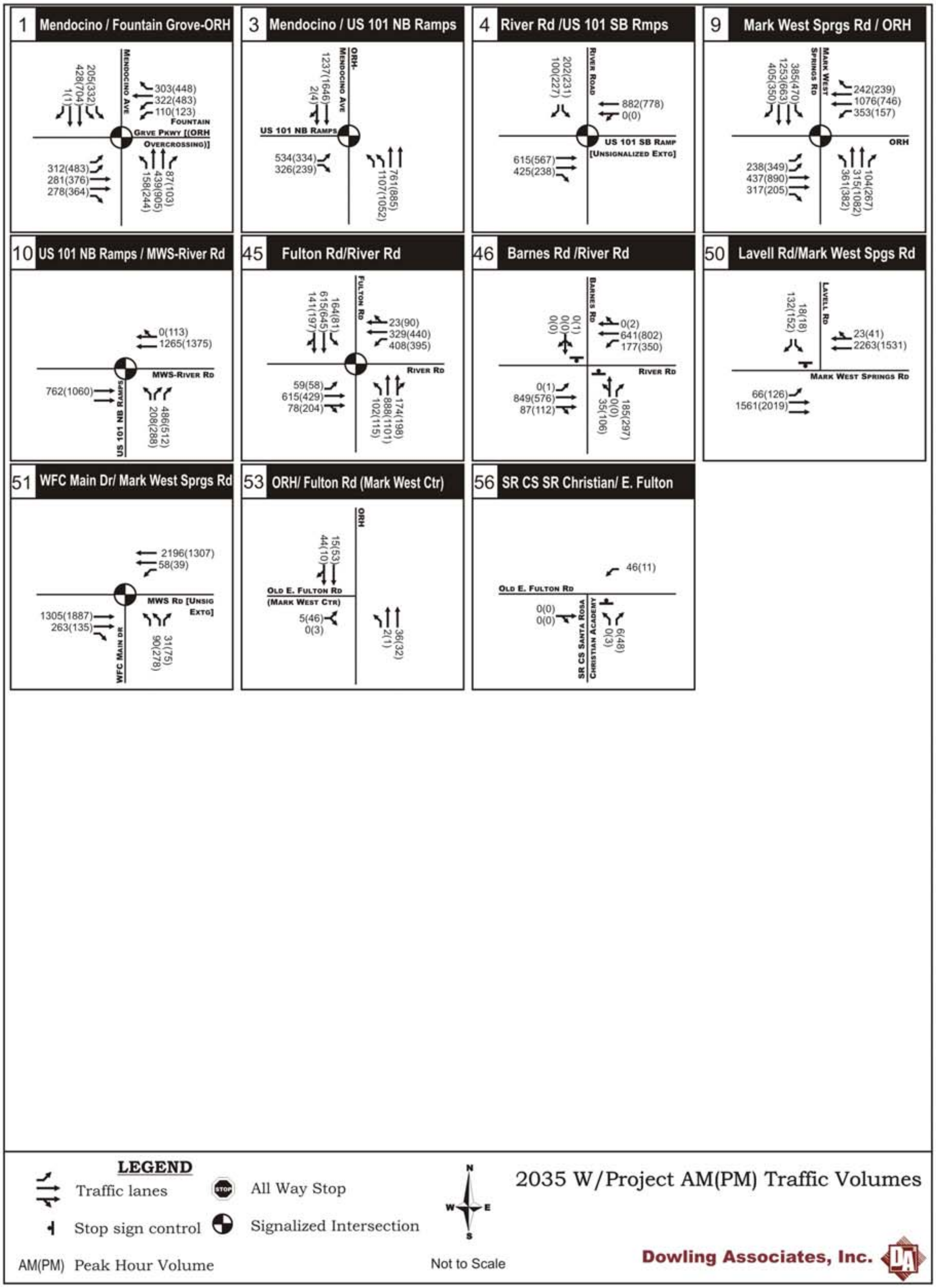
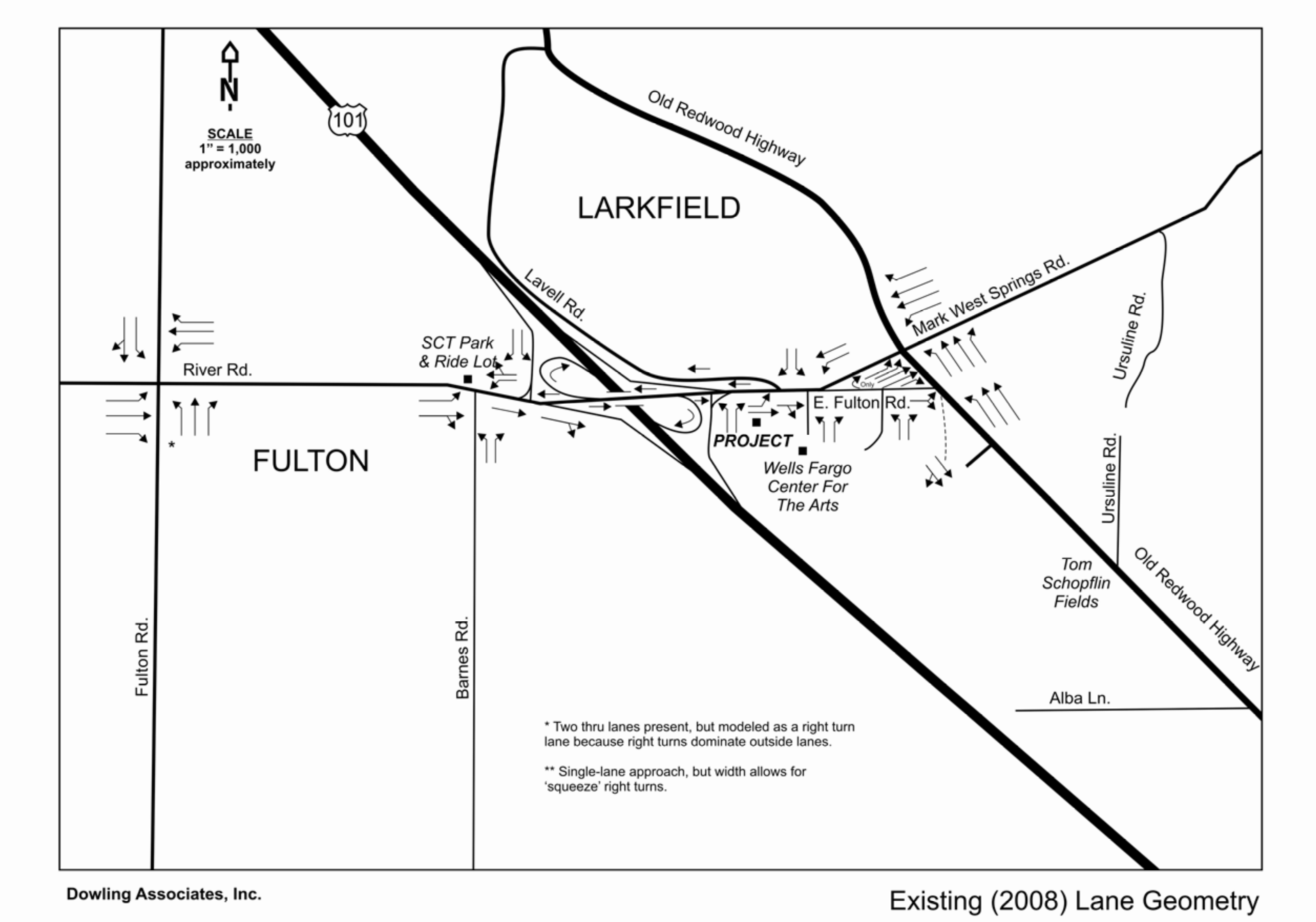
LEGEND
Traffic lanes
All Way Stop
Stop sign control
Signalized Intersection
AM(PM) Peak Hour Volume
Not to Scale
2014 W/Project AM(PM) Traffic Volumes
Dowling Associates, Inc.

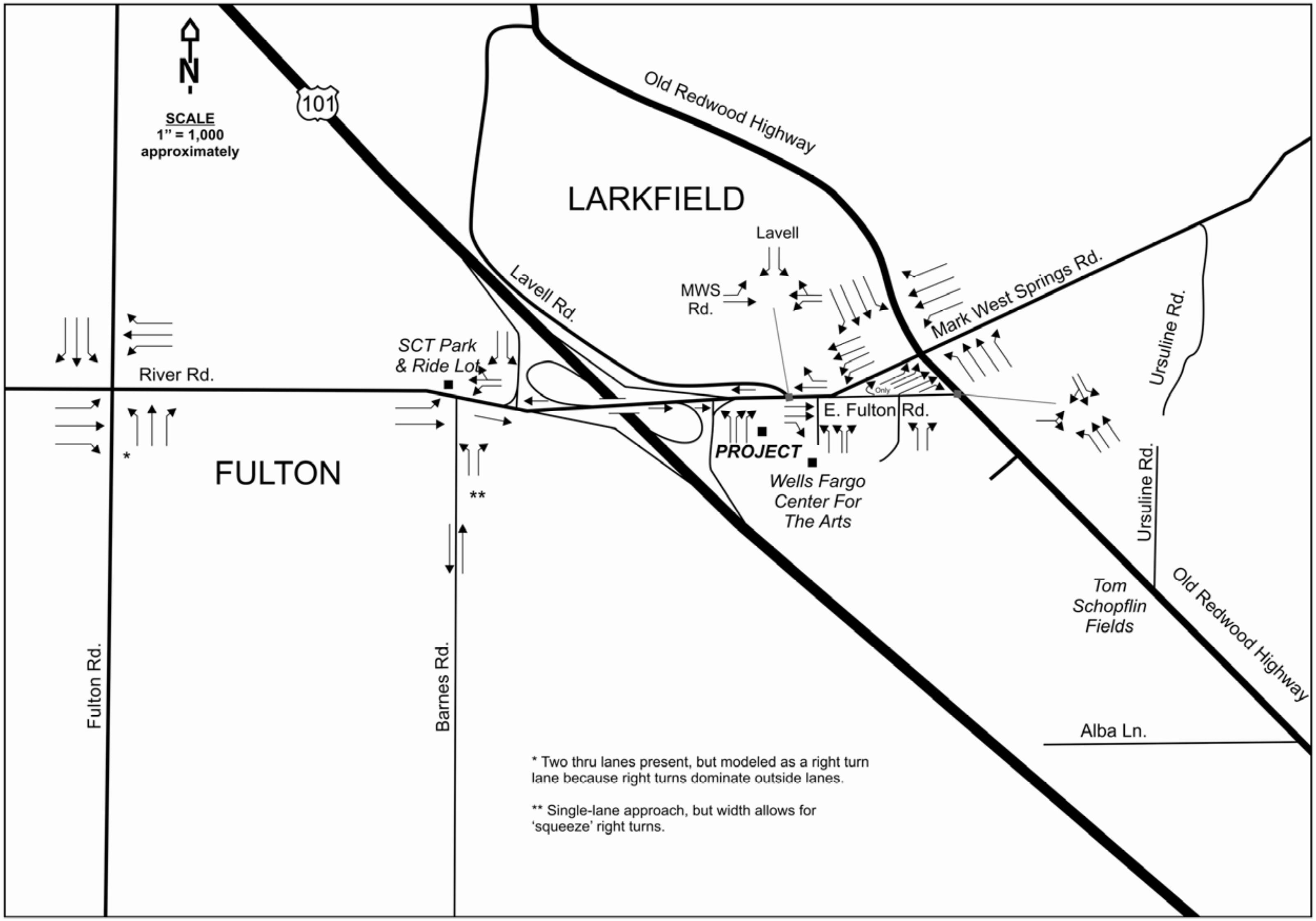


1 Mendocino / Fountain Grove-ORH
Mendocino Ave
205(332)
418(666)
1(1)
303(448)
322(483)
110(123)
Fountain Grve Pkwy [(ORH Overcrossing)]
312(483)
281(376)
278(364)
87(103)
409(887)
158(244)
3 Mendocino / US 101 NB Ramps
ORH-Mendocino Ave
1227(1608)
2(4)
US 101 NB Ramps
534(334)
326(239)
731(867)
1107(1052)
4 River Rd /US 101 SB Rmps
River Road
168(210)
100(227)
865(717)
0(0)
US 101 SB Ramp [Unsignalized Extg]
568(537)
425(238)
9 Mark West Sprgs Rd / ORH
Mark West Springs Rd
385(470)
1253(663)
390(341)
242(239)
1071(743)
353(157)
ORH
233(329)
435(884)
306(167)
104(267)
315(1082)
331(364)
10 US 101 NB Ramps / MWS-River Rd
0(113)
1210(1170)
MWS-River Rd
681(1009)
US 101 NB Ramps
374(443)
208(288)
45 Fulton Rd/River Rd
Fulton Rd
164(81)
615(645)
141(197)
23(90)
326(427)
397(353)
River Rd
59(58)
605(423)
78(204)
142(178)
888(1101)
102(115)
46 Barnes Rd /River Rd
Barnes Rd
0(1)
0(0)
0(0)
0(2)
626(747)
175(344)
River Rd
0(1)
807(550)
87(112)
180(294)
0(0)
35(106)
50 Lavell Rd/Mark West Spgs Rd
Lavell Rd
13(14)
132(152)
21(35)
2197(1280)
Mark West Springs Rd
66(126)
1368(1899)
51 WFC Main Dr/ Mark West Sprgs Rd
2196(1307)
9(8)
MWS Rd [Unsig Extg]
1305(1887)
65(13)
WFC Main Dr
14(11)
22(21)
53 ORH/ Fulton Rd (Mark West Ctr)
ORH
5(14)
44(10)
Old E. Fulton Rd (Mark West Ctr)
5(46)
0(3)
7(13)
2(1)
56 SR CS SR Christian/ E. Fulton
46(11)
Old E. Fulton Rd
0(0)
0(0)
SR CS Santa Rosa Christian Academy
6(48)
0(3)
LEGEND
Traffic lanes
All Way Stop
Stop sign control
Signalized Intersection
AM(PM) Peak Hour Volume
N
W
E
S
Not to Scale
2035 No Project AM(PM) Traffic Volumes
Dowling Associates, Inc.


1 Mendocino / Fountain Grove-ORH
Mendocino Ave
Fountain Grve Pkwy [(ORH Overcrossing)]
205(332)
428(704)
1(1)
303(448)
322(483)
110(123)
312(483)
281(376)
278(364)
87(103)
439(905)
158(244)
3 Mendocino / US 101 NB Ramps
ORH-Mendocino Ave
US 101 NB Ramps
1237(1646)
2(4)
534(334)
326(239)
761(885)
1107(1052)
4 River Rd /US 101 SB Rmps
River Road
US 101 SB Ramp [Unsignalized Extg]
202(231)
100(227)
882(778)
0(0)
615(567)
425(238)
9 Mark West Sprgs Rd / ORH
Mark West Springs Rd
ORH
385(470)
1253(663)
405(350)
242(239)
1076(746)
353(157)
238(349)
437(890)
317(205)
104(267)
315(1082)
361(382)
10 US 101 NB Ramps / MWS-River Rd
MWS-River Rd
US 101 NB Ramps
0(113)
1265(1375)
762(1060)
486(512)
208(288)
45 Fulton Rd/River Rd
Fulton Rd
River Rd
164(81)
615(645)
141(197)
23(90)
329(440)
408(395)
59(58)
615(429)
78(204)
174(198)
888(1101)
102(115)
46 Barnes Rd /River Rd
Barnes Rd
River Rd
0(1)
0(0)
0(0)
0(2)
641(802)
177(350)
0(1)
849(576)
87(112)
185(297)
0(0)
35(106)
50 Lavell Rd/Mark West Spgs Rd
Lavell Rd
Mark West Springs Rd
18(18)
132(152)
23(41)
2263(1531)
66(126)
1561(2019)
51 WFC Main Dr/ Mark West Sprgs Rd
MWS Rd [Unsig Extg]
WFC Main Dr
2196(1307)
58(39)
1305(1887)
263(135)
31(75)
90(278)
53 ORH/ Fulton Rd (Mark West Ctr)
ORH
Old E. Fulton Rd (Mark West Ctr)
15(53)
44(10)
5(46)
0(3)
36(32)
2(1)
56 SR CS SR Christian/ E. Fulton
Old E. Fulton Rd
SR CS Santa Rosa Christian Academy
46(11)
0(0)
0(0)
6(48)
0(3)
LEGEND
Traffic lanes
Stop sign control
AM(PM) Peak Hour Volume
All Way Stop
Signalized Intersection
N
W
E
S
Not to Scale
2035 W/Project AM(PM) Traffic Volumes
Dowling Associates, Inc.

APPENDIX H. Lane Configuration Diagrams





Dowling Associates, Inc.

2014 Lane Geometries Used in Traffic Analysis

APPENDIX L

UTILITIES AND WASTEWATER TECHNICAL REPORTS

WATER AND WASTEWATER SERVICES REPORT

NEW REPLACEMENT HOSPITAL PROJECT

SUTTER MEDICAL CENTER OF SANTA ROSA

B&R JOB # 3231.01

NOVEMBER 16, 2009

REGISTERED PROFESSIONAL ENGINEER
DAVID FRANKLIN LONG
No. C 57429
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

11-16-09

Brelje & Race Consulting Engineers
5570 Skylane Blvd., Santa Rosa, CA 95403
v. 707.576.1322 f. 707.576.0469
www.brce.com

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ATTACHMENTS

- County of Sonoma Department of Emergency Services – Application for Mitigation

1. WATER

1.1 PROJECTED INDOOR WATER USE FOR SUTTER MEDICAL CENTER CAMPUS

Projections for indoor water use at the new Sutter hospital facilities are calculated utilizing anticipated hospital occupancy levels, plumbing fixture use frequency and flow rates contained in the 1992 Energy Policy Act (cited in LEED WE Credit 3), plus an allowance for areas equipped with specialized fixtures such as surgery, emergency room, food service and janitorial facilities. Table 4 at the back of this report indicates that maximum day water use for the 70-bed Sutter Medical Center Hospital (SMC) will be 177 gpd/bed. Maximum day water use will coincide with full occupancy. Average daily water use is calculated using an 80% occupancy factor which results in 142 gpd/bed. These indoor water use rates are also applied to the 28-bed Physician's Medical Center and potential 29-bed SMC expansion.

Hospitals utilize chillers, cooling towers and boilers instead of conventional (e.g. air-cooled condenser based rooftop package units) heating, ventilation and air conditioning (HVAC) systems for heating and cooling needs. These hospital HVAC systems have water losses from evaporation, bleed-off and periodic replacement of cooling and heating system water. HVAC system water losses for the proposed hospital, Physicians Medical Center and medical office building (MOB) have been calculated based on square footages to average 10,200 gpd, with a peak daily use of 24,700 gpd. HVAC demands will vary with environmental conditions and building occupancy levels. Maximum water use will occur during the hottest days when the hospital is at or near full capacity.

A summary of projected indoor and HVAC water uses, including those for possible future expansions of the SMC are shown in Table 1.

1.2 PROJECTED LANDSCAPE IRRIGATION WATER USE

Approximately 10 acres of the Hospital property will be planted with low water use landscaping. Based on monthly rainfall history and evapotranspiration rates, projected peak day irrigation demand in the first year is calculated to be approximately 88,000 gallons, with a peak annual requirement of about 9,000,000 gallons, assuming a late spring or summer landscape plant installation. As plants become established, irrigation demands will diminish. After plant establishment, annual demand for irrigation is projected to drop to about 6,100,000 gallons.

Landscape irrigation demands need to be included when sizing the water supply system. Irrigation demands generally occur only during the spring and summer months, with the peak usually occurring in July. With irrigation restricted to approximately a 10 to 16 hour period, the flow rate necessary to satisfy the peak day demand is estimated to be 90 gpm in the establishment year, and just under 70 gpm in subsequent years.

1.3 FIRE FLOWS AND FIRE SERVICE

The County Fire Marshal initially indicated that minimum fire flows of at least 3,000 gpm may be required from hydrants around the hospital. To meet the Fire Marshal's requirement, hydraulic computer modeling of the California American Water Company (CalAm) distribution system serving WFC was performed to determine the improvements necessary to achieve 3,000 gpm fire flows. It was determined that the installation of 2,150 feet of 12-inch water main on Lavell Road to complete a piping loop in the off-site distribution system, combined with an 8-inch water main loop around the hospital site would result in available fire flows of over 3,000 gpm.

More recently, in response to changes in building type of construction classifications and related buildings for the new hospital and other fire system enhancements proposed by the applicant, the

Fire Marshal has confirmed a minimum fire flow requirement of 2,500 gpm along the project's Mark West Springs Road frontage would be acceptable.[1] A recent fire flow test, performed by CalAm Water, at a nearby off-site hydrant (near the intersection of Lavell Road and Mark West Springs Road) resulted in a fire flow of 2,500 gpm at an acceptable residual pressure, which eliminates the need to make the previously anticipated off-site improvements.

1.4 WATER SUPPLY

It is anticipated that the water system serving the hospital will be owned and operated by the hospital, and will consist of two groundwater supply wells and associated treatment facilities. The California Department of Public Health (CDPH), the regulating agency for public water systems, classifies the proposed system as a non-transient, non-community public water system under Title 22 of the Public Code.

In order for the water system to meet peak daily demands of both irrigation and domestic water uses, the groundwater supply source would need to be capable of delivering 134,550 gpd for the initial phase of construction in 2013. As the landscaping will have been installed with the initial phase and be mostly established for future phases, only 100,370 gpd will be necessary for complete site buildout. The site buildout peak daily demand equates to a constant flow rate of 70 gpm from the supply source over a 24-hour period; however, standard design practices dictate that peak daily demand be accommodated by pumping for not longer than 16 hours per day. With the initial phase of construction requiring higher irrigation flows, this translates to a maximum pumping flow rate of 140 gpm.

The CDPH requires public water systems to be capable of supplying the peak day demand from their water supply sources. Given that the site buildout peak day demand includes an initial plant establishment landscape irrigation volume that will be substantially diminished as landscaping matures, it is anticipated that a water supply source capable of delivering between 120 and 140 gpm will be sufficient to meet CDPH requirements.

With the anticipated annual hospital occupancy rate of 80%, withdrawal from the aquifer would be approximately 59 acre feet to meet the initial year demands and will diminish to be approximately 58 acre feet per year to meet complete site buildout demands.

Figure XVI-2 shows the location of the primary water system components for the project.

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[1] Letter to Thomas Jones, Brelje & Race, dated October 6, 2009 from Robert MacIntyre, Fire Marshal, Sonoma County Department of Emergency Services.
Fire service to the new hospital will be provided by CalAm. All on-site fire system piping and hydrants will be privately owned and maintained, and will meet CalAm and Sonoma County Fire Standards.

2. WASTEWATER

2.1 WASTEWATER COLLECTION

The project site is located along the southern boundary of the Airport-Larkfield-Wikiup Sanitation Zone (Sanitation Zone) that is operated by the Sonoma County Water Agency (SCWA). Annexation into the Sanitation Zone is the only viable means of providing public sewer service for the project. Numerous meetings and discussions regarding such service have taken place with Sutter Health (Sutter), Luther Burbank Memorial Foundation (LBMF), and SCWA staff.

The LBMF currently operates wastewater treatment and disposal facilities on site that serve the Wells Fargo Center for the Arts (WFC). The project includes abandoning these facilities and connecting WFC to the Sanitation Zone collection system (sewers). The hospitals and medical office building (MOB) will also contribute wastewater flows to the sewers. Although these additional flows will be completely offset in the majority of the existing trunk system due to implementation of the High-Efficiency Fixture Direct Installation Program (HEFDIP), local collector sewers in the upstream end of the collection system may be impacted by these additional flows (refer to Section 2.4.5 for more information on the HEFDIP). Sewer flow capacity is evaluated using peak wet weather flow (PWWF) criteria under which both hospitals and the MOB are projected to discharge a total of approximately 0.15 cubic feet per second (cfs)[2] to the collection system. Selection of the PWWF to be utilized in evaluating the effects upon the collection system is dependent upon several variables whose values will be determined during the SCWA sewer service application process.

There are two (2) potential points of connection to the collection system that could be utilized by the project. One potential point of connection is to the existing 8-inch sewer in Mark West Springs Road. Preliminary modeling by Brelje & Race indicates that this sewer, installed at a slope of 0.002 for its entire length, is capable of accommodating flows of at least 0.60 cfs before reaching pressure flow conditions.

A second potential point of connection is to the existing 12-inch sewer in Old Redwood Highway just south of Mark West Springs Road. Delivering wastewater to this connection point would likely require construction of a sewage lift station and force main serving the Sutter project. The force main would discharge to a gravity sewer on the project site from which point wastewater would then flow by gravity to the point of connection to the existing collection system.

Application to SCWA for sewer service for the project will include detailed modeling and design studies that will be used to select the preferred alternative for connection to the collection system.

For the location of connection points to the existing sewer system, see Figure XVI-3.

2.2 WASTEWATER TREATMENT

Average dry weather flow (ADWF) is the design parameter that is commonly used to identify the capacity of wastewater treatment facilities. ADWF is defined as the lowest average flow into a treatment facility during any 30-day period. This flow usually occurs during the late summer and is likely to change from year to year. The 2008 ADWF to the Sanitation Zone treatment plant was 0.673 million gallons per day (mgd), which is well below its current rated capacity of 0.900 mgd; however, the ADWF has been higher in past years, reaching a peak of 0.851 mgd in 2006. This peak ADWF, in combination with other unitary treatment process limitations at the plant, indicates that the plant is operating at nearly its current rated capacity.

[2] The average day flows for the hospitals and MOB were multiplied by 3.5 (peaking factor), to which resultant value was added an allowance for inflow and infiltration and a safety factor of 10% to arrive at 0.15 cfs.

Wastewater treatment has recently been improved from secondary to tertiary standards by the addition of filtration and chlorination facilities. Additionally, SCWA has plans for upgrades to the plant that would increase its treatment capacity to an ADWF of 1.2 mgd - the permitted capacity of the plant. These upgrades are currently scheduled to be funded by SCWA in 2015. Given that the treatment plant is currently operating at nearly its current rated capacity, improvements to the plant would need to be realized before significant wastewater flow is added to the system.

Wastewater discharged to the sewer collection system by the project will have BOD (biochemical oxygen demand) and TSS (total suspended solids) concentrations similar to those generated by residential units and commercial uses within the Sanitation Zone Although "zero footprint"[3] achievement will result in no additional wastewater flow entering the Sanitation Zone treatment plant, the project's overall effect on the influent to the plant will likely be a minor increase to the BOD and TSS loading. BOD and TSS are the primary constituents of concern when evaluating the treatment capabilities of the Sanitation Zone treatment plant.

2.2.1 Biochemical Oxygen Demand (BOD)

The BOD concentration of wastewater discharged to the sewer collection system is expected to average 219 mg/l. Table 2 contains BOD concentrations reported for the existing Sutter Hospital on Chanate Road which range between 90 and 250 mg/l over a 5-year period with an average concentration of 175 mg/l. The projected increase from 175 mg/l to 219 mg/l accounts for the fact that the proposed project buildings will be equipped with water conserving fixtures and therefore will likely generate a more concentrated waste stream.

The Sanitation Zone treatment plant processes wastewater during all times of the year such that its effluent BOD concentrations are below the limit established by its current Waste Discharge Requirements. Influent BOD concentrations at the Sanitation Zone plant range between 113 mg/l and 344 mg/l (5th and 95th percentile of data from 2005 to 2009). The BOD projected to be discharged to the sewer collection system by the proposed hospital facilities (48 lbs/day) is estimated to be less than 2% of that capable of being removed by the plant (refer to Table 3). No plant improvements are required to accommodate this slight additional load.

2.2.2 Total Suspended Solids (TSS)

The TSS concentration of wastewater discharged to the sewer collection system is expected to average 201 mg/l. Table 2 contains TSS concentrations reported for the existing Sutter Hospital on Chanate Road which generally range between 60 and 300 mg/l over a 5-year period with an average concentration of 161 mg/l. The increase from 161 mg/l to 201 mg/l accounts for the fact that the proposed project buildings will be equipped with water conserving fixtures and therefore will likely generate a more concentrated waste stream.

The concentration of TSS at the Sanitation Zone treatment plant currently poses intermittent problems when influent flows exceed the microfiltration process capacity necessary to produce effluent to tertiary standards. Influent TSS concentrations at the Sanitation Zone plant generally range between 111 mg/l and 346 mg/l (5th and 95th percentile of data from 2005 to 2009). The TSS projected to be discharged to the sewer collection system by the proposed hospital facilities (44 lbs/day) is estimated to be less than 2% of that entering the plant on an average day (refer to Table 3).

[3] "Zero footprint" means the complete reduction and/or offset of the wastewater flow to be generated by the proposed project by water conservation,or other measures.

The intermittent microfiltration operational problems generally occur during the winter when elevated plant influent flow exceeds the through-put efficiency of the microfilters. In this situation, a portion of the secondary effluent from the settling pond is temporarily diverted to a storage pond. Because of the elevated TSS levels, this diverted water does not meet secondary treatment standards and must therefore be retreated when plant inflow no longer exceeds the threshold that prevents the entire plant flow from being directed through the microfilters.

The Sanitation Zone plant currently operates with four microfiltration modules. The above intermittent microfilter capacity problem (including the effects of added TSS attributable to the project) could be fully addressed through the addition of two additional banks of microfilters to increase the tertiary treatment capacity. Adequate treatment for just the added TSS loading attributable to the project could be provided through alternative means by adding a tank to store and supplement the clean water supply to the microfilter backwash pumps. This would enable higher backwash flow rates that would improve backwash efficiency and allow longer net run times for the existing microfilters.

Adequate space exists within already developed areas at the Sanitation Zone plant to accommodate installation of either of the above improvements.

2.3 WASTEWATER DISPOSAL

Effluent storage and disposal are not considered by SCWA staff to be capacity-limiting issues. There are three effluent storage ponds in the Sanitation Zone system with a total storage capacity of 290 million gallons. Current discussions amongst SCWA, the City of Santa Rosa and the Town of Windsor regarding agreements to share the effluent storage and disposal capabilities of their respective systems are likely to result in there being no need for expansion of effluent storage and disposal facilities in the Sanitation Zone.

2.4 WASTEWATER GENERATION

Sutter plans to take a multi-prong approach to water conservation with the expectation of realizing a "zero footprint" for the project in terms of wastewater services needs. This approach includes the following three primary components:

1. Retrofit the Wells Fargo Center for the Arts with low flow toilets and other indoor water conserving devices.
2. Install low flow fixtures in both hospitals and the medical office building.
3. Achieve offset credits by funding a program to retrofit residential and commercial buildings already connected to the Sanitation Zone with ultra low flow toilets and other indoor water conserving devices.

2.4.1 Wells Fargo Center for the Arts

The current wastewater generated at the WFC has been determined to be an average of approximately 4,900 gallons per day (gpd). This flow was derived from metered water use data for the period October 2007 to October 2008 as shown in Table 4. This bi-monthly water data from billing records of California American Water Company (CalAm), the supplier of potable water to WFC, is reflective of wastewater generation since the LBMF operates its own on-site irrigation well to meet all outdoor irrigation water needs. The CalAm water use data also includes the minimal water needs and wastewater contributions from the HVAC system that serves existing facilities.

Opportunities for reducing the wastewater generated at WFC reside primarily with replacement or retrofit of existing water closets and sink faucets. Reduction is expected to be robust since a very high percentage of the indoor water use comes from toilet/urinal flushing and hand washing, especially during events that utilize the 1,668-seat Pearson Theatre. Plumbing fixture retrofit and replacements should reduce average wastewater generation at WFC to approximately 3,200 gpd. Refer to Table 5.

2.4.2 Hospitals

The domestic wastewater generated by the project hospitals – 99-bed (70 initial beds and a potential 29-bed expansion) Sutter Medical Center (SMC), and 28-bed Physician's Medical Center (PMC) - has been projected using anticipated hospital occupancy levels, plumbing fixture use frequency and flow rates contained in the 1992 Energy Policy Act (cited in LEED WE Credit 3), and an allowance for areas equipped with specialized fixtures such as surgery, emergency room, food service and janitorial facilities. Table 4 (Baseline Case) uses this data for the 70-bed SMC to arrive at a peak day wastewater generation volume of 177 gpd/bed. To determine wastewater discharged during a typical ADWF rating period, an average occupancy factor of 0.8 was applied to project a "worst-case" total baseline wastewater flow of 18,040 gpd (exclusive of flow from water treatment and HVAC facilities) for the the entire 127-bed hospital portion of the project. Refer to the following section for a discussion of wastewater generated by water treatment and HVAC operations.

As a means of comparison, Exhibit "A" of the current Ordinance that establishes criteria for determining sewer connection fees within the Sanitation Zone lists 175 gpd/bed as the hospital flow component.

2.4.3 Water Treatment and HVAC Facilities

Sutter proposes to install its own wells capable of providing domestic water supply. Well water will require treatment. Backwash of the treatment facility to clean and regenerate filter media may generate up to 1,880 gpd of wastewater. Although the facility may include the means to recycle backwash water through the filtration system and avoid discharge to the sewer, an allowance for 1,880 gpd has been made for the purpose of zero footprint calculations.

Although water consumed through HVAC equipment operation can be substantial, the consumption is primarily due to evaporative losses associated with heat rejection from cooling towers. In order to control the solids concentration in the cooling tower water, a small percentage of the circulating water is "bled off" and discharged to the sewer. These bleed losses are estimated to be 10% of the HVAC system water consumed on an average day or 1,320 gpd.

2.4.4 Medical Office Building

The wastewater generated by an 80,000 square foot medical office building (MOB) is projected to be 3,000 gpd at full occupancy. This volume is based on an occupant density of 2.5 persons per 1,000 square feet and a wastewater generation of 15 gpd per occupant. The MOB is projected to be occupied at the above density from Monday through Friday at most times during the year, but largely vacant on weekends. The wastewater discharged during a typical ADWF rating period is therefore expected to be approximately 2,140 gpd (5/7 x. 3,000 gpd).

2.4.5 Retrofit Existing Buildings Connected to Sanitation Zone

As of July 2008, there were 3,622 equivalent single-family residences (ESD) connected to the Sanitation Zone - roughly 65% are residential and 35% are commercial. A large proportion of the buildings in the service area were constructed prior to the advent of low and ultra-low flow fixtures being utilized in construction. Sutter will achieve a zero footprint for wastewater generation. In order to achieve zero footprint for the proposed project, any of the following on-site and off-site measures may occur:

- Installation of water conserving devices required by federal law (low flow toilets, low flow shower heads, and low flow faucets with aerators).
- Installation of water efficient clothes washers.
- Installation of water efficient dishwashers.
- Installation of submeters in multi-family buildings.
- Installation of conservation devices in commercial and institutional buildings.

Conversations with CalAm staff indicate that only about 60 residences within the service area have replaced their older toilets and clothes washing machines with new, lower water consumptive fixtures under their rebate program. As of July 2009, there was no similar rebate program established by SCWA for the Sanitation Zone service area; however, in August 2009, SCWA established the High-Efficiency Fixture Direct Installation Program (HEFDIP) whereby property owners can have their toilets, faucets and showerheads replaced with water conserving fixtures at no cost to the property owner, simply by signing up to have the work completed by a plumber on the approved program list. Sutter will be given the opportunity to fund this program to the extent necessary to achieve zero footprint status for the proposed project.

Although an unknown number of ESD may have already replaced high water use fixtures with low or ulta-low use ones outside of an organized rebate program, the number is likely insignificant compared to the number of connected ESD. Judging from the results of rebate programs in nearby communities (ref. Table C1, *Zero Footprint Design, Water Supply for University District Specific Plan*, Rohnert Park, CA, Jon Olaf Nelson Water Resources Management, December 2004, copy of report attached), it is anticipated that a minimum of 25% or approximately 900 ESD would voluntarily participate in a rebate program to replace their high water use fixtures if it were well-publicized and attractively financed. Since this projected level of participation is based in part upon programs that rebate the property owner with just a portion of the purchase price of water conserving fixtures, a turnkey program that replaces toilets, faucets and showerheads (including all labor) at no cost to the property owner would likely result in a participation level well above the 25% level.

For residential buildings (2.8 persons/ESD), the potential reduction in wastewater generation by replacing toilets, faucets and showerheads is estimated to be 40 gpd/ESD. If clothes washing machines are replaced with higher efficiency appliances, the reduction increases to 56 gpd/ESD (ref. Table ES-3 and Table 8, *Zero Footprint Design,* Nelson).

Due to wide variation in the types and numbers of wastewater generating fixtures present in commercial buildings, a standard reduction for all commercial building types is difficult to predict. For instance, commercial office buildings represent a per ESD reduction opportunity that would be higher than that for a residence since toilet use in an office setting contributes a much higher percentage of the overall wastewater generated than does toilet use in a residence. On the other hand, commercial buildings such as restaurants may not offer as much opportunity for wastewater reduction as does a residence due to the presence of specialized, high water-use kitchen fixtures and dishwashers that would not be likely candidates for replacement or retrofit in a standard water conservation outreach program For the purposes of this report, the potential reduction in wastewater generation for commercial buildings is conservatively estimated to be 28 gpd/ESD, one-half that of the residential figure.

2.5 PROJECTED AVERAGE DRY WEATHER FLOW AND ZERO FOOTPRINT OFFSET CREDITS

To realize a "zero footprint" project in terms of wastewater generation, the total average daily wastewater flow generated by the project will need to be offset by indoor water conservation in the service area. The projected total average daily wastewater flow for all buildings proposed for the initial phase of the project, including the WFC, is 21,700 gpd. The 29-bed SMC expansion would add 4,790 gpd to this figure. Conservative calculation of the number of ESD that would need to participate in a fixture replacement/retrofit program in order to achieve a "zero footprint" project is accomplished using the same proportion of residential and commercial ESD that are currently connected to the Sanitation Zone (65% and 35%, respectively). The resultant number required to completely offset all potential facilities would range between 578 ESD and 742 ESD, well below the projected minimum participation of 900 ESD. The lower end of the above range assumes all ESD retrofits would include a clothes washer whereas the upper end of the range assumes that none of the ESD retrofits would include a clothes washer. The actual number of ESD offsets required will depend upon the relative success of the turnkey (toilet, faucet, showerhead) and rebate (clothes washer) programs. Offsets for each phase of project development will be in place prior to connection of that phase to the District.

Table 7 shows the conceptual plan for how the offsets will be implemented by phase of the project (and by wastewater generation). Sutter will fund the cost of the ESD's offsets, currently estimated at approximately $1,045/ESD.

3. TABLES

Table 1 Sutter Medical Center Projected Average & Maximum Day Domestic Water Needs

LOCATION	WATER Average Day Use Gallons Per Day	WATER Maximum Day Use Gallons Per Day
INITIAL USE (2013)		
Sutter Medical Center Hospital (70 beds) [1]	9,910	12,390
Sutter Medical Center HVAC [2]	10,200	24,700
Water Treatment System Backwash	1,500	1,500
Medical Office Building (80,000 s.f.) [3]	2,140	3,000
Physicians Medical Center (28 beds) [1]	3,960	4,960
Initial Total	27,710	46,550
FUTURE EXPANSIVE USE (2020 +)		
Sutter Medical Center Expansion (29 beds) [1]	4,110	5,130
Expanded HVAC [4]	3,020	7,310
Expanded Water Treatment System Backwash	380	380
Future Total	7,510	12,820
Future Grand Total	35,220	59,370

1 Based on 177 gpd/bed at full occupancy and an 80% average day occupancy factor
2 Based on interview with mechanical engineering contractor for HVAC systems.
3 Based on 2.5 persons per 1,000 square feet and 15 gpd/person.
4 Based on proportional increase in hospital size from 98 beds to 127 beds.

Table 2 BOD & TSS Monitoring Data for Existing Chanate Road Hospital

Report Date	Collection Date	BOD (mg/l)	TSS (mg/l)
5/18/2004	4/27/2004	190	320
5/18/2004	4/28/2004	120	130
8/30/2004	8/12/2004	90	54
8/30/2004	8/13/2004	150	53
4/24/2005	2/15/2005	150	290
4/24/2005	2/16/2005	170	85
6/7/2005	5/17/2005	160	200
6/7/2005	5/18/2005	220	110
9/26/2005	8/16/2005	160	290
9/26/2005	8/17/2005	170	350
3/31/2006	2/28/2006	190	230
3/31/2006	3/1/2006	180	210
5/26/2006	5/9/2006	200	110
5/26/2006	5/10/2006	90	200
9/19/2006	8/15/2006	200	180
9/19/2006	8/16/2006	160	67
4/27/2007	2/27/2007	290	220
4/27/2007	2/28/2007	130	98
6/18/2007	5/15/2007	220	200
6/18/2007	5/16/2007	240	210
9/11/2007	8/20/2007	150	100
9/11/2007	8/21/2007	140	39
4/11/2008	3/3/2008	170	51
4/11/2008	3/4/2008	250	59
AVERAGE[1, 2]		**175**	**161**

Notes:

1. Average concentrations will be multiplied by 1.25 to account for potential concentration increases due to water conservation measures in new facilities.

2. For comparative purposes, Exhibit A in the ordinance that establishes the sewer ESD billing unit basis for the ALW Sanitation Zone uses a 200 mg/l concentration for both BOD and TSS.

Table 3 Sutter Medical Center Santa Rosa Campus Projected Wastewater Load Summary

Location	DAILY TOTALS		
	Average Daily Flow	BOD	TSS
PHASE 1 - INITIAL HOOKUP (2010)			
Wells Fargo Center	3,170 gpd		
TOTAL	**3,170 gpd**	**5.8 lbs/day**	**5.3 lbs/day**
PHASE 2 - INITIAL USE (2013)			
Sutter Medical Center Hospital (70 beds)	9,910 gpd		
Physicians Medical Center (28 beds)	3,960 gpd		
Sutter Medical Center / PMC HVAC Bleed[3]	1,020 gpd		
Medical Office Building (80,000 s.f.)[2]	2,140 gpd		
Water Treatment System Backwash	1,500 gpd		
TOTAL	**18,530 gpd**	**33.8 lbs/day**	**31.1 lbs/day**
PHASE 3 -FUTURE EXPANSIVE USE (2020 +)			
Sutter Medical Center Expansion (29 beds)	4,110 gpd		
Expanded HVAC Bleed[3]	300 gpd		
Expanded Water Treatment System Backwash	380 gpd		
TOTAL	**4,790 gpd**	**8.7 lbs/day**	**8.0 lbs/day**
GRAND TOTAL	**26,490 gpd**	**48 lbs/day**	**44 lbs/day**

CURRENT WASTEWATER TREATMENT PLANT LOADING

Location	DAILY TOTALS		
	ADWF	BOD*	TSS*
Airport Wastewater Treatment Plant	**0.9 mgd**	**3157 lbs/day**	**2973 lbs/day**

* Current values based on 95th percentile maximum daily loads from daily concentration and daily flow values

POTENTIAL WASTEWATER TREATMENT PLANT LOADING

Location	DAILY TOTALS		
	ADWF	BOD	TSS
Airport Wastewater Treatment Plant	**0.9 mgd**	**3217 lbs/day**	**3028 lbs/day**

POTENTIAL WASTEWATER TREATMENT PLANT LOADING INCREASE

Location	DAILY PERCENTAGE INCREASE		
	ADWF	BOD	TSS
Airport Wastewater Treatment Plant	**0.0 %**	**1.9 %**	**1.8 %**

Table 4 Wells Fargo Center for the Arts Historical Domestic Water Use

Bimonthly Period Ending	Volume Billed (100 cf)	Volume Billed (gallons)	Daily Average (gpd)
Oct-07	472.5	353,430	5,813
Dec-07	294.0	219,912	3,617
Feb-08	357.0	267,036	4,392
Apr-08	525.0	392,700	6,459
Jun-08	346.5	259,182	4,263
Aug-08	325.5	243,474	4,005
Oct-08	485.0	362,780	5,967

2007-2008 Daily Average 4,931

Table 5 Wells Fargo Center for the Arts Wastewater Reduction Due to Retrofit

Fixture	2007-2008 Wastewater		Unit Flow		% Reduction	Daily Avg. After Retrofit (gal)
	% of Total	Daily Avg. (gal)	Current Fixture	New Fixture		
Toilet	45%	2219	3.5 gal/flush	1.6 gal/flush	54.3%	1014
Urinal	15%	740	1.5 gal/flush	1.0 gal/flush	33.3%	493
Hand Sink	25%	1233	2.0 gpm	1.5 gpm	25.0%	925
Kitchen Sink	10%	493	3.0 gpm	3.0 gpm	0.0%	493
Other	5%	247	3.0 gal/use	3.0 gal/use	0.0%	247

Total 3172

Overall % Reduction from 2007-2008 due to Retrofit 35.7%

Table 6 Sutter Medical of Santa Rosa Projected Wastewater Generation

Number of beds = 70

Occupancy Breakdown	FTE[1]	Visitors[2]	Outpatients[3]	Inpatients
Male (Day Shift)	75	217	56	35
Female (Day Shift)	75	217	56	35
Male (PM Shift)	50	142	19	n/a
Female (PM Shift)	50	142	19	n/a
Male (Night Shift)	35	37	19	n/a
Female (Night Shift)	35	37	19	n/a
Total Male	**160**	**397**	**94**	**35**
Total Female	**160**	**397**	**94**	**35**
Total	**320**	**794**	**187**	**70**

BASELINE CASE[4]

Flush Fixture	Fixture Uses by Occupant Type (Uses/Day)				Flushrate (GPF)	Duration (Flush)	Wastewater (gpd)
	FTE[5]	Visitor[5]	Outpatients[6]	Inpatients[7]			
Water Closet (Male)	1	0.2	0.4	5	1.6	1	723
Water Closet (Female)	3	0.5	1	5	1.6	1	1,515
Urinal (Male)	2	0.3	0.6	0	1	1	495

Flow Fixture	Fixture Uses by Occupant Type				Flowrate (GPM)	Duration (seconds)	Wastewater (gpd)
	FTE[5]	Visitor[5]	Outpatients[6]	Inpatients[7]			
Lavatory Sink	3	0.5	1	5	2.5	15	1,184
Utility Sink	3	0	0	1	2.5	15	644
Shower	0.1	0	0	1	2.5	300	1,275
						Subtotal	5,836

Support Area Fixtures	% of Subtotal[8]	Wastewater (gpd)
Surgery & Emergency Room	25%	1,459
X-ray Processing	15%	875
Food Service	20%	1,167
Drinking Fountains	2%	117
Janitorial	15%	875

	Total	10,330
20%	Safety Factor	2,070
	Grand Total	12,400
	Peak Day gpd/bed	177
	Average Day Load Factor	0.8
	Average Day gpd/bed	142

Notes

1. Full-Time Equivalent Employees from traffic study
2. Three visitors per inpatient during day and PM shift and two visitors per outpatient during all shifts visitors
3. Based on 90th percentile target use rate for emergency services applied to 12 ED bays and 16 universal care stations
4. Energy Policy Act, 1992 (LEED WE 3)

Table 7 Water Offsets Program

PHASE	OFFSETS REQUIRED[1] *In equsivent single family dwelling, ESD's*	PROGRAM *To be verified by a feasibility study*	TIMING OF OFFSETS *In place before the following approval*	MONITORED BY
Phase I (2010 - 2012) - Entitlement, Relocation, Replacement of Utilities and Existing				
Annexation of the entire 53± ac. site to the Airport-Larkfield-Wikiup Sanitation Zone (all existing facilities and site improvements would remain in place)	Zero	Retrofit existing WFC facilities (urinals, toilets, hand sinks) to reduce flows from 4,931 gpd to 3,198 gpd.	Prior to any project approval	WFC
Connection of the existing LBMF facilities to the Airport-Larkfield-Wikiup Sanitation Zone wastewater treatment system;	69 to 89	Under SCWA High-Efficiency Fixture Direct Installation Program (HEFDIP), retrofit existing single family homes, apartment complexes and commercial buildings Sanitation Zone service area with new low flow toilets, low flow shower heads and/or low flow faucets to reduce wastewater generation (water use) by 3,200 gpd.	Prior to connecting to Sanitation Zone collection system	SCWA
Decommissioning of the existing on-site LBMF sewage treatment facility;	Zero			
Demolishing the existing barn (LBMF maintenance facility) on Lot A	Zero			
Relocating the maintenance activities to a newly-constructed Maintenance Facility. The maintenance shop would approximately 3,000.	Zero			

Table 7 Water Offsets Program

Phase II (2010-2013) - Medical Campus Construction of Medical Campus Facilities				
70 licensed bed acute inpatient facility with approximately 126,000 square feet of floor area	269 to 348	Under SCWA High-Efficiency Fixture Direct Installation Program (HEFDIP), retrofit existing single family homes, apartment complexes and commercial buildings Sanitation Zone service area with new low flow toilets, low flow shower heads and/or low flow faucets to reduce wastewater generation (water use) by 12,460 gpd.	Prior to connecting to Sanitation Zone collection system	SCWA
A support facility including an approximately 4,000 square foot Central Utility Plant (CUP), and approximately 4,000 square foot Plant Operations and Maintenance (PO&M) building (to house offices and workshops for the hospital engineering staff), and approximately 500 square foot Water Treatment Facility, and associated chemical/gas storage tanks and 2 hydro-pneumatic tanks of about 1,500 gallons each	Included in above	Included in above		
Medical Office Building (MOB) with approximately 80,000 square feet of floor area including administrative activities and operations.	46 to 60	Under SCWA High-Efficiency Fixture Direct Installation Program (HEFDIP), retrofit existing single family homes, apartment complexes and commercial buildings Sanitation Zone service area with new low flow toilets, low flow shower heads and/or low flow faucets to reduce wastewater generation (water use) by 2,140 gpd.	Prior to connecting to Sanitation Zone collection system	SCWA
Physicians Medical Center (PMC) – an acute care inpatient and outpatient facility providing for inpatient and outpatient surgery and also providing a full range of outpatient hospital services (28 licensed beds) approximately 100,000 square feet of floor area	86 to 111	Under SCWA High-Efficiency Fixture Direct Installation Program (HEFDIP), retrofit existing single family homes, apartment complexes and commercial buildings Sanitation Zone service area with new low flow toilets, low flow shower heads and/or low flow faucets to reduce wastewater generation (water use) by 3,980 gpd.	Prior to receiving certificate of occupancy for PMC	SCWA
LBMF Facilities (no change in buildings or site activities from Phase I)	Zero			

Table 7 Water Offsets Program

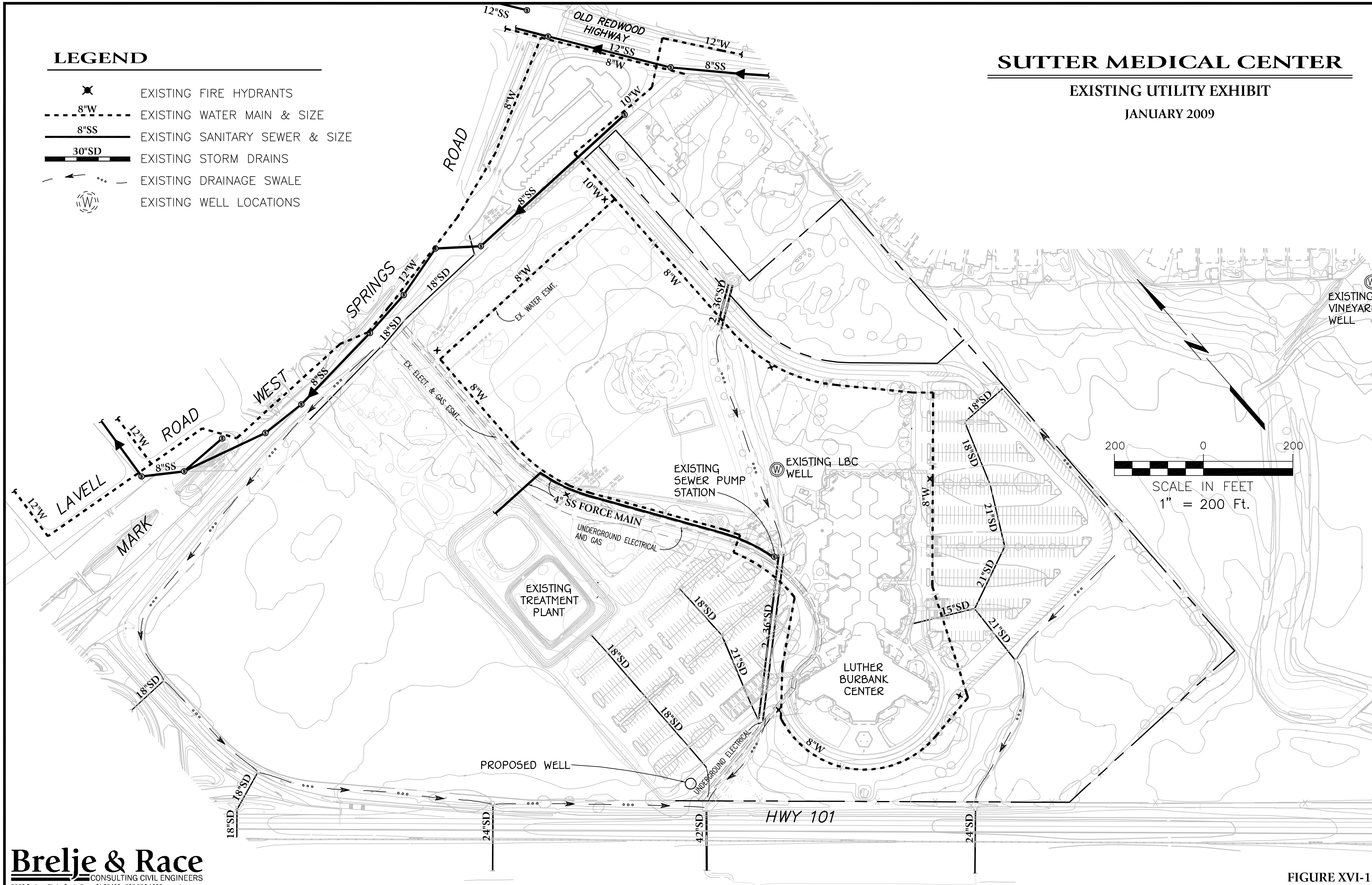
Phase III - Future Expansion (2010 or later)				
Sutter may expand the 70-bed Sutter Medical Center hospital by up to 29 beds, including expansion of the Emergency Department in approximately 36,000 square feet of additional floor area.	103 to 134	Under SCWA High-Efficiency Fixture Direct Installation Program (HEFDIP), retrofit existing single family homes, apartment complexes and commercial buildings Sanitation Zone service area with new low flow toilets, low flow shower heads and/or low flow faucets to reduce wastewater generation (water use) by 4,800 gpd.	Prior to receiving certificate of occupancy for SMC expansion	SCWA

Notes:
1. Range for offsets required is dependant upon how many include installation of high efficiency clothes washer.

SUTTER MEDICAL CENTER

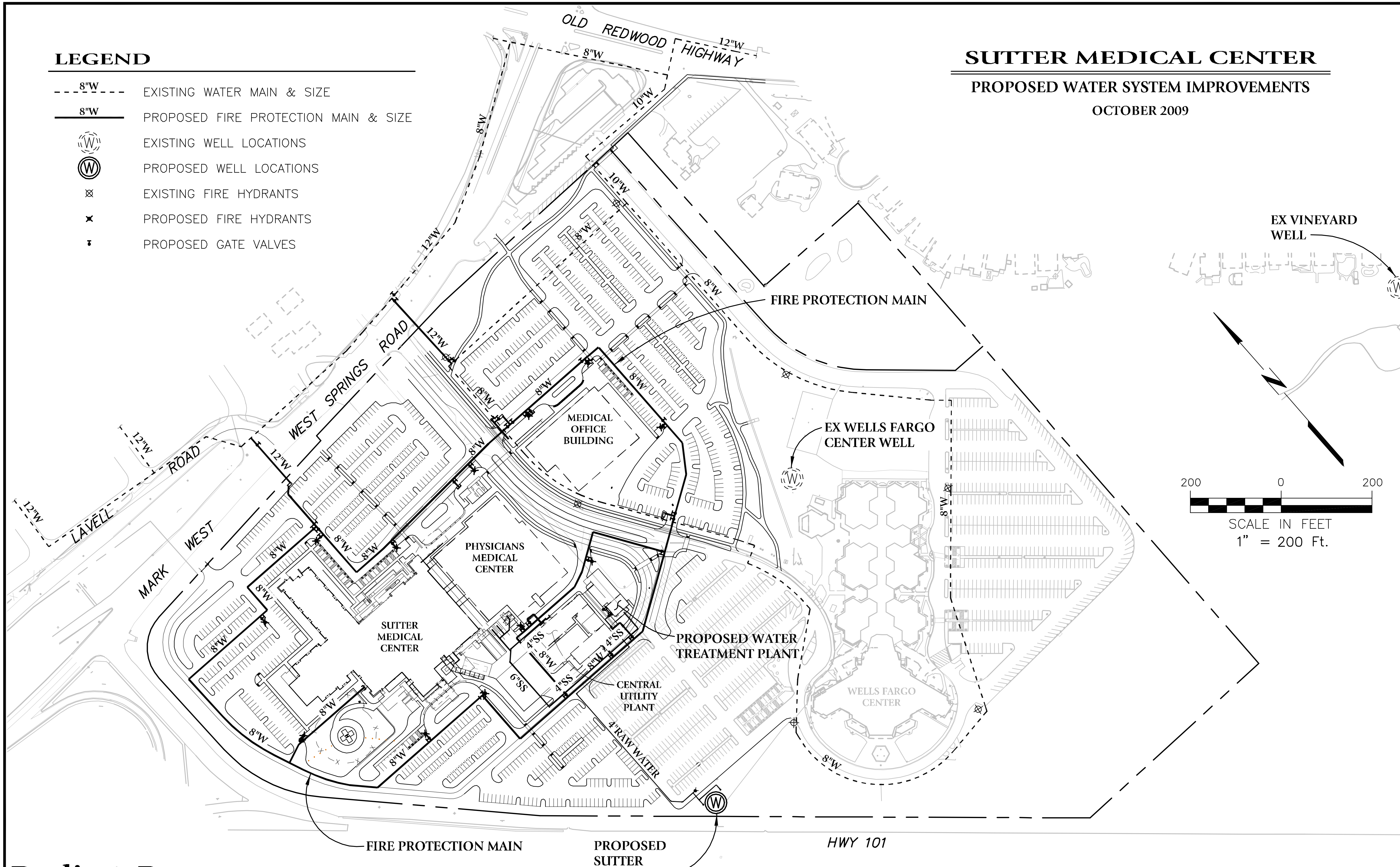
EXISTING UTILITY EXHIBIT

JANUARY 2009



Brelje & Race
CONSULTING CIVIL ENGINEERS
5570 Skylane Blvd. • Santa Rosa, CA 95403 • 707-576-1322 • www.brce.com

FIGURE XVI-1


SUTTER MEDICAL CENTER
PROPOSED WATER SYSTEM IMPROVEMENTS
OCTOBER 2009
LEGEND
8"W EXISTING WATER MAIN & SIZE
8"W PROPOSED FIRE PROTECTION MAIN & SIZE
EXISTING WELL LOCATIONS
PROPOSED WELL LOCATIONS
EXISTING FIRE HYDRANTS
PROPOSED FIRE HYDRANTS
PROPOSED GATE VALVES
OLD REDWOOD HIGHWAY
WEST SPRINGS ROAD
LAVELL ROAD
MARK WEST
HWY 101
MEDICAL OFFICE BUILDING
PHYSICIANS MEDICAL CENTER
SUTTER MEDICAL CENTER
CENTRAL UTILITY PLANT
WELLS FARGO CENTER
FIRE PROTECTION MAIN
EX VINEYARD WELL
EX WELLS FARGO CENTER WELL
PROPOSED WATER TREATMENT PLANT
4"RAW WATER
FIRE PROTECTION MAIN
PROPOSED SUTTER WELL SITE
200 0 200
SCALE IN FEET
1" = 200 Ft.
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10-22-09 kiflizghi \3231\dwg\3231 00\C-3231.00 EXHIBIT-Water-Well-Sewer.dwg TAB: WATER AND WELLS
FIGURE XVI-2

SUTTER MEDICAL CENTER

PROPOSED SEWER SYSTEM IMPROVEMENTS

OCTOBER 2009

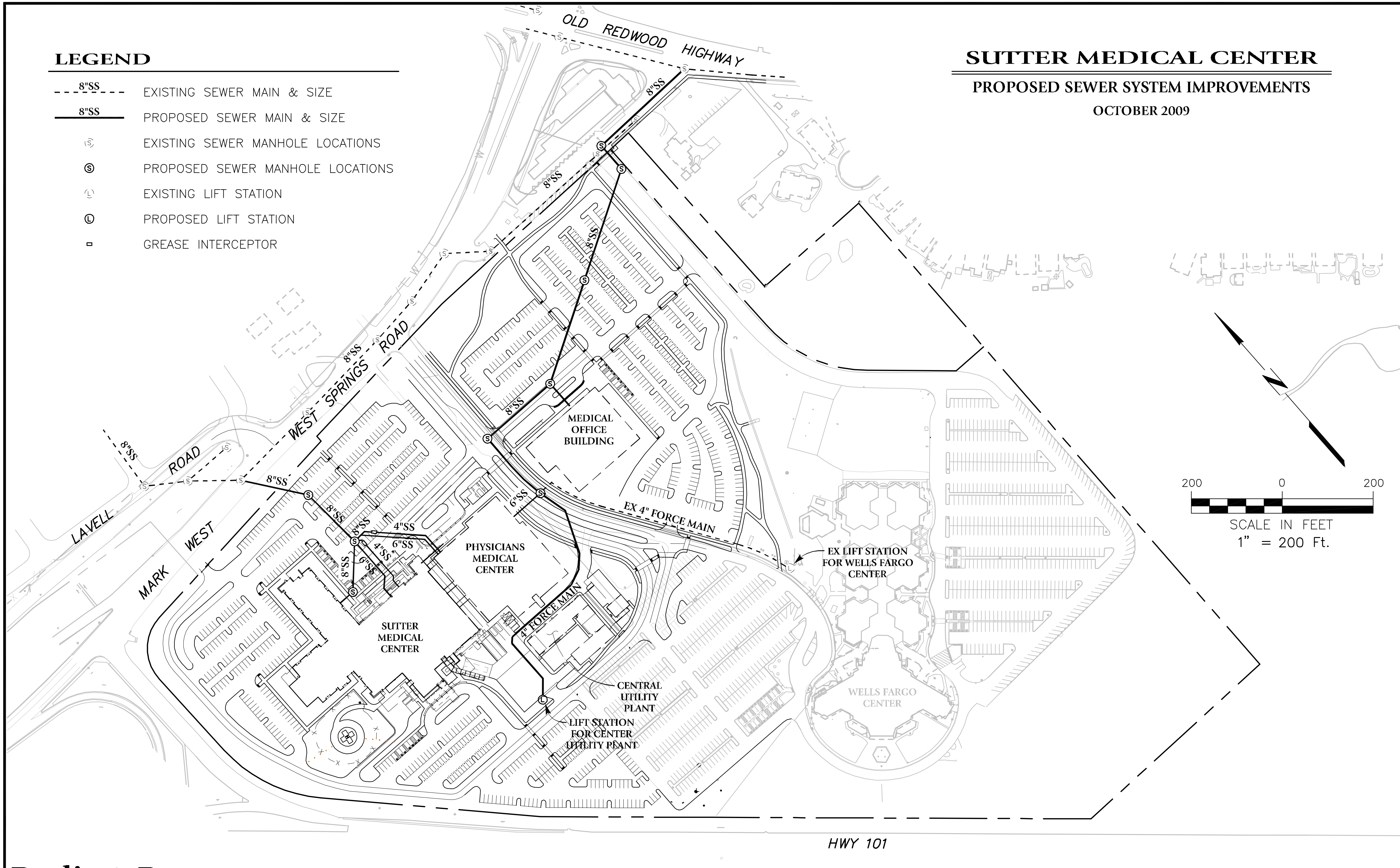

FIGURE XVI-3

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10-22-09 kiflizghi \3231\dwg\3231 00\C-3231.00 EXHIBIT-Water-Well-Sewer.dwg TAB: SEWER

COUNTY OF SONOMA
DEPARTMENT OF EMERGENCY SERVICES
FIRE SERVICES • EMERGENCY MANAGEMENT • HAZARDOUS MATERIALS
Mark Aston, DIRECTOR/FIRE CHIEF

October 6, 2009

c/o Thomas Jones
Brelje & Race
5570 Skylane Blve
Santa Rosa, CA 95403

RE: APPLICATION FOR MITIGATION
SUTTER HOSPITAL PROJECT MARK WEST SPRINGS RD
APN No. 058-040-058 & 058-040-059

Code section to be modified:
Fire Flow Requirements – Sonoma County Code-13-17 / CFC Appendix §B-101.1

Nature of requested modification:

- Improved fire resistance of structures - minimum construction type for buildings (except for Central Utility Plant), shall be I-B. (Central Utility Plant shall be at least Type II-B).
- Installation of hose connections consistent with 1999 NFPA-13 § 5-15.5.2 shall be installed on every floor at each stairwell enclosure, and at the rooftop where the stairwell breaches the roofline.

Specific individual reason strict letter of code is impractical:
Only 67% of the required fire flow can be provided by the water municipality.

The modification requested is approved:
Approved based on general conditions above in addition to specific conditions noted in attached letter from Brelje & Race dated September 21, 2009.

It is believed that the mortifications requested will reduce fire growth, and provides local fire responders with the ability to attack a given fire in less time than if there were no hose connections.

By being able to attack a fire in less time, fire growth is limited, therefore reducing the amount of water that would be required to extinguish a given fire.

RECEIVED
BRELJE & RACE
OCT 13 2009

Respectfully submitted,

Robert MacIntyre, Fire Marshal
Sonoma County Department of Emergency Services

E:\SO CO DEPT OF EMERGENCY SERVICES\PREVENTION & ENFORCEMENT DIVISION\Projects\Sutter Hospital Project\Alternate Method Approval Letter.doc

Cc w/enc:

Mark Aston, Fire Chief
Sonoma County Department of Emergency Services
2300 County Center Drive – Suite 221-A
Santa Rosa, CA 95403

Jerry Faddis, Fire Plan Check Specialist II
Sonoma County Department of Emergency Services
2300 County Center Drive – Suite 221-A
Santa Rosa, CA 95403

Shems Peterson, Supervising Building Inspector
Sonoma County PRMD
2550 Ventura Ave
Santa Rosa, CA 95403

Doug Williams, Fire Chief
Rincon Valley Fire Protection District
P.O. Box 530
Windsor, CA 95492

Kevin Moore
OSHPD FLSO II – Northern Region
400 R Street
Sacramento, CA 95811

Tom Minard, Project Manager
SMCSR
100 Roland Way, Suite 220
Novato, CA 94945

Fred Feizollahi
California American Water Company
4701 Beloit Drive
Sacramento, CA 95838

Brelje & Race
CONSULTING CIVIL ENGINEERS

September 21, 2009

Bob Macintyre, Fire Marshal
Department of Emergency Services
2300 County Center Drive, Room A221
Santa Rosa, CA 95403

Fire Chief Doug Williams
Rincon Valley Fire District
8200 Old Redwood Highway
Windsor, CA 95492

Subject: **Request for Alternate Means of Protection under §111.2.4 California Fire Code with regards to the Water Supply for Fire Fighting for the proposed Sutter Medical Center of Santa Rosa (SMCSR) located at 50 Mark West Springs Rd, Santa Rosa**

Assessor's Parcel Numbers 58-040-058 and 059

B&R File No. 3231.01

Gentlemen:

We are requesting approval of our proposed water supply for fire fighting via Alternate Means of Protection under §111.2.4 2007 California Fire Code (CFC) based on the following:

There is an existing 8" diameter fire and domestic water system loop, owned and operated by California American Water Company (Cal Am), serving the Wells Fargo Center (WFC) property. SMCSR proposes a privately owned fire system loop for the medical complex, connected to the Cal Am system in Mark West Springs Road in at least two locations, and to the existing Cal Am system on the WFC property in two additional locations. This highly looped system will provide significant redundancy and therefore reliability in the expanded fire protection system.

The proposal that we offer for your review and approval consists of the following components:

1. Cal Am has confirmed that they can provide a minimum fire flow of 2500 gallons per minute for a duration of 2 hours from their existing water main located in Mark West Springs Road along the project frontage. The calculated basic fire flow for the proposed hospital (SMCSR), future Physician's Medical Center (PMC), and future Medical Office Building (MOB), based upon their size and type of construction, is 3750 GPM. However, §B105 CFC allows the local fire authorities to approve up to a 75% reduction of the required fire flow under certain circumstances, such as providing NFPA 13 fire sprinkler systems in all structures, but in no case less than 1500 GPM. The fire flow available

from Cal Am at the project frontage represents a 34% reduction from the base flow, and is approximately 67% more than the 1500 GPM minimum flow.

2. All medical center buildings will be separated into separate fire areas so that if there were an event in one of the buildings, it will be contained within that building.

3. Providing an improved emergency access to the Wells Fargo Center by widening and improving the main and secondary entrance roadways.

4. SMCSR is currently assisting the Wells Fargo Center in securing necessary permits for a new fire alarm system for the WFC facility. This work is intended to be executed by WFC as their separate project.

5. The proposed hospital, future PMC, and future MOB will all be provided with 2.5" hose connections in all stair enclosures even though fire hose connections are not required in less than 4 story buildings. These facilities provide additional support for the reduction in the base fire flow.

6. The proposed new hospital (125,715 SF; 2 stories) will be of Type I-B Construction rather than Type III-B as allowed by the California Building Code, providing superior fire resistant construction.

7. The proposed future PMC (100,000 SF; 3 stories) will be of Type I-B Construction rather than Type III-B as allowed by the California Building Code, providing superior fire resistant construction.

8. The proposed future MOB (80,000 SF; 3 stories) will be of Type I-B Construction rather than Type III-B as allowed by the California Building Code providing superior fire resistant construction. Alternatively, the owner may propose a smaller 72,000 SF, 3 story building of Type II-A construction if the cost of the Type I-B building is prohibitive.

9. The proposed new Central Utility Plant (CUP, 5,730 SF; 1 story and separate 1256 SF Water Treatment building) will be of Type II-B Construction rather than Type V-B as allowed by the California Building Code, again, providing superior fire resistant construction. The proposed new Plant Operations and Maintenance building (PO&M, 3,140 SF; 1 Story) will be of Type V-B Construction.

An exhibit depicting the locations on the site of the various structures discussed above is attached to assist with your review of the proposal.

We hope that you will agree, this proposal will surpass the intent of §B105 of the California Fire Code. If you are in agreement that this proposal meets the requirements to support an alternate means of protection finding, please sign a copy of this letter in the space provided below and return to us as a confirmation. Thank you very much for your time and consideration of this request.

Very truly yours,

BRELJE & RACE

Thomas R. Jones

Enclosure

Alternate Means of Protection Approved

Robert Macintyre – County of Sonoma, Fire Marshal **Date**

cc w/enc: Jerry Faddis – Fire Plan Check Specialist II
Department of Emergency Services
County of Sonoma
2300 County Center Drive, Suite 221 – Building "A"
Santa Rosa, CA. 95403

Kevin Moore
OSHPD FLSO II – Northern Region
400 R Street
Sacramento, CA 95811-6213

Tom Minard, Project Manager
SMCSR
100 Roland Way, Suite 220
Novato, CA 94945

Fred Feizollahi
California American Water Company
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Sacramento, CA 95838-2434

3231.01-090918

5-15.4.3* Dry Pipe Systems. A trip test connection not less than 1 in. (25.4 mm) in diameter, terminating in a smooth bore corrosion-resistant orifice, to provide a flow equivalent to one sprinkler of a type installed on the particular system, shall be installed on the end of the most distant sprinkler pipe in the upper story and shall be equipped with a readily accessible shutoff valve and plug not less than 1 in. (25.4 mm), at least one of which shall be brass. In lieu of a plug, a nipple and cap shall be acceptable.

5-15.4.4 Preaction Systems. A test connection shall be provided on a preaction system using supervisory air. The connection used to control the level of priming water shall be considered adequate to test the operation of the alarms monitoring the supervisory air pressure.

5-15.4.5 Deluge Systems. A test connection is not required on a deluge system.

5-15.4.6 Backflow Devices.

5-15.4.6.1* Backflow Prevention Valves. Means shall be provided downstream of all backflow prevention valves for flow tests at system demand.

5-15.4.6.2 When backflow prevention devices are to be retroactively installed on existing systems, a thorough hydraulic analysis, including revised hydraulic calculations, new fire flow data, and all necessary system modifications to accommodate the additional friction loss, shall be completed as a part of the installation.

5-15.5 Hose Connections.

5-15.5.1† Small ($1^1/_2$-in.) Hose Connections.

5-15.5.1.1* Where required by Sections 7-3, 7-4, 7-6, 7-7, and 7-8, small ($1^1/_2$ in.) hose lines shall be available to reach all portions of the storage area. The hose connections shall not be required to meet the requirements of Class II hose systems defined by NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.* Hose connections shall be supplied from one of the following:

(1) Outside hydrants
(2) A separate piping system for small hose stations
(3) Valved hose connections on sprinkler risers where such connections are made upstream of all sprinkler control valves
(4) Adjacent sprinkler systems
(5) In rack storage areas, the ceiling sprinkler system in the same area (as long as in-rack sprinklers are provided in the same area and are separately controlled)

5-15.5.1.2* Hose used for fire purposes only shall be permitted to be connected to wet sprinkler systems only, subject to the following restrictions:

(1) Hose station's supply pipes shall not be connected to any pipe smaller than $2^1/_2$ in. (64 mm).

Exception: For hydraulically designed loops and grids, the minimum size pipe between the hose station's supply pipe and the source shall be permitted to be 2 in. (51 mm).

(2) For piping serving a single hose station, pipe shall be minimum 1 in. (25.4 mm) for horizontal runs up to 20 ft (6.1 m), minimum $1^1/_4$ in. (33 mm) for the entire run for runs between 20 and 80 ft (6.1 and 24.4 m), and minimum $1^1/_2$ in. (38 mm) for the entire run for runs greater than 80 ft (24.4 m). For piping serving multiple hose stations, runs shall be a minimum of $1^1/_2$ in. (38 mm) throughout.
(3) Piping shall be at least 1 in. (25 mm) for vertical runs.
(4) When the pressure at any hose station outlet exceeds 100 psi (6.9 bar), an approved device shall be installed at the outlet to reduce the pressure at the outlet to 100 psi (6.9 bar).

5-15.5.2* Hose Connections for Fire Department Use. In buildings of light or ordinary hazard occupancy, $2^1/_2$-in. (64-mm) hose valves for fire department use are permitted to be attached to wet pipe sprinkler system risers. *[See 7-2.3.1.3(d).]* The following restrictions shall apply:

(1) Sprinklers shall be under separate floor control valves.
(2) The minimum size of the riser shall be 4 in. (102 mm) unless hydraulic calculations indicate that a smaller size riser will satisfy sprinkler and hose stream demands.
(3) Each combined sprinkler and standpipe riser shall be equipped with a riser control valve to permit isolating a riser without interrupting the supply to other risers from the same source of supply.

(For fire department connections serving standpipe and sprinkler systems, refer to Section 3-9.)

5-16 Spray Application Using Flammable and Combustible Materials.

5-16.1 For applicable terms not defined in Chapter 1, the terms defined in NFPA 33, *Standard for Spray Application Using Flammable or Combustible Materials,* shall be used.

5-16.2* The sprinklers for each spray area and mixing room shall be controlled by a separate, accessible, listed indicating valve. Sprinkler systems in stacks or ducts shall be automatic and of a type not subject to freezing. (**33:** 7-2.4)

5-16.3 Sprinklers protecting spray areas and mixing rooms shall be protected against overspray residue so that they will operate quickly in event of fire. If covered, cellophane bags having a thickness of 0.003 in. (0.076 mm) or less, or thin paper bags shall be used. Coverings shall be replaced frequently so that heavy deposits of residue do not accumulate. Sprinklers that have been painted or coated, except by the sprinkler manufacturer, shall be replaced with new listed sprinklers having the same characteristics. (**33:** 7-2.5)

5-17 Storage and Handling of Cellulose Nitrate Motion Picture Film.

5-17.1 For applicable terms not defined in Chapter 1, the terms defined in NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film,* shall be used.

5-17.2 In areas or room where nitrate film is handled, the area that is protected per sprinkler shall not exceed 64 ft^2 (6 m^2) with sprinklers and branch lines not being over 8 ft (2.4 m) apart. (**40:** 3-1.4)

5-17.3 Cabinet Protection. (**40:** 4-2.5)

5-17.3.1 Where cabinets are required to be sprinklered, they shall be provided with at least one automatic sprinkler. (**40:** 4-2.5.1)

5-17.3.2 Where cans are stored on more than one shelf, as shown in Figure 5-17.3.2 and as described in 4-2.6.1 or 4-2.6.2 of NFPA 40, one sprinkler shall be provided for each shelf. (**40:** 4-2.5.2)

APPENDIX M

ENERGY TECHNICAL REPORTS

ENERGY CONSERVATION

The CEQA Statues provide that EIRs shall include a detailed statement on significant effects of a project and "mitigation measures proposed to minimize significant effects on the environment, including, but not limited to, measures to reduce the wasteful, inefficient, and unnecessary consumption of energy" (Public Resources Code §21000(b)(3). CEQA Guidelines Section 15126.2 discusses requirements for an EIR to address potentially significant effects, and although it does not include energy specifically, it mentions use of nonrenewable resources. CEQA Guidelines Section 15126.4(a)(1)(C) requires an EIR to discuss energy conservation measures, if relevant. Appendix F to the Guidelines addresses energy conservation goals, notes that potentially significant energy implications of a project should be considered in an EIR, and contains suggested guidance on the contents of EIR discussions on energy.

Energy is consumed during the construction, operation and maintenance of projects, both directly and indirectly. This section describes the existing energy resources, derived from petroleum products, electricity and natural gas available within the project area and analyzes the impacts related to these resources that would result from the implementation of the Proposed Project.

Environmental Setting

This section addresses the Proposed Sutter Medical Center of Santa Rosa/Luther Burbank Medical Facility's (SMCSR/LBMF) energy sources, as well as the Project's efforts to conserve energy and use energy more efficiently. Although these terms are used interchangeably, it is useful to differentiate between energy efficiency and energy conservation. Energy efficiency means using less energy/electricity to perform the same function. Conservation means "doing without" in order to save energy rather than using less energy to do the same thing. For example, turning off lights, turning down the air conditioner, and making fewer vehicle trips are all conservation measures. Installing lighting that uses less electricity, installing additional insulation, and switching to a vehicle with better gas mileage are energy efficiency measures.

Utility Energy

Pacific Gas & Electric (PG&E) currently provides gas and electric services to the Project site including the existing LBMF facility. PG&E is regulated by the California Public Utilities Commission (CPUC). PG&E's service area extends from Eureka to Bakersfield (north to south) and from the Sierra Nevada to the Pacific Ocean (east to west).

PG&E obtains its energy supplies from power plants and natural gas fields in northern California and from energy purchased outside its service area and delivered through high voltage transmission lines. PG&E purchases both gas and electrical power from various sources, including utility companies in other western states and Mexico (CEC, 2003). To promote the safe and reliable maintenance and operation of utility facilities, the CPUC has mandated specific clearance requirements between utility facilities and surrounding objects or construction activities.

Electricity Energy Consumption

Based upon data and reports compiled by the California Energy Commission and the Energy Information Administration of the U.S. Department of Energy, in 2000, California used over 1,933 kilowatt hours of electricity. This electricity was produced from power plants fueled by natural gas (37%), coal (21%), hydro (16%), nuclear (15%), and renewables (11%).

Approximately 78% of the electricity was generated within California, with the balance imported from other states, Canada, and Mexico.

Electricity usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all electricity-consuming devices within a building. The average annual usage of electricity is roughly 13 kWhr/square foot for all commercial buildings. Electricity supply in California involves a complex grid of power plants and transmission lines located in the Western United States, Canada, and Mexico. The issue is complicated by market forces that have become prominent since 1998, which is when a new regulatory environment commonly referred to as “deregulation” took effect in California. Supply is further complicated by the fact that the peak demand for electricity is significantly higher than the off-peak demand. For example, in August 2004, peak electric demand – due in large part to hot weather – reached a record high of 44,497 megawatts, which is almost double the lowest demand period.

In 2000-2001, electric demand exceeded supply on various occasions, which required utilities to institute systematic rotating outages to maintain the stability of the grid and prevent widespread blackouts. Since that time, additional generating capacity has come on-line and upgrades to various transmission lines are occurring. The California Energy Commission’s 2007 Integrated Energy Policy Report (Integrated Energy Report) provides strategies that will increase efficiencies promoting conservation and reducing energy needs over the next 10-20 years.

Natural Gas

In 2007, California used almost 2.2 trillion cubic feet of natural gas. The natural gas was used electricity production (43%), industrial uses (23%), transportation (1%), commercial uses (10%), residential uses (22%) and with net storage losses (2%). Approximately 14% of the natural gas was produced within California, with the balance imported from other states and Canada.

Natural gas usage in California for differing land uses varies substantially by the type of uses in a building, type of construction materials used in a building, and the efficiency of all gas-consuming devices within a building. The average annual usage of natural gas is roughly 37 cubic feet/square foot for commercial buildings. According to the Integrated Energy Policy Report, in order to meet peaking demand, Northern California will need gas infrastructure improvements (e.g., additional pipeline capacity) and increased conservation.

California Energy Supply

California’s major sources of energy are petroleum products (i.e., gasoline, diesel and oil), electricity, and natural gas. The California Energy Commission (CEC) indicates that California petroleum resources in 2007 came from in-state (39.34%), foreign sources (44.88%), and Alaska (15.79%). In 2006, natural gas resources in California came from the Southwest

(40.3%), Canada (23.4%), in-state (13.5%), and the Rocky Mountains (27.7%). Electricity production by resource type in California in 2007 included natural gas at 45.2%, coal at 16.6%, hydroelectric at 11.7%, nuclear at 14.8%, and renewable at 11.8%. Renewable consisted of geothermal (4.5%), biomass (2.1%), small hydro (2.8%), and solar and wind (2.5%). Imports from the northwest and southwest added 8.17% and 22.4%, respectively.[1]

California Energy Use Patterns

State-level and county trends are relied upon to characterize energy consumption locally.

Currently the top three fossil fuels, coal, oil and natural gas, provide more than 85% of all the energy consumed in the United States, nearly two-thirds of our electricity, and virtually all of our transportation fuels. Petroleum products themselves supply more than 40 % of our total energy demands and more than 99% of the fuel we use in our cars and trucks. As for electricity, more than half of the amount generated in the United States derives from coal. It is estimated that for the foreseeable future coal will continue to be the dominant fuel used for electric power production. The next biggest fuel source of electricity is nuclear power which supplies about 20% of the electricity produced in the United States. On the other hand, natural gas is the fastest growing fuel. More than 90% of the power plants to be built in the next 20 years will likely be fueled by natural gas; virtually all of which will be domestically produced.[2] Northern Sonoma County is the site of the world's more significant geothermal fields, The Geysers. The Geysers generates about 5,000,000 megawatt-hours per year. Additional sources within the County include hydroelectric power, methane gas, and solar photovoltaics. Additional opportunities exist for individual and small scale production from other renewable energy sources, including passive solar collection, wind energy, hot water, and biomass. These sources are associated with lower up-front costs, increased efficiency, and minimal environmental impacts.

In California, total statewide energy consumption was 8,420.4 Trillion BTU[3] for 2006. Petroleum use accounted for approximately 47% of all energy consumption, of which approximately 57% was for motor vehicle fuel. Motor gasoline use accounted for about 24% of total use, or 1,999.4 Trillion BTU. The electric power sector accounted for about 19% of all energy consumption, while natural gas accounted for about 28% of all energy consumption. By end-use sectors, transportation was by far the biggest energy consumer, which accounted for approximately 40% of all energy consumption. The other three sectors, industrial, commercial and residential, were about equal consumers accounting for approximately 23%, 19% and 18% of all energy consumption, respectively.[4] Table 1 illustrates California electricity usage in Sonoma County. Table 2 provides natural gas demand figures Statewide.

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[1] State of California Energy Commission's website. http://www.energyalmanac.ca.gov, 2008. Renewable numbers derived from http://www.energy.ca.gov/research/renewable/, 2007.
[2] U.S. Department of Energy's website. http://www.energy.gov/energysources/index.htm, 2008.
[3] Btu is defined as the quantity of energy necessary to raise the temperature of 1lb. of water 1° Fahrenheit.
[4] U.S. Department of Energy's website. http://www.eia.doe.gov/emeu/states/_seds.html, 2008.

Table 1
California Utility Electricity Consumption by County for 2005
kWh (million)

County	Residential	Non Residential	Total
Sonoma	2,646	5,529	8,175

Kilowatt-hour (kWh): The most commonly used unit of measure telling the amount of electricity consumed over time, which is one kilowatt (1,000 watts) of electricity supplied for one hour.

Source: California Energy Commission's website, http://www.ecdms.energy.ca.gov/elecbycounty.asp#results, 2008.

Table 2
California Natural Gas Demand 2006 in MMcfd (Million Cubic Feet per Day)

	State Total
Residential	1,300
Commercial	573
Industrial	1,392
Electric Gen	2,613
Transportation	25
Storage & Losses	129
State Total	***6,032***

Regulatory Setting

This section summarizes the federal, State and local laws and regulations applicable to energy resources and energy use.

Federal Agencies

Federal agencies regulate energy production, transmission and consumption through various regulations and programs. Federal agencies, such as the Environmental Protection Agency (EPA), the U.S. Department of Energy (US-DOE), and the U.S. Department of Transportation (USDOT) affect energy consumption in the transportation sector through fuel economy standards, funding for transportation infrastructure and funding for energy related research and development projects. The USDOE also promotes a diverse supply and delivery of reliable, affordable and environmentally sound energy. The Federal Energy Regulatory Commission (FERC) is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. FERC also reviews proposals to build liquefied natural gas (LNG) terminals and interstate natural gas pipelines as well as licensing hydropower projects.

Energy Policy Act of 2005 (EPACT)

The EPACT is intended to establish a comprehensive, long-range energy policy, and the USDOE is responsible for its implementation. It provides incentives for traditional energy production as well as newer, more efficient energy technologies and conservation. Those incentives come in the form of various tax credits and deductions, which include automobile tax credits, home energy efficiency improvement tax credits, energy efficient commercial building deduction and business tax credits for businesses that produce biodiesel/alternative fuels and manufacture or purchase energy-efficient appliances.[5]

Power Plant and Industrial Fuel Use Act

The Power Plant and Industrial Fuel Use Act is administered by the USDOE. In summary, the purpose of the Act is to reduce the importation of petroleum and increase the Nation's capability to use indigenous energy resources of the United States to the extent such reduction and use further the goal of national energy self-sufficiency and otherwise are in the best interests of the United States; to encourage and foster the greater use of coal and other alternate fuels, in lieu of natural gas and petroleum, as a primary energy source; and to the extent permitted by the Act, to encourage the use of synthetic gas derived from coal or other alternate fuels.[6]

Transportation Equity Act for the 21st Century (TEA-21)

TEA-21 builds on the initiatives established in the *Intermodal Surface Transportation Efficiency Act of 1991(ISTEA)*, which was the last major authorizing legislation for surface transportation. TEA-21, enacted on June 9, 1998, authorizes highway, highway safety, transit, and other surface transportation programs for a six-year period (1998-2003). However, because Congress could not agree on funding levels, the Act has continued past 2003 by means of temporary extensions.[7] TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

State and Local Agencies

California Energy Commission (CEC)

The CEC is the State's primary energy policy and planning agency. Created by the Legislature in 1974, the Commission has five major responsibilities: forecasting future energy needs and keeping historical energy data; licensing thermal power plants 50 megawatts or larger; promoting energy efficiency through appliance and building standards; developing energy technologies and supporting renewable energy; and planning for and directing state response to energy emergency. With the signing of the Electric Industry Deregulation Law in 1998 (Assembly Bill 1890), the Commission's role includes overseeing funding programs that support public interest energy research; advance energy science and technology through research, development and demonstration; and provide market support to existing, new and emerging

[5] Federal Energy Regulatory Commission's website. http://www.ferc.gov/, 2008.
[6] Cornell Law School, United States Code Collection. http://www4.law.cornell.edu/uscode/42/ch92.html, 2007.
[7] Transportation Equity Act for the 21st Century. http://en.wikipedia.org/wiki/Transportation_Equity_Act_for_the_21st_Century, 2008.

renewable technologies. California is preempted under federal law from setting state fuel economy standards for new on-road motor vehicles.[8]

California Public Utilities Commission (PUC)

The PUC regulates privately owned electric, telecommunications, natural gas, water and transportation companies, in addition to household goods movers and rail safety. The PUC is responsible for ensuring that customers have safe, reliable utility service at reasonable rates, protecting against fraud, and promoting the health of California's economy.[9]

State and Local Regulations

State of California Energy Action Plan (EAP)

Administered by the California Energy Commission, the EAP was initially created in 2003 and updated in 2005. The EAP established shared goals and specific actions to ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound for California's consumers and taxpayers. Also incorporated in the EAP are specific actions reflecting the importance of transportation fuels to California's economy and the need to mitigate the environmental impacts caused by their use, as well as the importance of taking actions in the near term to mitigate California's contributions to climate change from the electricity, natural gas and transportation sectors.[10]

California's Energy Efficiency Standards for Residential and Non-residential Buildings of 2005 (Title 24 Building Standards)

The California Energy Commission administers Title 24 Building Standards, which were established in 1978 in response to a legislative mandate to California's energy consumption. Last updated in October 2005, the standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.[11]

Sonoma County General Plan 2020[12]

The following goals and policies are from Sonoma County's General Plan Open Space and Resource Conservation Element and are applicable to the Proposed Project:

GOAL OSRC-14: **Promote energy conservation and contribute to energy demand reduction in the County.**

Objective OSRC-14.1: Increase energy conservation and improve energy efficiency in County government operations.

[8] California energy commission's website. http://www.energy.ca.gov/commission/index.html, 2009.
[9] California Public Utilities Commission's website. http://www.cpuc.ca.gov/PUC/aboutus/, 2009.
[10] California Energy Commission's website. http://www.energy.ca.gov/energy_action_plan/index.html, 2008.
[11] California Energy Commission's website. http://www.energy.ca.gov/title24, 2009.
[12] Sonoma County General Plan 2020. http://www.sonoma-county.org/PRMD/gp2020/index.html, 2008.

Objective OSRC-14.2: Encourage County residents and businesses to increase energy conservation and improve energy efficiency.

Objective OSRC-14.3: Reduce the generation of solid waste and increase solid waste reuse and recycling.

Objective OSRC-14.4: Reduce greenhouse gas emissions by 25% below 1990 levels by 2015.

Policy OSRC-14d: Support Project applicants in incorporating cost effective energy efficiency that may exceed State standards.

Policy OSRC-14f: Use the latest green building certification standards, such as the Leadership in Energy and Environmental Design (LEED) standards, for new development.

Standards of Significance

The Proposed Project would have a significant energy impact if it would result in:

- Wasteful, inefficient and unnecessary usage of energy as identified by CEQA Section 21100(b)(3) and CEQA Guidelines 15126(a)(1); or
- A substantial increase in demand or transmission service, resulting in the need for new or expanded sources of energy supply or new or expanded energy delivery systems or infrastructure.

Impacts and Mitigation Measures

This section discusses the potential impacts of the Proposed Project on overall energy consumption and mitigation processes proposed by the Project.

Impact 1 – Construction Energy Use

Construction

Construction-related energy consumption would result from Project construction and the use of secondary facilities. A secondary facility is defined as any facility that would produce any construction materials that would be used during the construction and maintenance of the Proposed Project. Energy consumed for Project construction would be that used during the construction of the hospital campus (Sutter Medical Center Santa Rosa, Physicians Medical Center, Central Utility Plant and Medical Office Building) and for the transportation of building materials and equipment to and from the work site.

The construction period for the total hospital campus could approach 48 months, and as a result, any energy consumption from construction and transportation of building materials and equipment to and from the work site will be potentially significant. These impacts relate primarily to importation of fill (8,695 truck loads) and roadway completion. Mitigation measures are listed below that will reduce these impacts to less than significant levels.

Secondary facilities

It is assumed that secondary facilities, such as those that would produce construction materials for the Proposed Project would utilize all reasonable energy conservation practices in order to minimize the costs associated with energy use. As such, it can be assumed that construction-related energy consumption by secondary facilities during the construction of the Proposed Project would not result in a wasteful, inefficient and unnecessary usage of energy; or placement of a significant demand on regional energy supply or requirement of substantial additional capacity with regards to energy consumption during the construction phase.

Indirect Consumption

The Proposed Project would generate approximately 328 AM peak hour trips and 467 trips during the PM peak hour.

Based upon the traffic analysis, at least 15% (and possibly as many as 50%) of traffic trips to the Project are diverted trips – trips which occur to the existing Sutter facility in Santa Rosa. The hospitals at full build out would house 127 beds (similar to the current 135 licensed beds at the Chanate Campus in Santa Rosa). Medical offices would likely off set many of the existing medical offices in the Santa Rosa area, and those offices (especially at Sutter's Warrack and Chanate facilities) would like be replaced by non-medical uses, based upon City of Santa Rosa Zoning.

<u>Mitigation Measure for Impact 1:</u>

Fossil fuels used for construction vehicles and other energy consuming equipment would be used during site clearing, grading, and construction for the Project. Fuel energy consumed during construction would be temporary in nature and would not represent a significant demand upon energy resources upon completion of the following measures:

Energy Conservation During Construction

Some incidental energy conservation would occur during construction through implementation of the noise mitigation measures identified in the noise section. For example, there would be some fuel savings resulting from the prohibition of unnecessary idling of vehicles and equipment, and from the requirement that equipment be properly maintained. In addition, the mitigation measures listed in the Air Quality section include several measures that will result in energy conservation including:

- restructuring idling times;
- finding source material for fill that is closest to the site

. Also, the construction materials could include recycled materials and products originating from nearby sources in order to reduce costs of transportation. Also, given current high fuel prices, contractors have a strong financial incentive to avoid wasteful, inefficient and unnecessary consumption of energy during construction.

The Traffic Demand Management (TDM's) incorporated with the Project include on site bike and shower facilities, telecommuting, flexible schedules, off – on-site paths and sidewalks, bikeways, priority for van pools, carpools, recharge stations for electric vehicles (and possibly natural gas) and convenient public transit (including upgraded bus stop adjacent to the site).

All of these measures will reduce vehicle use and increase efficiencies. Additionally, transit ride time to the new hospital is less than to the existing Chanate facility (based upon SCT and SRT schedules).

Impact 2 – Operational Energy Use

The Proposed Project consists of four main components of a medical office complex including the 162,000sf Sutter Medical Center (99 beds after Phase III) and 100,000sf Physicians Medical Center (28 beds), a 11,500sf Central Utility Facility and an 80,000sf Medical Office Building. The LMBF main facilities are not being modified. The auxiliary functions (maintenance shed, parking areas and play fields) will be relocated.

The preliminary electrical and natural gas usage estimates (in annual kWh, therms and cubic feet) for the Sutter Santa Rosa Medical Center campus (Sutter Hospital – 162,000sf, Physicians Medical Center – 100,000sf, MOB – 80,000sf) have been estimated by the mechanical engineers to use 109,337 therms of gas and 6,520,577 kWh of electricity per year.

Although the Proposed Project would result in the consumption of large quantities of energy (typical for a project of this size), several aspects of the Project would help manage the amount and efficiency of energy consumption and would ensure that the related consumption is not inefficient, wasteful or unnecessary or place a significant demand on regional energy supplies.

<u>Mitigation Measures For Impact 2</u>

The following energy conservation measures shall be implemented in order to minimize inefficient energy usage and promote conservation of energy resources throughout the life of the Project:

<u>Daylighting of all buildings 100,000 sf or greater</u>

Each interior public space with access to daylight shall be equipped with a “daylighting system” to reduce use of electricity for area lighting. The daylighting system shall include switching mechanisms to automatically and continuously dim all lights as the daylight contribution increases through use of properly placed windows and skylights.

<u>Night Dimming</u>

Each interior public corridor shall be equipped with an automatic switching system to dim lighting within the corridor to between 60% and 70% illumination between the hours of 10:00 pm and 7:00 am (standard time).

Energy Efficient HVAC Systems

All mechanical equipment provided for the purpose of heating and cooling interior public spaces shall satisfy all California title 24 requirements; in addition, all such equipment shall achieve a minimum EER (energy efficiency ratio) of rating of 10.0 or equivalent.

Central Energy Management for all buildings 100,000 sf or greater

Each campus building as identified on the approved development plan shall be equipped with energy management systems. The direct digital control system for the campus buildings will be networked and meet the typical requirements of an “energy management system.”

Water Heating for buildings 100,000 sf or greater

If applicable or feasible, waste heat shall be captured in order to preheat water for uses requiring heated water.

Cool Roofs

All flat roof surfaces (excluding decorative architectural elements and canopies) shall be provided with a high albedo membrane roof, also known as a cool roof. The solar reflectivity of such roof membrane systems are intended to lower interior cooling loads in the Sonoma County climate zone by roughly 10%, compared to conventional roofing. Solar reflectivity on roofs also reduces the amount of conversion of UV rays to infrared heat, possibly reducing the heat island effect created by most large, developed parcels of land.

Interior Lighting Systems

All interior public spaces shall be provided with lighting systems that utilize high efficiency T-8 or T-5 fluorescent lamps and electronic ballasts, or approved equivalent systems. Fluorescent lamps shall be of the "low-mercury" variety.

LED Interior Signage Illumination for all buildings 100,000 sf or greater

Light emitting diode (LED) lighting, or an approved equivalent, shall be used for all internally illuminated building signage. LED lighting technology is recognized as consuming substantially less electricity than fluorescent or other illumination sources. In addition, the longer lamp life afforded by LED technology substantially reduces need to manufacture and dispose of fluorescent lamps.

Recycled Materials in Building Construction for all buildings 200,000 sf or greater

Recycled Steel: when possible and not resulting in out of area sourcing, a minimum of 80% of the structural steel used in the construction of buildings shall be comprised of recycled materials.

UBC

In addition to the above design features of the Project, the California Building Standards Code, energy conservation requirements in the most current edition of Title 24, Part 6, California Code of Regulations, for non-residential buildings would be applied. The Commission also wanted to emphasize energy efficiency measures that save energy at peak periods and seasons and to improve the quality of installation of energy efficiency measures.

Savings By Design

The Project will participate in PG&E's Savings by Design program which will ensure additional energy efficient measures will be incorporated into the Project.

OSHPD Review

Pursuant to the California Building Standards Code and the Energy Efficiency Standards, both OSHPD and the County shall review the design components of the Project's energy conservation measures when the Project's building plans are submitted. Energy efficient measures could include: insulation; the use of energy efficient heating, ventilation and air conditioning equipment (HVAC); solar-reflective roofing materials; energy-efficient indoor and outdoor lighting systems; the incorporation of skylights, high performance glazing, etc.

Colocation

In terms of energy consumption related to vehicle use, the colocation of the medical services of the Proposed Project would focus the destination of vehicle trips and benefit fuel consumption. The proposed mix of medical services would encourage multi purpose trips and reduce fuel consumption by reducing the number of trips some people might otherwise make between different medical facilities. The Sutter Hospital Project was registered for the Leadership in Energy and Environmental Design (LEED) in 2008. Pursuing LEED certification will further the incorporation of energy conservation and sustainability measures into the Project design. These are summarized in Table 3.

Table 3 lists all pertinent measures included in CARB's Scoping Plan for the state's compliance with AB 32, and presents Sutter's sustainability policies, programs, Project design features and how they comply with the AB 32 Scoping Plan measures.

Table 3
Consistency of the Sutter Project Features with AB 32 Scoping Plan Measures

Scoping Plan Measure	Sutter Policy/Project Feature
SPM-1: California Cap-and-Trade Program linked to Western Climate Initiative	Not applicable.
SPM-2: California Light-Duty Vehicle GHG Standards	Not applicable.
SPM-3: Energy Efficiency	Aggressive conservation efforts and development of renewable power will be fundamental to Project design. Buildings will be designed to consume reduced levels of energy and demand over the current hospital. LEED: The Project has been registered for LEED certification.
SPM-4: Renewables Portfolio Standard	Not applicable
SPM-5: Low Carbon Fuel Standard	Not applicable
SPM-6: Regional Transportation-Related Greenhouse Gas Targets	Develop a coordinated master plan to guide design and implementation of the principal circulation infrastructure, including plans that address streets, on and off site roads, bikeways, pedestrian ways, transit and parking; created a comprehensive, interconnected bicycle and pedestrian circulation system that provides access to major buildings. Work with local and regional transit providers to coordinate transit service, and establish convenient transfers between transit and other modes of travel. Provide priority parking for vanpools, carpools, and energy efficient and low-pollution vehicles, with recharge stations for electric vehicles and provide a natural gas vehicle charging stations, if possible.
SPM-7: Vehicle Efficiency Measures	Not applicable.
SPM-8: Goods Movement	Not applicable.
SPM-9: Million Solar Roofs Program	Sutter is working with PG&E in its Savings By Design program to design feasible methods that optimize solar and thereby minimizing grid connected peak electricity loads by shifting electricity used for cooling away from peak electricity demand periods through a variety of methods that include solar power.
SPM-10: Heavy/Medium-Duty Vehicles	Minimize construction emissions.

Scoping Plan Measure	Sutter Policy/Project Feature
SPM-11: Industrial Emissions	Not applicable.
SPM-12: High Speed Rail	Not applicable.
SPM-13: Green Building Strategy	Buildings will be designed to consume less energy and demand than the existing hospital and surpass Title 24 minimum efficiency standards, and achieve LEED certification. There is a relationship between indoor environmental quality and materials, lighting, thermal comfort, human health & productivity. Accordingly, Sutter Health as a community role model has a vested interest in delivering environments that optimize patient outcomes and provide a “best place to work and practice” environment for its employees. Minimizing and controlling sources of allergens, mutagens, carcinogens and endocrine disruptors, while providing access to daylight and comfortable indoor climate in an accessible setting are fundamental building design goals. Exposure conditions that adversely affect health can only be evaluated in the light of the benefits received and the alternatives available. **Environmental Air Quality Guidelines** • Establish minimum indoor air quality (IAQ) performance to enhance indoor air quality in buildings, thus contributing to the comfort and well-being of the occupants • Minimize production, distribution and exposure to pollutants- provide risk group specific protection where elimination is impossible • Provide occupants with access to natural daylight and healing views • Provide energy efficient thermal comfort within acceptable ranges • Provide occupant controlled zoned environmental controls (light, view, thermal, ventilation) • Manage pathogens and infection transmission with appropriate barriers, air flow, discharge and refresh rates **Environmental Air Quality Strategies** • Ensure high quality indoor air and thermal comfort by meeting or exceeding ASHRAE 62-1999 and ASHRAE 55-1992 as the minimum basis of design • Baseline design with minimum impact methods and materials including low VOC / low toxic finishes and materials i.e. Green Seal-certified paints; composite wood and agrifiber products without urea-formaldehyde resins; carpet systems certified by Carpet & Rug Institute Green Label Program; adhesives meeting local Air Quality Management District guidelines. • Design and specify systems that prevent trapping of water and microbial growth • Define and implement ICRA Infection control plan for all construction

Scoping Plan Measure	Sutter Policy/Project Feature
	and renovation projects • Install entryway systems (e.g., walk off tiles) to trap dirt and particulates • Position building air intakes to prevent contamination from vehicle exhaust and other sources • Assure easy access to inspect and clean filters and ductwork in Air handling systems • Ventilate source areas (smoking areas, housekeeping, copying rooms, hazardous waste) • Buildings not non smoking • Design environments including materials, products, mechanical systems and design features to attenuate sound and vibration within tolerances outlined in Hospital guidelines in ASHRAE Application Handbook.
SPM-14: High GWP Gases	Not applicable.
SPM-15: Recycling and Waste	**Materials Conservation and Resource Efficiency** The healthcare delivery environment is first and foremost concerned with the health and welfare of the patients and staff. Although use of sustainable materials can significantly enhance a building's environmental impacts, there is no room in a critical care setting to compromise the health of our patients. Products and materials used in the healthcare delivery setting must be the best available that is appropriate for the use intended. Total Life Cycle costs associated with operating and maintaining the products and materials proposed must be balanced with the first cost and life cycle environmental impacts of the products considered. Hospital designs must seek to include sustainable harvest material, minimize production of persistent and bioaccumulative toxics (PBTs) and reduce waste. **Materials Conservation and Resource Efficiency Guidelines** • Balance resource depletion reduction objectives with service specific requirements • Reduce embodied energy (use lowest energy density product available) • Reduce toxics generated throughout the life cycle of materials • Reduce waste by including waste evaluations in design choices • Reduce impact of reuse or disposal of building **Materials Conservation and Resource Efficiency Strategies** • Reuse existing structures with minimum demolition practical • Specify materials and methods with reduced (or free from) ozone depleting substances and/or equipment using CFCs, HCFCs, and halons, balancing ozone depletion potential (ODP) with global warming potential (GWP)

Scoping Plan Measure	Sutter Policy/Project Feature
	• Review design alternatives that consider materials that; ❖ are free from toxic chemicals ❖ do not release toxic byproducts throughout their life cycle ❖ do not include toxins that are carcinogenic, persistent or bioaccumulative. (e.g. mercury, arsenic, urea formaldehyde, plasticizers in PVC and asbestos) ❖ are recycled, reused/salvaged, remanufactured or from sustainable sources ❖ are sustainably harvested ❖ are from local sources when available ❖ are easily reusable, recyclable, or biodegradable on disposal ❖ are design for efficient material use (less material use and less waste) ❖ are design for adaptability of building design as needs change (reusable movable) ❖ are designed for disassembly and recycle or reuse at end of building life. • Exterior envelope materials that; ❖ The thermal performances of the buildings are being evaluated including high performance glass and exterior insulating systems. An energy model has been erected to empirically evaluate and optimize the energy performance of the design. • Life cycle costs are being discussed and evaluated throughout the design process.
SPM-16: Sustainable Forests	Not applicable
SPM-17: Water	**Water Efficiency and Conservation** Water efficient design balances water quality and quantity availability and demand, both inside and outside of the building/campus. Water efficient design incorporates available resources and is responsive to the watershed and utility systems capacity as both source and sink. Limitation in utility system capacity and effectiveness demand that water be treated as a constrained and precious resource. Storm and Sanitary Sewer effluent flows can be dramatically impacted by environmentally sound planning and design. **Water Efficiency and Conservation Guidelines** • Optimize the use of potable water resources to conserve water and maintain water quality • Minimize operational impacts to off site treatment of wastewater by avoiding harshest and most problematical chemicals and processes

Scoping Plan Measure	**Sutter Policy/Project Feature**
	• Minimize storm water peak releases from the site, (capture and stage/ meter/ re-use) • Maximize use of on-site water resources, (e.g., rainwater, gray water) where appropriate • Enhance water quality through SWPPP **Water Efficiency and Conservation Strategies** • Use high performance fixtures and equipment: e.g., low flow and pressure assist toilets and urinals; low-flow showerheads and faucets; automatic use activation on sinks, toilets and urinals; Water saving "Energy Star" labeled (or such as an equivalent Dolfin system), dietary housekeeping laundry and mechanical systems equipment. • Minimize boiler, mechanical and cooling tower water blow down chemical loading on sanitary sewer by eliminating water treatment chemicals. When possible evaluate use of non-evaporative condenser heat rejection equipment (air cooled, or ground source – large air cooled systems are not likely to be included in this Project) • Specify native plants that are tolerant of local climate, soils and water • Install drip irrigation and high efficiency irrigation control with moisture sensors, weather based controllers. • Collect and store storm water runoff from roofs and site and use for irrigation, sewage conveyance, toilet flushing and/or HVAC/process makeup water or aquifer recharge • Minimize hardscapes and install site water runoff control and metering systems including permeable peak storage, specialty paving and other pervious surface materials • Create managed wetlands systems to locally recharge underground water flows.
SPM-18: Agriculture	Not applicable.

The SMCSR/LBMF Medical Plan ensures that development within the Project area would be subject to the above identified guidelines to ensure that the Project as well as Title 24 guidelines and regulations are met if not exceeded. Therefore, the Project would be expected to have ***less-than-significant*** impact regarding the wasteful, inefficient or unnecessary consumption of energy.

Impact 3 - Increased Demand on Electric and Natural Gas Infrastructure

The Project site is currently served by electric and gas services. Overhead electric lines with a 12Kv capacity currently extend along the Mark West Springs Road frontages. A 3" natural gas line also extends along the Project frontage.

PG&E has indicated they have adequate power to serve the Proposed Project.

Because the Project would require the extension of existing gas and electric facilities to adequately service the development associated with the Proposed Project it could have a ***potentially significant*** impact. The implementation of the mitigation measures included below would reduce the impacts associated with electric and natural gas services to a ***less-than-significant*** level.

Mitigation Measure for Impact 3:

> The improvement plans shall show the location and method of connection to the existing natural gas supply line located along the Mark West Springs Road frontage of the site.
>
> The improvement plans shall provide for underground installation of all onsite utilities. In addition, improvement plans shall be prepared to provide for the undergrounding of existing overhead utility lines along Mark West Springs Road frontage, as required by the County and utility pole owners.

Cumulative Impacts Related to Increased Energy Consumption from the Proposed Project in Combination with other Foreseeable Projects in the Region

The Project in combination with other future development projects would result in an increased demand on energy resources. Gas and electric service providers would be subject to increased pressure to supply additional energy resources, which could result in the need to expand existing facilities or to build new power plants. PG&E has adequate gas and electric facilities in the area to serve[the Proposed Project and that the Proposed Project would not result in any major conflicts with PG&E's existing gas and electric facilities.

As indicated above, the Project would be subject to the minimum energy conservation requirements of Title 24 of the California Code of Regulations and will participate in PG&E's "Savings by Design" program, which would serve to reduce the amount of energy resources needed to operate the Project. The Project would also be required to fund the necessary infrastructure improvements to ensure that the Project receives adequate energy resources. Because other future developments would also be required to comply with Title 24 and fund the construction of the necessary utility infrastructure improvements, and as this is no evidence indicating that PG&E, through its long-term planning, would not be able to keep pace with increasing demands, cumulative energy impacts would be considered ***less-than-significant***.

APPENDIX N

ALTERNATIVES SCREENING TECHNICAL REPORTS

Appendix N1

Initial Screening Analysis of Potential Alternatives to the Proposed Sutter Medical Center of Santa Rosa/Luther Burbank Memorial Foundation Project

INITIAL SCREENING ANALYSIS OF POTENTIAL ALTERNATIVES TO THE PROPOSED SUTTER MEDICAL CENTER OF SANTA ROSA/LUTHER BURBANK MEMORIAL FOUNDATION PROJECT

Submitted to Sonoma County, March 24, 2009

I. INTRODUCTION

Sutter Health and its project team of environmental and planning consultants have prepared this initial screening analysis of potential alternatives that could be evaluated in considering the proposed new Sutter Medical Center of Santa Rosa hospital and medical campus (the "Project"). This analysis was prepared to assist Sonoma County and its environmental consultant in its evaluation of potential project alternatives that could be included in the environmental impact report for the Project. This analysis reflects Sutter's consideration of a wide range of possible alternatives, including 19 alternative sites and 7 alternative configurations of the Proposed Project site, and was generated from a number of sources.

In the following sections, we set forth the following introductory information:

- In Section II, a list of the 26 potential project alternatives considered in this screening analysis.
- In Section III, suggested criteria to be applied in the screening of potential alternatives to determine which alternatives should be evaluated in detail in the EIR.
- In Section IV, a description of the bases upon which various potential alternatives were included in this screening analysis.

Following this introductory material, this submission includes a series of tabbed sections with a written screening analysis for each of the potential alternatives.

II. LIST OF POTENTIAL ALTERNATIVES CONSIDERED

The following is a list of the potential alternatives to the Proposed Project and the Proposed Project site considered in this screening analysis, including CEQA's required "No Project" alternative.

Noise Reduction Alternative/No Helistop

Emissions Reduction Alternative/No Soil Surcharge

Reduced Project Alternative I (70 Bed Hospital Without Accompanying Facilities)

Reduced Project Alternative II (All Onsite Facilities Reduced)

Reconfigured Alternative

Chanate Alternative

No Project Alternative (Hospital Closure)

Decentralized Alternative

Airport Business Center Alternate Site

Shiloh Road/101 Alternate Site

Todd Road/Moorland Alternate Site

Wick Property Alternate Site (Santa Rosa/Todd)

Guerneville Road/Lance Drive Alternate Site

Ring Property Alternate Site

101/Todd Road NW Alternate Site

North Point Corporate Center Alternate Site

Fountaingrove Executive Center/Old Redwood Highway Alternate Site

Westwind Business Park Alternate Site

Southwest Corner 101/Shiloh (West) Alternate Site

Southwest Corner 101/Shiloh (East) Alternate Site

Airway Drive Alternate Site

Two Bridges Property Alternate Site

Fountaingrove Winery Alternate Site

Fulton Road Alternate Site

Roseland Shopping Center Alternate Site

Warrack Hospital Alternate Site

West Third Street Properties Alternate Site

III. SUGGESTED SCREENING CRITERIA

This section sets forth suggested criteria for screening the potential alternatives, for the County's consideration. These criteria are based upon factors set forth in CEQA and in the CEQA Guidelines.

The California Environmental Quality Act (CEQA) requires that an EIR compare the effects of a "reasonable range of alternatives" to the effects of the project. The alternatives selected for comparison should be those that would attain most of the basic objectives of the project and avoid or substantially lessen one or more significant effects of the project (CEQA Guidelines § 15126.6). The range of alternatives to be compared is governed by a "rule of reason" which requires the EIR to set forth only those alternatives necessary to permit an informed and reasoned choice by the decision-making body and informed public participation (CEQA Guidelines § 15126.6(f)). CEQA generally defines "feasible" to mean an alternative that is capable of being accomplished in a successful manner within a reasonable period of time, while also taking into account economic, environmental, social, technological, and legal factors. Based upon the CEQA statutory and Guideline provisions governing the reasonable range of alternatives to be evaluated in an EIR, the following factors could be considered by the County in evaluating the potential alternatives and determining which alternatives should be evaluated in the EIR:

1. The extent to which the alternative would accomplish most of the basic objectives of the Proposed Project;

2. The extent to which the alternative would avoid or lessen any of the identified potentially significant environmental effects of the Proposed Project;

3. The feasibility of the alternative, taking into account site suitability, availability of infrastructure, property control (ownership), and consistency with applicable plans and regulatory limitations;

4. The extent to which an alternative contributes to a "reasonable range" of alternatives necessary to permit a reasoned choice; and

5. The requirement of the CEQA Guidelines to consider a “No Project” alternative and to identify an environmental superior alternative in addition to the no-project alternative (CEQA Guidelines § 15126.6(e)).

Project Objectives

Sutter presented its Project Objectives to the County as part of its February 2, 2009 clarified Proposal Statement (now dated March 5, 2009). Although the extent to which an alternative meets Project Objectives is one of the suggested screening criteria based on the CEQA Guidelines, this screening analysis considers a number of potential alternatives and alternate sites which would not meet these objectives or would meet these objectives only to a limited extent. The objectives as set forth in the Proposal Statement are the following:

6. To provide a new Sutter Medical Center of Santa Rosa ("Sutter Medical Center") hospital and Medical Campus in Sonoma County that promotes new, accessible and innovative health care models and that complies with the requirements of the Hospital Facilities Seismic Safety Act (including Senate Bill 1953 and Senate Bill 1661, and the statutory requirements for submission of building plans to the Office of Statewide Health Planning and Development by January 1, 2009 and commencement of construction by January 1, 2011). This level of health care will be made available to Sonoma County residents by incorporating advanced technologies available for diagnosis and treatment in a new, modern hospital through an

integrated Medical Campus that supports the continuous delivery of high quality, cost effective healthcare services.

7. To provide a high-quality integrated development that promotes the interaction of the Medical Campus and the Wells Fargo Center for the Arts in a synergistic manner that incorporates the fine arts as part of the healing process at the Medical Campus. The provision of an integrated Medical Campus and the interaction between that Medical Campus and the Wells Fargo Center are fundamental to attracting physicians and other medical professionals, as well as attracting patients to the Medical Campus.

8. To ensure that the Sutter Medical Center is constructed in a manner that honors the Health Care Access Agreement with Sonoma County, while achieving a level of development intensity that will allow the Medical Campus to be developed in a cost-effective manner.

9. To provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center.

10. To ensure that the Medical Campus is efficiently designed and of sufficient size, and connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

11. To the extent consistent with the fundamental objective of providing integrated delivery of health care services, to construct a Medical Campus that meets the *Sutter Health Facility Planning and Development Building Design Policy for Sustainability* with respect to site selection, water efficiency and conservation, energy efficiency, material and resource efficiency and environmental air quality. The proposed Medical Campus will strive to meet these policies by employing "green" and sustainable design and construction practices to achieve goals including maximizing green space, employing energy efficient hospital design, stressing water conservation and implementing a construction waste management and recycling plan for all construction components. Sutter will seek to partner with public and private service providers such as PG&E to achieve these sustainability goals.

12. To provide a Medical Campus linked to the LBMF in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing

environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

13. To allow for uninterrupted operation of medical services currently provided at Sutter's Chanate campus and maintain continuity of care.

14. To provide an emergency entrance to the Sutter Medical Center close to US 101 and to design the overall Medical Campus in a manner that facilitates ambulance access from US 101.

15. To provide a Medical Campus in Sonoma County on property owned by or available to Sutter, which includes:

   - A 70-bed Sutter Medical Center that complies with the Hospital Facilities Seismic Safety Act and the existing Health Care Access Agreement between Sutter and the County of Sonoma, providing inpatient services including obstetrics, a Level III neonatal intensive care unit, intensive care, emergency services, medical/surgical and diagnostic services, supporting ancillary services, and a full range of women's reproductive health services.

   - A Central Utilities Plant to service the Medical Campus that meets the requirements of the Hospital Facilities Seismic Safety Act.

   - A 28-bed Physicians Medical Center that will comply with the Hospital Facilities Seismic Safety Act and provide 24 hour inpatient care, including medical, nursing, surgical, intensive care, anesthesia, laboratory, radiology, and pharmacy services.

   - A visually unobtrusive helistop that meet the functional needs of the Medical Center, with controlled access to ensure public safety during helicopter landing and take-off, which complies with all applicable regulatory and life safety requirements for helistops and helicopter travel, including, but not limited to, Federal Aviation Administration and Caltrans Division of Aeronautics requirements for flight path obstruction clearance.

   - A Medical Office Building that can accommodate physicians affiliated with Sutter Medical Foundation North Bay, as well as independent physicians, and provide supplemental hospital services to support the Sutter Medical Center and Physicians Medical Center.

16. To further the LBMF's nonprofit mission to enrich, educate, and entertain the community through the arts through accessible and outstanding presentation of fine arts and entertainment performances, contemporary art exhibitions, family and education programs and facility-based services.

17. To revise LBMF's existing Use Permit to allow for certain single-day community events on the East Lawn and certain outdoor sales events on the South Lawn in compliance with the County's General Plan sound limits and County and State permit requirements.

Considerations Regarding Parcel Size, Configuration and Accessibility

In developing suggested criteria for screening the potential alternatives for the County's consideration, Sutter also reviewed its 1999 Sutter Medical Center Master Plan, a document which assessed the parcel size, configuration and accessibility appropriate for a replacement site for the Sutter Medical Center.

The 1999 Master Plan evaluated the potential construction of a 174-bed replacement hospital for Sutter Medical Center of Santa Rosa at its current Chanate Road site, or on a new site. This Master Plan considered only the development of a replacement hospital, and in determining how much land would be needed to construct the hospital on a new site specifically did not evaluate development of a Medical Office Building.

The Master Plan concluded that desirable qualities for a new site would include the following:

- The new site should be located closed to US 101 and be near a freeway exit

- In addition to good freeway access, the site should have access from streets on at least two sides. This would allow for the separation of service and emergency vehicles from patient, visitor and staff traffic.

- Based on the Master Plan study the site should have a minimum of 18 acres to accommodate what was then described as a full program (174 beds and 360,000 SF), allow for expansion and avoid the initial need for parking structures. If a Medical Office Building were desired on the Medical Center site additional land would be required to accommodate the building and its parking.

- The site should have a regular shape. An elongated, narrow shape cannot be as efficiently developed even if it has the required area.

- Sites with extreme topography should be avoided. However, it is not necessary that the site be flat.

Significant Impacts Relevant to Selection of Alternatives

One of the primary considerations in selecting alternatives for evaluation in the EIR should be whether the alternative would avoid or substantially lessen one or more significant effects of the project. The analysis submitted to the County on February 2 in the summary environmental checklist and the various detailed attachments indicates that the Project would result in the following impacts which are anticipated to be significant and unavoidable impacts (i.e., impacts for which no feasible mitigation measures are identified to reduce the impact to a less-than-significant level):

- Helistop Operational Noise Impacts on the Adjacent Land Uses
- Temporary Regional Air Quality Impacts Associated with Importing Fill
- Cumulative Traffic Impacts

In addition, as noted below in section III.C, it may be appropriate to consider alternatives that reduce other potentially significant impacts, even if those impacts are not anticipated at this time to be significant and unavoidable impacts of the project.

Although the primary aim of an alternatives analysis in an EIR is to reduce or avoid significant and unavoidable impacts identified with the Project, the Guidelines generally authorize lead agencies to consider alternatives that "avoid or substantially lessen any of the significant effects of the project." On this basis, it may also be appropriate to consider other environmental impacts in addition to those which have been identified at this point as significance and unavoidable, even if it appears that the impacts can be mitigated to a less than significant level based on the mitigation measures identified in the environmental checklist and accompanying technical studies submitted on February 2. Also, as the County's environmental impact analysis proceeds, the conclusions regarding the significance of various impacts may be revised.

CEQA-Required "No Project" Alternative

As indicated in the discussion of CEQA Guidelines, above, consideration of a "no project" alternative is required. "The purpose of describing and analyzing a 'no project' alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project." Also, the "no project" alternative is "not the baseline for determining whether the proposed project's environmental impacts may be significant, unless it is identical to the existing environmental setting analysis which does establish that baseline..." (CEQA Guidelines § 15126.6(e).)

A key consideration for the selection of project alternatives to the Project, and for the formulation of the no project alternative required by CEQA, is compliance with the Alquist Act and SB 1953. These statutes mandate the replacement or seismic retrofit of existing acute care hospital facilities that do not meet current earthquake-resistant standards for hospitals. If this requirement is not met, a non-complying acute care hospital must be closed. Under the CEQA Guidelines, if the failure to proceed with the proposed project would not preserve existing environmental conditions, then the no project alternative should identify the practical consequence of not approving the project. (CEQA Guidelines § 15126.6(e)(3)(B).) Under these provisions, the No Project alternative would consist of a decision not to proceed with the construction and development of the proposed Project, and the closure of the existing Sutter Medical Center at Chanate Road.

IV. BASIS FOR INCLUDING POTENTIAL ALTERNATIVES IN THIS SCREENING ANALYSIS

The following discussion summarizes the bases upon which potential alternatives were included in this initial screening analysis. In compiling the potential alternatives to be included in this analysis, the Sutter project team considered a very broad range of potential alternatives and alternate sites, including alternatives which may not substantially meet project objectives and alternatives which may not reduce environmental impacts. The purpose of this screening is to evaluate this broad range of potential alternatives so that the County may determine which of them meet the criteria of the CEQA Guidelines for inclusion and more detailed analysis in the EIR. Those criteria for screening include the extent to which the alternative meets project objectives and reduces environmental impacts. In other words, potential alternatives were not "screened out" of this analysis on the basis that they do not meet project objectives or reduce impacts, but those factors would be a proper basis for the County to apply determining which potential alternatives should be evaluated in detail in the EIR.

CEQA Requirements

As required by CEQA, this analysis includes a “no project” alternative. Under the CEQA Guidelines, the “no project” alternative must describe the circumstance under which the Project does not proceed. The “no project” alternative was also informed by CEQA Guideline section 15126.6(d)(3)(B), which provides that if disapproval of the project under consideration would result in predictable actions by others, that no project consequence should be discussed.

As also required by CEQA, this analysis considers several alternatives developed by Sutter that may avoid or substantially lessen significant effects of the Project. (CEQA Guideline § 15126.6(b).)

Alternatives Suggested By County Environmental Review Staff

During Sutter’s preliminary discussions of potential alternatives, County PRMD staff suggested several potential alternatives that could be considered in the preliminary screening of alternatives for the EIR. Each of these suggestions has been evaluated in this analysis.

Alternate Sites Considered By Sutter’s Siting Advisory Panel

This analysis includes a number of sites which were considered by a Siting Advisory Panel convened by Sutter Health in 2000 and 2001 to discuss possible sites for the location of a new Sutter Hospital for Sonoma County. The sites considered by the Advisory Panel included the Proposed Project site at the Wells Fargo Center. This Advisory Panel was a volunteer panel of local citizens, and the Panel was convened prior to the formulation of the current proposed project. This analysis includes some information on these potential alternate sites that was developed by the Advisory Panel. In response to the County’s suggestion that this screening analysis should include the site evaluated by the Panel, the Sutter project team also conducted its own review for this initial screening analysis, including information relating to the current status of these sites. In some cases, the information available from the Advisory Panel's consideration was limited, as the Panel's records do not always clearly reflect what specific parcels in a given location were under consideration. The Siting Advisory Panel evaluated sites based (i) availability, (ii) proximity to a freeway, (iii) ability to provide helicopter access, (iv) ability to serve the existing Chanate hospital's patient population, (v) accessibility via public transit, (vi) General Plan and Zoning Code designation for medical uses, (vii) suitable infrastructure, and (viii) cost. The Advisory Panel's evaluation was one part of Sutter's thorough evaluation of potential sites, and that overall evaluation by Sutter led to the decision to purchase the Wells Fargo Center site.

Sites Identified By Sutter In 2009

Sutter also developed a further list of alternate sites in order to provide a thorough evaluation of potential alternate sites to be considered in the screening analysis for EIR and those sites are included in this analysis.

INITIAL SCREENING ANALYSIS OF POTENTIAL PROJECT ALTERNATIVES

Noise Reduction Alternative/No Helistop

Alternative Address/Location: 50 Mark West Springs Road, unincorporated Sonoma County, north of Santa Rosa (the Proposed Project Site)

Description of the Alternative: This alternate consists of the Project as proposed, except that the helistop is not included. Patients who would otherwise arrive by helicopter would instead arrive at the Sonoma County airport and would be transported by ambulance to the Medical Campus (Sutter Medical center or Physicians Medical Center).

Reason for Evaluating this Alternative: This alternative is included in the screening analysis because it will reduce two of the potentially significant impacts that would result from development of the project as proposed. Adoption of a project alternative that does not include the helistop would avoid two noise related impacts identified as significant and unavoidable impacts in the summary environmental checklist and supporting materials submitted to the County by Sutter on February 2. These two impacts are helistop operational noise impacts on adjacent land uses resulting from annoyance and sleep disturbance, and helistop operational noise impacts on the project site.

Screening Evaluation:

Environmental Impacts:

As noted above, this alternative would reduce two significant noise related impacts. Most remaining impacts of this alternative would be substantially similar to the impacts of the Proposed Project.

However, elimination of the helistop from the Proposed Project would result in increased ambulance service from the Sonoma County Airport to the Project site, a path which is primarily along Highway 101. This would result in an increase in interruptions (approximately 170 per year) to normal traffic flow along the 4 mile path between the Airport and Sutter Medical Center.

Project Objectives:

Elimination of the helistop from the Proposed Project would result in delay in treatment of patients who would otherwise be brought directly to the Sutter Medical Center or Physicians Medical Center via helicopter. Patients would be diverted to Sonoma County Airport before they could be transported, via ambulance, to the Medical Center. The trip from the Sonoma County Airport to the Project site is 4 miles. This trip, depending upon traffic, can take as little as 7 minutes, or as much as 20 minutes in commute traffic. This could result in negative impacts to patient outcomes and would undermine Sutter's goal to provide high quality care.

This alternative would also substantially reduce Sutter's ability to provide the medical services set forth in the Health Care Access Agreement.

Emissions Reduction Alternative/No Soil Surcharge

Alternative Address/Location: 50 Mark West Springs Road, unincorporated Sonoma County, north of Santa Rosa (the Proposed Project Site)

Description of the Alternative: This alternative consists of the Project as proposed, except that the Project would include driven piles, instead of surcharging the property.

Reason for Evaluating this Alternative: This alternative is included in the screening analysis because it could avoid a potentially significant impact of the project as proposed. As noted in the summary environmental checklist submitted on February 2 (page 8), the daily emissions associated with haul truck trips needed for surcharging the site would be considered significant. By using driven piles to meet seismic safety requirements, instead of soil surcharging, this alternative might avoid that significant impact.

Screening Evaluation:

Environmental Impacts:

This alternative would eliminate some truck trips associated with soil surcharging and therefore would reduce emissions of NOx, ROG and PM_{10} related to those truck trips. Accordingly, the significant and unavoidable air quality impact would be reduced. However, the air quality impact would remain significant and unavoidable. This is because, of the total amount of surcharging (approximately 100,000 cubic yards) required by the Proposed Project, almost 3/4 of that amount would still be required to raise and prepare the site for construction. Given that approximately 75,000 cubic yards of fill would still be required, the air quality impacts related to both NOx and PM_{10} would drop by approximately 1/4, to approximately 180 pounds/day, and ROG to 13.5 pounds/day. Based on the BAAQMD Threshold of Significance for those emissions, this alternative's air quality impacts would remain significant and unavoidable.

Also, to construct OSHPD-compliant structures on the site, an alternative form of seismically safe foundation would be required. This alternative form of foundation construction would involve the drilling of piles. Pile driving would require up to 1,800 driven piles and the time required for pile-driving would be approximately 8 months. Noise and vibration associated with pile driving are significant environmental concerns. Vibration impacts from pile driving have been determined not to be a potentially significant environmental impact as nearby sensitive receptors are located a sufficient distance from the pile driving (see Impact XI.2 in the summary environmental checklist). Noise impacts, however, would be significant and unavoidable (Impact XI.9b in the checklist), even after implementation of mitigation.

Project Objectives:

Surcharging has been approved by OSHPD as part of its review of site design of the Proposed Project related to seismic safety. If surcharging is not an option, then pile driving will be required. This would necessitate complete resubmittal to OSHPD, and would delay the Project by months, if not years.

As a result this alternative would also substantially reduce Sutter’s ability to provide the medical services set forth in the Health Care Access Agreement.

Reduced Project Alternative I (70 Bed Hospital Without Accompanying Facilities)

Alternative Address/Location: 50 Mark West Springs Road, unincorporated Sonoma County, north of Santa Rosa (the Proposed Project Site)

Description of the Alternative: This alternative consists of a proposed 70 bed Sutter Medical Center, a central utilities plant to service the Medical Center, and a helistop to service the Medical Center, but does not include an accompanying Physicians Medical Center or a Medical Office Building.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis at the suggestion of County PRMD staff.

Screening Evaluation:

Environmental Impacts:

Under this alternative, all impacts related to site disturbance and operations (e.g. traffic and parking, operational noise, hydrology and water quality, demand for public services and utilities, etc.) would be reduced by a little more than half (57%). Further, depending upon building locations, impacts to nearby biological resources (on-site wetlands) could be avoided. This alternative would also reduce impacts related to construction, as there would be fewer buildings covering a smaller footprint on the site. However, impacts to geology or soils, cultural resources, land use and planning, mineral resources, population and housing would not be markedly different from that of the proposed project.

This alternative would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as a significant portion of that fill would still be required. Noise impacts associated with the helistop would remain significant and unavoidable, and traffic impacts, while dispersed over a larger area (including trips to other medical support services such as x-rays, labs, medical offices etc. that would likely be constructed near the 70-bed hospital), would remain regionally significant.

Project Objectives:

This alternative would make it difficult for the Sutter Medical Center to provide integrated care among services in different settings: 1) physician/medical office-based care; 2) outpatient services (e.g. outpatient surgery, outpatient imaging and emergency services); 3) inpatient (hospital services). A single co-located medical campus is more convenient for patients, physicians, visitors and employees and reduces duplications of services.

Reduced Project Alternative II (All Onsite Facilities Reduced)

Alternative Address/Location: 50 Mark West Springs Road, unincorporated Sonoma County, north of Santa Rosa (the Proposed Project Site)

Description of the Alternative: This alternative reduces the intensity of all of the major components of the proposed project. The alternative assumes that soil surcharging would be conducted, as with the Proposed Project, and includes a helistop for purposes of providing access to neonatal intensive care patients and cardiac care patients. For purposes of this screening analysis, this alternative is assumed to consist of each component of the Project reduced by 25% to 50%. Thus, this alternative would include a Sutter Medical Center of 35 to 52 beds, a Physicians Medical Center of 14 to 21 beds, and a Medical Office Building of between 40,000 and 60,000 square feet. This alternative is set forth in this analysis at a conceptual level to evaluate whether a reduced protect alternative of this type would meet CEQA criteria for an alternatives analysis, and thus to determine whether this type of alternative should be formulated in further detail for inclusion in the EIR.

Reason for Evaluating this Alternative: This alternative is included in the screening analysis at a conceptual level because an overall reduced intensity alternative is often considered for evaluation in environmental impact reports as a potential means of reducing environmental impacts.

Screening Evaluation:

Environmental Impacts:

This alternative would reduce all impacts of the project by 25%-50%. It would reduce the cumulative traffic impacts associated with the Proposed Project, as there would be fewer vehicle trips to and from the Project site, but this alternative is not expected to reduce such traffic impacts to a less than significant level. This alternative would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that fill would still be required. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop. This alternative would thus not avoid any of the significant and unavoidable impacts of the Project, although there would be some reduction in cumulative traffic impacts.

Project Objectives:

This alternative would substantially reduce Sutter's ability to honor the Health Care Access Agreement, as a Sutter Medical Center of 35 to 52 beds is not sufficient to provide the health care services that are envisioned in the Health Care Access Agreement.

Reconfigured Alternative

Alternative Address/Location: 50 Mark West Springs Road, unincorporated Sonoma County, north of Santa Rosa (the Proposed Project Site)

Description of the Alternative: This alternative would consist of a reconfiguration of the proposed components of the Project on the Project site. This alternative is set forth in this screening analysis at a conceptual level of detail in order to determine whether a reconfigured alternative should be developed at a further level of detail and evaluated in the EIR. Typically a reconfigured alternative is evaluated when the location of particular project components results in significant environmental impacts, or when the placement of project components affects particular environmental resources on the Project site. For example, a reconfigured alternative could be developed to avoid the large wetlands identified on the site. Alternatively, a reconfigured alternative could be developed to create greater setbacks from adjacent land uses or otherwise reconfigure the project to avoid aesthetic or land use compatibility issues with adjacent land uses.

Reason for Evaluating this Alternative: A reconfigured project alternative is one of the types of alternatives that are often evaluated for inclusion in EIRs as a potential means of reducing project impacts.

Screening Evaluation:

Environmental Impacts:

A reconfigured project alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. This is primarily because the impacts of the Proposed Project that are associated with the placement of various elements of the Project on the Project site are already less than significant. For instance, after mitigation, the Project would not result in significant wetland or other biological impacts, or land use compatibility impacts. Addressing such less than significant impacts by reconfiguring the Project to, for instance, increase setbacks, would require either greater building height, or construction of a parking structure, or both. Such changes would increase the aesthetic impacts of the Project. Also, to the extent that the Proposed Project may result in any significant aesthetic impacts, the reconfiguration of multi-story buildings would be unlikely to lessen those impacts, because the medical campus portion of the site would still be converted from a relatively open site to a site developed with several multi-story buildings and parking.

Project Objectives:

A reconfigured alternative would include all of the services of the Proposed Project and so would meet all Project Objectives.

Chanate Alternative

Alternative Address/Location: 3325 Chanate Road, Santa Rosa

Description of the Alternative: Under this alternative, the 1956 and 1972-era structures at the Sutter Medical Center of Santa Rosa on Chanate Road would be seismically retrofitted to meet Structural Performance Category (SPC)[1] 2 and Non-structural Performance Category (NPC) 3.[2] The 1991-era and later acute care buildings would receive non-structural retrofitting. The site's 2002 and 2004-era buildings would continue to be used for patient care and would not be retrofitted. The 1936-era building would be used for non-acute care and office purposes and would not be retrofitted.

Reason for Evaluating this Alternative: This alternative is included in the screening analysis because some members of the community have suggested at various times that the Sutter Medical Center be kept at its current site on Chanate Road. It is also included because a site re-use alternative is often considered for evaluation in environmental impact reports as a potential means of reducing environmental impacts. Also, PRMD staff suggested including this alternative in the screening analysis.

Screening Evaluation:

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[1] SB 1953 required hospitals to evaluate and apply for ratings to the Office of Statewide Health Planning and Development (OSHPD) for seismic performance and non-structural performance. Structural performance Category (SPC) ranges from SPC-1, non-conforming, SPC-2, conforming to 2030, and SPC-3 through 5, facilities that are authorized for permanent use.. Non-structural Performance Categories (NPC) each cover a different category of non-structural element or different locations with a hospital. NPC 2 through 4 are considered steps towards full compliance and NPC-5 adds further elements that are needed for full compliance.

[2] The 1999 Sutter Master Plan considered the re-use of the Chanate site for a 174-bed replacement hospital. The Master Plan concluded that the need to keep the hospital operational during construction would require phased construction taking approximately 13 years to complete. It also concluded that "the lack of adequate site area, particularly in the initial phases of construction, and the need for up to nine acres of surface parking to support the proposed program demands consideration of a higher-density, more 'urban' alternatives. These alternatives include high rise construction (greater than four floors), large parking structures, and relatively little landscaped open space on the site." However, it did not evaluate the need for construction to the standards imposed by Hospital Facilities Seismic Safety Act and so the Master Plan on-site proposal is not considered as a potential alternative in this Screening Analysis.

- The Chanate campus acute care facilities are subject to the compliance requirements of the Hospital Facilities Seismic Safety Act as amended by Senate Bills 1953 and 1661.
- The Chanate campus is comprised mostly of aged buildings that carry a non-conformance seismic performance rating of SPC-1.
- In 2005, Sutter applied for, and received, extensions on its SB 1953 compliance deadline until January 1, 2013.
- Under SB 1953, if the Chanate campus' acute care facilities are seismically retrofitted to an interim seismic standard of SPC-2 by January 1, 2013, the facilities will be compliant with Hospital Facilities Seismic Safety Act through 2030.
- The seismic retrofit activities required to achieve the interim seismic standard of SPC-2 would require a variety of significantly disruptive activities, including the removal of portions of the exterior walls of the acute care facilities to allow for the welding of steel plates, the construction of internal shear walls, and the filling-in of windows. The activities would also include extensive reworking of infrastructure to achieve an NPC-3 rating at building separations. These activities would require shutting down sections of the hospital during construction, resulting in the displacement of hospital beds and the need to relocate patient care during the duration of the retrofit work.
- In May of 2008, Rutherford & Chekene, the engineering and structural geotechnical firm that evaluated and classified the Chanate campus structures for SB 1953 purposes, submitted an update to Sutter concerning the potential retrofit of the Campus to interim seismic standard SPC-2. They informed Sutter that the Chanate site has been confirmed by the California Geological Survey as having a "high potential for fault rupture," and has been classified by OSHPD to "have potential for fault rupture."
- Rutherford & Chekene have advised Sutter that it would not be able to retrofit the Chanate acute care facilities to interim seismic standard SPC-2 unless it 1) it demonstrates to OSHPD that there are no faults under the acute care facility structures or 2) identifies the location of faults under the acute care facility structures and receives approval from OSHPD for to retrofit those facilities to SPC-2. Extensive (10 feet deep or more) trenching around the entirety of the existing acute care facilities would be necessary to evaluate the potential for fault rupture. If faults were identified, Rutherford and Chekene have advised that obtaining OSHPD approval for retrofit would be "difficult." OSHPD has never approved operation of an acute care facility constructed on a fault.
- The Chanate site is within the "PI" (Public/Institutional) General Plan land use category. Hospitals are appropriate land uses within this category.
- The site is within the "PI" (Public and Institutional) Zone District and hospitals are permitted by Conditional Use Permit. The maximum building height limit is 35 feet.

- This site is surrounded by residential and medical uses.

Environmental Impacts:

Even assuming that OSHPD would permit continued operation of acute care facilities on a fault, this alternative could expose people and structures to potential substantial adverse effects associated with the rupture of earthquake faults.

The noise generated by existing helicopter operations at the Chanate facility would continue. Given that the site it surrounded by residential uses, the construction-period traffic would likely result in significant traffic impacts near the site.

Project Objectives:

Implementation of this alternative would significantly impact Sutter's ability to provide for uninterrupted operation of medical services at Sutter's Chanate campus, and could therefore substantially impede Sutter's ability to maintain continuity of care.

Continued operation of an acute care facility located on a fault has never been approved by OSHPD, nor has OSHPD reviewed a proposal for an interim seismic upgrade to the Chanate campus. If OSHPD would approve such a plan, it would necessitate the submittal to OSHPD of plans for an as-yet-undetermined approach to assure seismic safety for an acute care facility on a fault, and would delay the Project by months, if not years. As a result this alternative would substantially reduce Sutter's the ability to provide the medical services set forth in the Health Care Access Agreement.

Under this alternative, the acute care operations at Chanate will only be in compliance with the Hospital Facilities Seismic Safety Act until 2030.

No Project Alternative (Hospital Closure)

Alternative Address/Location: Under this alternative, no project would be developed at any address or location, and the existing Sutter Medical Center of Santa Rosa at 3325 Chanate Road would be closed.

Description of the Alternative: Under this alternative, the Proposed Project would not be constructed, and the existing Sutter Medical Center of Santa Rosa at 3350 Chanate Road would be closed in accordance with the Hospital Facility Seismic Safety Act and SB 1953. These statutes mandate the replacement or seismic retrofit of existing acute care hospital facilities that do not meet current earthquake-resistant standards for hospitals. If this requirement is not met, a non-complying acute care hospital must be closed.

Reason for Evaluating this Alternative: This alternative is included in the screening analysis because evaluation of the No Project alternative is required by CEQA. Under the CEQA Guidelines, the no project alternative must describe the circumstances under which the project does not proceed. CEQA Guideline § 15126.6(d)(3)(B) states that, if disapproval of the project under consideration would result in predictable actions by others, that "No Project" consequence should be discussed. "Where failure to proceed with the project will not result in preservation of existing environmental conditions, the analysis should identify the practical result of the project's non-approval and not create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment."

Screening Evaluation:

Environmental Impacts:

This alternative eliminates all potential impacts associated with the Proposed Project, as well as eliminating all impacts associated with the operation of the existing Sutter Medical Center on Chanate Road. However, it is expected that the closure of the existing Sutter Medical Center would result in the redistribution of patients to Santa Rosa Memorial Hospital and other regional hospitals. Accordingly, the traffic impacts of the Proposed Project would be redistributed throughout the region. Impacts could be greater at some already impacted locations. Helicopter noise impacts would be transferred to already existing hospitals. Air emissions impacts would be reduced to less than significant levels.

Project Objectives:

The "No Project" alternative would not provide any of the services of the Proposed Project, and so would fail to meet all Project Objectives.

Decentralized Alternative

Alternative Address/Location: Conceptual

Description of the Alternative: This alternative proposes the construction on the Proposed Project site of a 70-bed Sutter Medical Center hospital and a 50,000 square foot medical office building. Additionally, a 28-bed Physicians Medical Center and a 50,000 square foot medical office building would be constructed on an undetermined separate site. Each hospital facility would include a helistop, as it would be needed to provide for patient access. Further, each facility would include a central utility plant (smaller than the one proposed for the Project) and parking facilities, (also smaller than those included in the Proposed Project). This alternative is set forth in this analysis at a conceptual level to evaluate whether an alternative of this type would meet CEQA criteria for an alternatives analysis, and thus to determine whether this type of alternative should be formulated in further detail for inclusion in the EIR.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because consideration of split site or dispersed alternatives for possible inclusion in the EIR was suggested to Sutter by County PMRD staff.

Screening Evaluation:

Environmental Impacts:

Development of this alternative would require the construction of facilities at two locations. It will result in increased development and may increase traffic over the levels of the Proposed Project where patients must make trips to both locations. It will also result in dispersed as well as possibly increased helicopter use (with its associated noise impacts), a decrease in energy savings (as construction of two facilities will eliminate many of the efficiencies that are possible under the Proposed Project based on the co-location of related medical uses), and increased emission of greenhouse gases (due to increased traffic and decreased site development efficiencies).

Project Objectives:

This alternative would significantly undermine Sutter’s ability to construct an efficiently designed Medical Campus of sufficient size, and connectivity to provide the most modern and efficient layout for the integrated delivery of health services. It will reduce Sutter’s ability to promote functional relationships among departments, services and programs, and will not allow for the provisions of functional circulation within the inpatient and outpatient spaces.

This alternative would undermine Sutter’s ability to construct a Medical Campus that meets the *Sutter Health Facility Planning and Development Building Design Policy for Sustainability*. The construction of two facilities at different locations will eliminate the efficiencies Sutter would have otherwise achieved through the integrated design of the Proposed Project. Specifically, it will substantially reduce Sutter’s ability to employ “green” and sustainable design and construction practices to achieve goals including maximizing green space, employing energy efficient hospital design, stressing water conservation and implementing a construction waste management and recycling plan for all construction components.

Airport Business Center Alternate Site

Alternative Address/Location: 1631 Airport Boulevard. The site is in the unincorporated area of Sonoma County, but within a designated urban services area. The area is commonly known as the Airport Specific Plan area of the County

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 24.3 acre vacant site. This site on the north side of Airport Boulevard, has access off Skylane Boulevard via Aviation Boulevard. The site is still vacant, but has received a Tentative Map entitlement, and final map approval and recording is expected by June, 2009. The site is comprised of 2 parcels and is narrow (500' wide) and 2,500± feet long. This site is not owned by Sutter

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. Since that time, the site has been sold and, as noted above, is currently being considered for development as part of the larger business park.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews, as well as further review in 2009 yielded the following information:

- The site is currently the subject of an active development application that is being processed through Sonoma County PRMD by a developer to subdivide into individual lots for business/industrial park development.
- There is a Tentative Map for the site, for Business Park uses with a pending Final Map.
- The site is not located along Highway 101 corridor and is not visible from Highway 101.
- The site is long and narrow and is not conducive to a hospital campus configuration. Altering this would require assemblage of adjoining parcels under separate ownership. The adjacent parcels have historically not been for sale.
- Development of this site would potential require a General Plan Amendment (GPA). Airport Land Use Commission (ALUC) approval would also be required as the site is within the airport Turning Pattern Zone (TPZ).
- The site contains potential wetlands acreage on its north area, and so a detailed Biological Assessment would be required.
- The site would be split by the County's planned future extension of Aviation Boulevard.

- While utility services are available, upgrades or extension of all utilities would be required.
- The site's surrounding uses consist of a moderately dense business park.
- The site is close to Sonoma County Airport and this is subject to high airport noise levels.
- The site has possible liquefaction issues.
- The site is accessible by Sonoma County Transit via a transit stop at Airport Boulevard at Brickway (approximately 500' from the site).
- Development of this site would not displace any residences.

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Finally, it would likely have similar cumulative traffic impacts to the Proposed Project.

Given the unusual configuration of the site, the site may need to be developed a density greater than indicated in Sutter's Project Proposal. Accordingly, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Given the narrowness of the site, implementation of this alternative would impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

The constrained nature of the site could also impair Sutter's ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

Shiloh Road/101 Alternate Site

Alternative Address/Location: On Shiloh Road at the southeast corner of Shiloh Road at Highway 101. The site is within Town of Windsor limits, and is a part of the Shiloh Corridor Vision Plan.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 27 acre site is vacant with limited agricultural uses. The site is still undeveloped and is presumed available. This site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site contains 14.3 acres of confirmed wetlands, seasonal streams, and creek setbacks.
- The site may contain California Tiger Salamander and other protected species including nesting birds.
- A detailed biological assessment would be required.
- The floodplain encroaches on the site, such that development would require fill and offset of lost flood plain storage volume at another location.
- Development of the Proposed Project at the site would require the construction of significant local and regional road improvements, including the replacement and widening of Shiloh Road where it crosses over Highway 101, as well as related off-ramp and signal improvements.
- The Windsor Zoning Map on the Town's website shows approximately the western half of the property as RMU (Regional Mixed Use), the northeastern corner of the property as BMU (Boulevard Mixed Use) and the southeastern corner of the property at CR-24 (Compact Residential, 12-24 units). Section 27.10.020 of the Windsor Zoning Ordinance refers to RMU and BMU as general plan designations, with Regional Commercial and Boulevard Commercial as the comparable zoning designations. Under the Zoning Code, hospitals are allowed with a use permit in the regional commercial and boulevard commercial zones, but heliports are not allowed. Neither a hospital nor a heliport is allowed in the CR zone.

- The site has possible liquefaction issues.
- While utility services are available, upgrades or extension of all utilities would be required.
- The site has agricultural potential.
- Development of this site would not displace any residences.
- The site is accessible by Sonoma County Transit at Shiloh Road at Old Redwood Highway (approximately 1,000' from the site) with no sidewalk access.
- The site adjoins Highway 101 and has good visibility and access.

Environmental Impacts:

Development of this site would likely result in significant biological impacts related to impacts to wetlands, bird species, and California Tiger Salamander habitat. It would likely result in increased construction impacts associated with the replacement of the existing Highway 101 overpass that would be necessary to provide adequate access to the site. There might also be a variety of additional construction impacts associated with the fill required to raise the site above the floodplain (and off-site offsets to result in zero net fill).

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Finally, it would likely have similar cumulative traffic impacts to the Proposed Project.

Project Objectives:

Assuming that all elements of the Proposed Project can be developed on this alternative site, it would appear to generally meet the Project Objectives.

Todd Road/Moorland Alternate Site

Alternative Address/Location: 801, 3809 & 3901 Moorland Avenue. The site is under County jurisdiction, but within the Urban Growth Boundary of the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 19.9 acre site. The site is mostly vacant, with existing limited agricultural uses. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. The Panel considered the site to be too far south.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site has an awkward modified "L" configuration.
- The site contains an identified breeding pool for California Tiger Salamander and so a detailed Biological Assessment would be required.
- The site is zoned M1 SR VOH and M3 VOH and designated under the General Plan as Rural Residential. These General Plan and zoning designations do not permit hospital uses.
- The site is surrounded by agricultural, light and heavy industrial uses.
- The site is subject to potential noise from passing Northwestern Pacific Railroad (NWPRR) train traffic, although there is no direct train service access to the site.
- Development of the site will require annexation into the City of Santa Rosa in order to obtain utility services.
- While utility services are available, upgrades or extension of all utilities would be required.
- Development of the site would like require widening of Moorland Ave and related signal reconfigurations.
- Development of this site would not displace any residences.
- There is room for expansion of this site to adjacent parcels which are vacant.
- The site is accessible by Sonoma County Transit at Todd Road at Moorland Avenue.

- The site has good visibility from Highway 101, and workable freeway access.

Environmental Impacts:

Development of this site could result in potentially significant impacts to California Tiger Salamander (CTS) and CTS habitat. This alternative would also not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. There is also potential for increased noise impacts from the nearby operations of the Northwestern Pacific Railroad (NWPRR). As well, it would likely have similar cumulative traffic impacts to the Proposed Project.

Because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Given the less than optimal configuration of the site, and unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

The constrained nature of the site could also impair Sutter's ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

Wick Property Alternate Site (Santa Rosa/Todd)

Alternative Address/Location: This site is located south of Todd Road east of Santa Rosa Avenue. The site is in unincorporated Sonoma County, outside the City of Santa Rosa's city limits but within the City's Urban Growth Boundary.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on the 11.6± acre site is vacant and appears landlocked. The site is not owned by Sutter and is currently vacant. The site was recently sold to a new buyer who has no desire to sell at this time.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site has no frontage on Santa Rosa Avenue or Todd Road. As a result, access is very restricted. The site is not visible from Highway 101.
- Even if the site was for sale, acquisition of additional parcels adjacent to the site necessary to provide sufficient acreage to develop the Proposed Project at the density currently proposed would require purchasing land under multiple ownerships.
- Development of the site would require significant local and regional utility and roadway improvements.
- The site is zoned RR10 and designated under the General Plan as Diverse Agriculture. The General Plan and zoning designations do not permit hospital uses.
- The site is surrounded by a mixture of "car lots," automotive services and some retail properties.
- The site is accessible by Sonoma County Transit at Santa Rosa Avenue at Todd Road (approximately 1,600 feet from the site).
- Development of this site would not displace any residences.

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Further, because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

Guerneville Road/Lance Drive Alternate Site

Alternative Address/Location: 1601 & 1696 Lance Drive. The site is comprised of two lots and is an island of unincorporated County territory surrounded by the City of Santa Rosa. This site includes one home with limited agricultural use.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 18.5 acre site. The site will require annexation into the City of Santa Rosa. The site is not visible from Highway 101. The site is not owned by Sutter and is owned by a historically reluctant seller.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is currently zoned AR B6 5, VOH (Valley Oak Habitat) and has been pre-zoned by the City as R1. That City zoning designation does not allow hospital uses.
- In order to provide utility services to the site it would need to be annexed into Santa Rosa, which will require LAFCO approval
- Helicopter service to the site would require overflight of residential areas.
- The site is believed to contain wetlands and would require a detailed Biological Assessment.
- Development of the site would require significant local and regional utility and roadway improvements.
- There is an existing well and septic system on the site.
- The site has agricultural potential.
- The site is accessible by Santa Rosa Transit at Guerneville Road at Lance Drive (approximately 700 feet from the site).

Environmental Impacts:

Development of this site could result in potentially significant biological impacts related to potential wetlands on the site. This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Further, because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Ring Property Alternate Site

Alternative Address/Location: 1700 Hampton Way, Santa Rosa. The site is within the City limits of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on a 18.5± acres site south of and adjacent to Highway 12 and Stony Point Road (old driving range site and adjoining parcels). The site is not visible from Highway 101. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is comprised of two parcels, one long and narrow, and a second in an awkward "L" shape. Neither parcel is conducive to a hospital campus configuration. The two parcels which comprise the site are bisected by a public bicycle path, the Joe Rodota Trail. Altering this would require assemblage of adjoining parcels under separate ownership and these adjoining parcels are not for sale.
- The site is difficult to access. Currently it is accessed via Hampton Way, though there are possible easement issues. Development of this site would require supplemental access from Sebastopol Road or Stony Point Road.
- One of the two parcels which make up this site is currently in use as an "auto dismantler" which could suggest possible environmental remediation issues.
- The site is zoned R-3-15 and designated in the General Plan as General Commercial. Neither the zoning nor General Plan designations permit hospital uses.
- Helicopter service to the site would require overflight of residential areas.
- The site is accessible by Santa Rosa Transit at Stony Point Road at Highway 12, and by Sonoma County Transit at Sebastopol Road at Hampton Way, both adjacent to the site.

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Further, because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Given the awkward configuration of the site, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

Further, the constrained nature of the site could also impair Sutter's ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

101/Todd Road NW Alternate Site

Alternative Address/Location: 237 Todd Road in unincorporated Sonoma County. The site is not within the City of Santa Rosa's city limits, but is within the City's Urban Growth Boundary.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on 11.1± acres of vacant land in the county. The site is not owned by Sutter. Since the original evaluation of this site, it has been sold and is now fully developed, making it no longer available for the project. The site is not visible from Highway 101 and not easily served by Highway 101.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Development of this site would likely impact California Tiger Salamander breeding pools and habitat.
- Helicopter service to the site would require overflight of residential areas.
- The site is adjacent to Recycling Center which could result in noise and odor impacts to the Medical Campus.
- The site is zoned M2 VOH and designated in the General Plan as Rural Residential. Neither the zoning nor General Plan designations permit hospital uses.
- The site is subject to potential noise levels from passing Northwestern Pacific Railroad (NWPRR) train traffic, although there is no direct train access to the site.
- The site is accessible by Sonoma County Transit at Todd Road at Mooreland Avenue (900 feet away).
- Development of this site would not displace any residences.

Environmental Impacts:

Development of this site could result in potentially significant impacts to California Tiger Salamander (CTS) and CTS habitat. This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. There is also potential for increased noise impacts from the nearby operations of the Northwestern Pacific Railroad (NWPRR). This site would likely have similar cumulative traffic impacts to the Proposed Project.

Because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

North Point Corporate Center Alternate Site

Alternative Address/Location: Challenger Way, Mercury Way and Apollo Way, Santa Rosa. The site is within the City limits of the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on 19.96 acres in the Northpoint Corporate Center Business Park. The site is composed of seven parcels. The central parcel has now been developed with office uses by Nokia. The resulting split in the available parcels results in an available northern development area of 11.96 acres. The 14.2 acres south of Mercury Way that were originally available have now also been partially built out. The remaining 8 separate parcels total 13.7 acres. The site is not visible from Highway 101. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. Since that time, as noted above, several of the individual parcels which make up this site have been developed.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Hospitals are not a permitted use in any Residential, Business Park or Industrial Zone District within the City of Santa Rosa. This would effectively preclude a Hospital in the area along Corporate Center Parkway, all within the "BP" (Business Park) Zone District within the "Santa Rosa Corporate Center" (identified by the 2000/2001 Siting Advisory Panel as "Northpoint Corporate Center").
- Helicopter service to the site would require overflight of residential areas.
- While utility services are available, upgrades or extension of all utilities would be required.
- The site is accessible by Santa Rosa Transit at Corporate Center Parkway at Apollo Way, adjacent to the southeasterly portion of the split site.
- Development of this site would not displace any residences.

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This site would likely have similar cumulative traffic impacts to the Proposed Project.

Because the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

Fountaingrove Executive Center/Old Redwood Highway Alternate Site

<u>Alternative Address/Location</u>: 3700 Old Redwood Highway/3569 Round Barn Circle, Santa Rosa. The site is within the City of Santa Rosa.

<u>Description of the Alternative</u>: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 15.59± acre site. This site is located at the western edge of the Fountaingrove Executive Center, on the portion of the Fountaingrove Executive Center that fronts Old Redwood Highway. A substantial portion, approximately three-quarters, of the northern end of this site has been developed since 2001. The site is not owned by Sutter.

<u>Reason for Evaluating this Alternative</u>: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. The site was ruled out from further consideration by the Panel as being too expensive, with too much slope on the land, and not being compatible with other development in the area.

<u>Screening Evaluation</u>:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The remaining portion of the site that is available for development is awkwardly configured.
- The site is zoned and designated in the General Plan for Retail and Business Services. The General Plan and zoning designations do not permit hospital uses.
- The site's extreme topography is incompatible with hospital needs/uses
- The site is adjacent to an existing Cancer Center
- The site accessible by Santa Rosa Transit at Round Barn Boulevard at Round Barn Circle
- The site is visible from the Highway 101 and has acceptable access.
- Development of this site would not displace any residences.

<u>*Environmental Impacts:*</u>

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. As well, it would likely have similar cumulative traffic impacts to the Proposed Project.

Because the remaining developable portion of the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

It is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Westwind Business Park Alternate Site

Alternative Address/Location: 3355 Westwind Boulevard in an unincorporated area of Sonoma County, but within a designated Urban Services area.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on 19.2± acres of vacant land within Westwind Business Park. The site is not visible from Highway 101. Several of the parcels which comprise this site have recently been developed. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is zoned MP 2 VOH and designated in the General Plan as General Industrial. The General Plan and zoning designations do not permit hospital uses.
- Airport Land Use Commission (ALUC) approval would also be required as site is within Turning Pattern Zone (TPZ)
- Development on the site would be subject to airport noise.
- While utility services are available, upgrades or extension of all utilities would be required.
- Development of this site would not displace any residences.
- The site is accessible by Sonoma County Transit at Copperhill Parkway at Westwind Boulevard (approximately 500 feet from the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Further, because the remaining developable portion of the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Southwest Corner 101/Shiloh (West) Alternate Site

Alternative Address/Location: Pruitt Ave and Caletti Ave; no specific addresses assigned. The site is within the limits of the Town of Windsor.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 33± acres site at Southwest corner of Highway 101 and Shiloh Road. The site has difficult access off Shiloh Road and the development area is located south of Standard Structures, necessitating driving past the industrial facility. A portion of the site was recently subdivided, and one parcel was recently developed with FedEx Ground distribution center. Another parcel has been leased to Mead Clark Lumber. The site is highly visible from Highway 101. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. The Panel deemed the site to be too far north

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Development of this site would likely require replacement and widening of the Shiloh Road overcrossing of Highway 101, as well as upgrading of interchange ramps and signals.
- The site is designated Heavy Industrial in the General Plan and zoning ordinances. The zoning and General Plan designations do not permit hospital uses.
- Development of this site would require relocation of operating industrial uses.
- Development of this site would not displace any residences.
- Given that some of the parcels which make up this site contain existing industrial uses, there may be environmental remediation issues.
- Limited flooding issues exist on north and south ends that would require mitigation through channel capacity improvements.
- The site is subject to potential noise levels from passing Northwestern Pacific Railroad (NWPRR) train traffic, although there is no direct train access to the site.
- While utility services are available, upgrades or extension of all utilities would be required including replacement/extensions of existing private utility systems with public systems.

- The site has only marginal freeway access due to configuration of main intersection at Shiloh Road.
- The site is accessible by Sonoma County Transit at Shiloh Road at Conde Lane (approximately 1000 feet from the northwest corner of the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. There is also potential for increased noise impacts from the nearby operations of the Northwestern Pacific Railroad (NWPRR). As well, it would likely have similar cumulative traffic impacts to the Proposed Project.

Project Objectives:

It is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

Southwest Corner 101/Shiloh (East) Alternate Site

Alternative Address/Location: Pruitt Ave and Caletti Ave; no specific addresses assigned. The site is within the limits of the Town of Windsor.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 45.4± acre site. The site is at Southwest corner of Highway 101 and Shiloh Road. It is currently vacant, and has recently undergone a Master Planning process at the Town of Windsor. The site is triangular in shape and shares similar access problems with Alternative S (the adjacent parcel). The site is zoned heavy industrial. The site is highly visible from Highway 101. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site may[3] have been one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001. The Panel deemed the site to be too far north.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Development of this site would likely require replacement and widening of the Shiloh Road overcrossing of Highway 101 as well as upgrading of interchange ramps and signal, and either a westerly offsite roadway extension to Shiloh and Conde Lane or a southerly offsite roadway extension to Aviation Boulevard.
- The site is zoned and designated Heavy Industrial and Light Industrial in the General Plan. The zoning and General Plan designations do not permit hospital uses.
- The site is subject to potential noise levels from passing Northwestern Pacific Railroad (NWPRR) train traffic, although there is no direct train access to the site.
- Limited flooding issues exist on north and south ends that would require mitigation through channel capacity improvements.
- Given that some of the parcels which make up this site contain existing industrial uses, there may be environmental remediation issues.
- Development of this site would not displace any residences.

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[3] In reviewing the Site Advisory Panel's records it was not clear whether this site, or an adjacent parcel, was considered by the Panel. Accordingly, Sutter has included both sites in the screening analysis (see prior analysis of Alternative S).

- The site has only marginal freeway access due to configuration of main intersection at Shiloh Road.
- The triangular layout of the site is not conducive to a hospital campus configuration.
- While utility services are available, upgrades or extension of all utilities would be required including replacement/extensions of existing private utility systems with public systems.
- The site is accessible by Sonoma County Transit at Shiloh Road at Conde Lane (approximately 1000 feet from the northwest corner of the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. There is also potential for increased noise impacts from the nearby operations of the Northwestern Pacific Railroad (NWPRR). Finally, it would likely have similar cumulative traffic impacts to the Proposed Project.

Project Objectives:

Given the awkward triangular configuration of the site, implementation of this alternative could impede Sutter’s ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

The configuration of the site could also impair Sutter’s ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

Airway Drive Alternate Site

Alternative Address/Location: 3833, 3737, 3745, and 3731 Airway Drives, and 1021 Hopper Avenue, Santa Rosa. The site is within the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 22.9 acre site, which is comprised of 5 parcels. Sutter Medical Center operates several medical uses in the northerly parcel (in the "Landmark" Building). The southern most parcel is the site of a self-storage facility and two parcels north of that facility is a residential unit. The site is comprised of several parcels and bisected by a creek. The site is only partially controlled by Sutter and the remaining portions are under multiple ownerships, including at least one historically reluctant seller. The site is visible from Highway 101

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site is one of the sites that was initially considered by the Siting Advisory Panel convened by Sutter in 2000-2001.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Helicopter service to the site would require overflight of residential areas.
- The site is zoned Office Commercial and designated General Commercial in the City's General Plan.
- A portion of the site is bisected by a creek and will require setbacks.
- A detailed Biological Assessment would be required as development of the site could potentially impact nesting birds, steelhead and wetlands.
- Development of the site would displace at least one residence.
- Development of the site would require significant local and regional utility and roadway improvements.
- It appears that there is a large midden on the northerly parcel such that development of the site could result in potential impacts to cultural resources.
- The site is accessible by Santa Rosa Transit by Hopper Lane at Airway Drive adjacent to the southeasterly parcel.

Environmental Impacts:

Development of this site could result in potentially significant biological impacts related to steelhead salmon, wetlands and potentially sensitive plant habitat. It may also result in potential significant and unavoidable impacts to cultural resources which could extend onto the site. This alternative would also to reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Project Objectives:

Given the awkward configuration of the site, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

The configuration of the site could also impair Sutter's ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.

Two Bridges Property Alternate Site

Alternative Address/Location: 300, 303, 400, 410 and 425 Elnoka Lane, Santa Rosa. This site is within the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on a portion of this 66.8± acre site. The site is located on Highway 12 at the site of the former Two Bridges Project. The level portion of the site, 12.8 acres, is the subject of an active development application for a senior development. The remainder of the site is too steep for the uses anticipated by the Proposed Project. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part of Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- Helicopter service to the site would require overflight of residential areas.
- The ridge lines and terrain issues on the site limit the ability to develop that portion of the site which is not already the subject of a development application.
- The site is zoned "PD" and Medium Density Residential and designated in the General Plan as Law and Medium Residential. The Zoning and General Plan designations do not permit hospital uses.
- Access to the southern half of the site is very difficult.
- The site is not visible from Highway 101 and has no direct access route to Highway 101.
- A creek runs through the site and would require setbacks.
- The site is accessible by Sonoma County Transit at Melta Road at Highway 12 (approximately 700 feet from the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Given the limited portions of the site which can be developed due to its steep terrain, the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking. Accordingly, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

Given the development limitations imposed by the terrain of the site, it is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Implementation of this alternative would also significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Fountaingrove Winery Alternate Site

Alternative Address/Location: Round Barn Road, Santa Rosa, within the city limits of the City of Santa Rosa. This site is a part of the Fountaingrove Planned Community.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 36.1± acre site. The site is vacant, with the exception of the historic Fountaingrove Winery. The site is effectively two development areas which, while contiguous, would be impossible to access internally, thereby reducing the developable acreage, or resulting in a split development with two separate accesses off Round Barn Road. The eastern portion of the property has been developed to provide overflow parking for the near by Medtronics plant; the western portion remains undeveloped. The site is not visible from Highway 101 and is only accessible to the Highway via a circuitous route. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part of Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is within the "Business Park' General Plan land use category and within the "PD" (Planned Development) Zone District.
- The site is within "HC" (Highway Tourist Commercial) land use area and the "Winery" portion is within the "Historic Combining Area."
- The land use/development standards are governed by "Fountaingrove Ranch Planned Community District", which consists of a Policy Statement, Land Use and Circulation Plan, and a Development Concept Plan adopted in 1981. The site is shown on the Development Concept Plan as having two separate developable areas, separated by the winery site and by topographic features. The list of permitted uses does not include Hospital. There is a maximum 35' height limit for development on the site.
- The variable topography and ridgelines/tree cover and existing designated open space will constrain site any development of the site, even one structured to accommodate a split site configuration.
- Helicopter service to the site would require overflight of residential areas.

- The site is adjacent to a Cancer Center.
- Development of this site would not displace any residences.
- The site is accessible by Santa Rosa Transit at Round Barn Blvd. at Round Barn Circle.
- Given the slope of the site, development will require construction of a foundation using driven piers.
- The closest public transit is Santa Rosa Transit on Round Barn Boulevard at Round Barn Circle opposite the southwesterly end of the site. There is a second stop at Round Barn Boulevard and Unocal Court adjoining the northwesterly end of the site.

Environmental Impacts:

Development on this alternative site could result in impacts to historic resources on near the site, as well as possibly to the adjacent Cancer Center as a result of the pile driving that would be necessary to construct Proposed Projects on this site. Pile driving would be necessary in order to develop a seismically compliant foundation compatible with OSHPD requirements resulting in fewer emissions and a less than significant air quality impact. This alternative would not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. This alternative would likely have similar cumulative traffic impacts to the Proposed Project.

Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

Fulton Road Alternate Site

Alternative Address/Location: 1615 Fulton Road, Santa Rosa; within the City limits of the City of Santa Rosa, at the western edge of the urban boundary.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 37.9± acre site on the eastern side of Fulton Road. The site is almost across the road from Piner High School. The site is not owned by Sutter and is the site of a recently approved tentative map for the Fox Hollow 178-unit residential development. Access to the "Fox Hollow" development is extremely limited, with one very narrow stub street/bridge over SCWA channel proposed. The site is not visible from Highway 101. The site is split into two parcels by a major drainage canal reducing its developable acreage by almost half. The "front" or eastern site is 22.7± acres and the "rear" site is 15.2± acres. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part of Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site has split zoning. The "front" (22.7± acre) site is designated "Low Density Residential" in the General Plan and is located in the "R-1-6" (Single Family Residential) District. The "rear" 15.2± acres is designated "Very Low Density Residential" in the General Plan and is located in the RR-40 District. Hospitals are not permitted in either the R-1-6 or the RR-40 district.
- Overflight of residential and school areas would be required to access the Helistop.
- The site is within a California Tiger Salamander habitat area and also may contain wetlands. A detailed Biological Assessment would be required.
- The site is split by drainage channel which would make development of the west portion of the property difficult
- While utility services are available, upgrades or extension of all utilities would be required including extensions.
- The site has agricultural potential.

- The site is accessible by Santa Rosa Transit at Fulton Road at Piner High School (approximately 300' from the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. This alternative would likely have similar cumulative traffic impacts to the Proposed Project, with potentially additional traffic impacts due to the addition of Project-related traffic to roadways which appear undersized for that volume of traffic.

Given the limited portions of the site which can be developed due to its configuration and existing development plans, the developable portion of the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking. Accordingly, development of the Proposed Project on this site would likely require development of the Project with substantially increased building heights and smaller setbacks, both of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

It is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Implementation of this alternative would also significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Roseland Shopping Center Alternate Site

Alternative Address/Location: 561, 565, 665 and 673 Sebastopol Road, Santa Rosa. The site is in unincorporated area of Sonoma County, but within a designated urban services area and within the City's sphere of influence.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 10.83± acre site. The site is the front side of a shopping center and is located on the north side of Sebastopol Road, east of Dutton Avenue. The site adjoins the Santa Rosa city-limits. Sutter does not own the site, which is owned by multiple parties. The site is not visible from Highway 101, but is accessible to Highway 12 via congested streets.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part of Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is currently designated in the County's General Plan as "Mixed Use/Community Shopping Center." The County's General Plan policies and objectives include requirements for "mixed use" pedestrian-oriented and neighborhood-serving commercial uses, and hospitals are not identified as permitted/appropriated uses.
- If the property were annexed to the City, the Zone District which would be applied to the property would be required by Government Code to be consistent with the General Plan.
- It is anticipated that the City zoning district applicable to the property would be the "CSC" (Community Shopping Center) Zone District. While the CSC District permits Hospitals by Conditional Use Permit (CUP), it requires all development in that District (including, presumably Hospitals) "to be a mixed use project with a residential component," unless otherwise approved by the Planning Commission. The "mixed use" and related requirements would likely preclude a Hospital on the site given, for instance, that the addition of residential uses to a hospital project would result in substantial land compatibility issues.

- Development of the site would require annexation to City of Santa Rosa. However, LAFCO's position has been that they will not approve any annexations in the Roseland/Southwest area until the City and County have agreed on an overall plan/strategy of annexation, including agreement as to cost/revenue sharing. This limitation on annexations is not anticipated to be resolved in the near future.
- Overflight of residential and school areas will be required to access helistop.
- Development of this site would not displace any residences.
- The site is accessible by Santa Rosa Transit and Sonoma County Transit at Sebastopol Road at Dutton Avenue.

Environmental Impacts:

This alternative would result in new impacts related to the demolition of the existing shopping center on the site. This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This alternative may result in greater cumulative traffic impacts than the Proposed Project given that the site is accessible to Highway 12 only via already congested streets.

Further, given the limited portions of the site which can be developed due to its configuration and existing development plans, the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

It is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Implementation of this alternative would also significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Warrack Hospital Alternate Site

Alternative Address/Location: 2449 Summerfield Road, Santa Rosa, within the city limits of the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 11.2 acre 12 parcel site. The site is the current location of the former Warrack Hospital and various medical offices at the southeast corner of Summerfield Road and Hoen Avenue. The site is not visible from Highway 101 and only indirectly accessible to Highway 12 via congested streets. Sutter owns the ground underlying approximately 85 to 90 percent of the site, although a portion of this ownership is subject to ground leases to third parties. The remainder of the site is in a mix of separate ownerships. The mix of separate ownerships and ground leases on the site would require a difficult assemblage of parcels and interests to allow for the development of the Proposed Project on the site.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part of Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site has been zoned by the City of Santa Rosa as Planned Community development and designated as Public/Institutional and Office in the General Plan.
- The site is zoned for Mixed Use, Planned Development and Office Commercial.
- Overflight of residential and school areas will be required to access Helistop
- The site is surrounded by residential areas.
- Development of this site would not displace any residences.
- The site is served by surrounding infrastructure.
- The site is accessible by Santa Rosa Transit at Summerfield Road at Hoen Avenue (at the site).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. This alternative may result in greater cumulative traffic impacts than the Proposed Project given that it can only accessed via already congested streets.

Further, given the limited portions of the site which can be developed due to its configuration and existing development plans, the site is significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Project Objectives:

It is not clear that, even with increased building heights and reduced setbacks, the full program proposed by Sutter in its Project Proposal could be developed on this site. Accordingly, implementation of this alternative would likely significantly undermine Sutter's ability to provide the medical services set forth in the Health Care Access Agreement, and to meet any of the Project Objectives associated with development of a Sutter Medical Center, Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building.

Implementation of this alternative would also significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

West Third Street Properties Alternate Site

Alternative Address/Location: 691 and 414 West Third Street, Santa Rosa. The sites are entirely within the city limits of the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 27.5 acre site. The site is comprised of three parcels houses Imwalle Gardens (13.5 acres) and a vacant parcel (10.4 acres). Imwalle Gardens is an existing urban agricultural operation that has been in business since 1886. The sites are on the north side of West Third Street, east of Dutton Avenue. The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because this site was identified by Sutter in 2009, as part as Sutter's further evaluation of potential alternate sites, as a potential alternate site that should be considered in the screening analysis in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project, including consideration of information from the prior reviews as well as further review in 2009, yielded the following information:

- The site is subject to mixed Residential zoning, R1-6 & R3-18 and designated in the General Plan as Medium to Low Density Residential. The General Plan and zoning designations do not allow hospital uses.
- The sites are not visible from Highway 101 and only indirectly accessible to the freeway via congested streets.
- Overflight of residential and school areas will be required to access Helistop
- Development of the site would require significant local and regional utility and roadway improvements.
- The site is agricultural.
- The site is accessible by Santa Rosa Transit at W. Third Street at Rusch Court (approximately 1,400' away).

Environmental Impacts:

This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas. As well, it would likely have similar, if not greater, cumulative traffic impacts to the Proposed Project. Finally, development of this site may result in a significant impact to agricultural resources.

Project Objectives:

Implementation of this alternative would also significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

BB. Air Center Site

Alternative Address/Location: No addresses have been assigned to these undeveloped parcels at this time. The site is located to the north of the west end of Northpoint Parkway in the southwest area of the City of Santa Rosa.

Description of the Alternative: Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this 31 acre site. The site is comprised of two parcels under common ownership, and is a portion of the old Santa Rosa Air Center site used by the armed forces during World War II. The site can be accessed at its southeast corner from Northpoint Parkway but, as the site is at the "dead end" of Northpoint Parkway, there is no other readily available secondary access point. The site is not visible from Highway 101 and there is no there is no direct access to Northpoint Parkway from Highway 101.

To access the site from Highway 101, patients, visitors and staff would have to exit Highway 101 at Hearn Avenue, travel approximately 1.4 miles west to Sebastopol Road, turn north for 0.3 mile, and then turn left onto Northpoint Parkway and travel approximately 1.3 miles to the site. Alternately, they could exit Highway 101 at State Highway 12, take Highway 12 1.6 miles to Stony Point Road and from there travel 1.0 mile to Northpoint Parkway, and then 1.2 miles to the site. Patients, visitors and staff coming from the west would likely take Highway 101 to Highway 12 and exit at Fulton/South Wright Road. From there they would travel 1.1 miles to Corporate Center Parkway, 0.8 miles to Northpoint Parkway, and then 0.3 miles to the site.

The site is not owned by Sutter.

Reason for Evaluating this Alternative: This alternative is included in this screening analysis because, following Sutter's initial submission of information for the screening analysis of various sites, County PRMD staff suggested evaluation of this site in order to provide a thorough basis for evaluating which alternatives should and should not be considered in detail in the EIR.

Screening Evaluation:

Sutter's preliminary evaluation of the site's suitability for development of the Proposed Project yielded the following information:

- The site contains significant acreage of concrete and asphalt surfaces that were previously used as runways and taxiways.
- The entire site is within the designated California Tiger Salamander (CTS) study zone, but limited development has been permitted on other portions of the old Santa Rosa Air Center that were covered with hard surfacing.
- Development of areas not currently surfaced will likely result in CTS habitat impacts; extensive biological assessments would be required.

- A review of the aerial photographs of the site suggests that there are at least two potential wetlands areas on the site. A wetlands evaluation would be required.
- Assuming that development of the site will likely be limited to those areas currently covered by former development because of biological constraints (see attached map of the site), only approximately 14 acres of the site are likely to be developable, and these portions of the site form an awkward configuration for development of a hospital or medical campus.
- The site is within 4 General Plan residential land use categories: Low Density, Medium Low Density, Medium Density and Medium High Density Residential. Hospitals are not noted as being permitted land uses in any of those General Plan categories.
- The site is within a Planned Development District. The Development Plan and Policy Statement for that District are dated 1994/1995. The Policy Statement allows for "Health Care Facilities" by Conditional Use Permit. However, those documents were prepared pursuant to the Zoning Code in effect at that time, which defined "Health Care Facilities" to include "hospitals." The Zoning Code currently in effect, and which has been in effect since its adoption in 2004, no longer includes "hospitals" as part of that definition. The current Zoning Code would not permit a hospital anywhere within that "PD" District. Hospitals are not permited in any of the City's Residential zoning districts.
- The site is surrounded by existing and proposed residential uses, so helicopter service to the site would require overflight of residential areas.
- Drainage infrastructure in this portion of Santa Rosa is extremely limited, and likely will require the extensive use of onsite detention due to drainage system capacity limitations to the west and south.
- The site is marginally served by Santa Rosa Transit, with the nearest stop being approximately 1/3 miles away at Corporate Center Parkway just north of Northpoint Parkway. Only two buses service this stop per hour.
- Sewer and water utilities are available at the southeast corner of the site, and would require extension onto the site to provide service.
- Development of this site would not displace any residences.

Environmental Impacts:

Development of this site could result in potentially significant impacts to California Tiger Salamander (CTS) and CTS habitat and to wetlands. This alternative would not reduce any identified significant or significant and unavoidable impacts of the Proposed Project. It would not eliminate or lessen the significant and unavoidable air quality impacts associated with the surcharging of the Project site, as that work would still be required on the alternative site. It would also not eliminate or lessen the significant and unavoidable noise impacts associated with the operation of the helistop, as a helistop would still be required. Instead, this alternative would likely result in greater noise impacts due to the need for helicopters arriving and leaving the site to fly directly over residential areas.

While Northpoint Parkway is a four lane (two lanes each way) divided parkway from Corporate Center Parkway east to Stony Point Road, from Stony Point Road south to Hearn Avenue, it is only wide two lane roadway. Further, Hearn Avenue east to Highway 101 is a only a two-lane roadway. Existing traffic congestion becomes increasingly significant as drivers approach Highway 101 and the Hearn Avenue/Highway 101 interchange is an awkward, offset configuration both north and southbound. The two lane overcrossing at Hearn Avenue is currently heavily overtaxed with traffic during peak travel periods and on the weekends, as it is the main interchange for numerous commercial areas on the east side of the Freeway, as well as for Auto Row on the west side of the freeway. The main alternate route to the site (Highway 101 to Highway 12 to Stony Point to Northpoint Parkway) is also already congested, particularly from West Third Street south to Hearn Avenue. Further, the planned widening of Stony Point Road, south of Sebastopol Road, was recently placed on hold by the Santa Rosa City Council. Accordingly, the cumulative traffic impacts of this alternative are likely similar if not greater than those of the proposed Project.

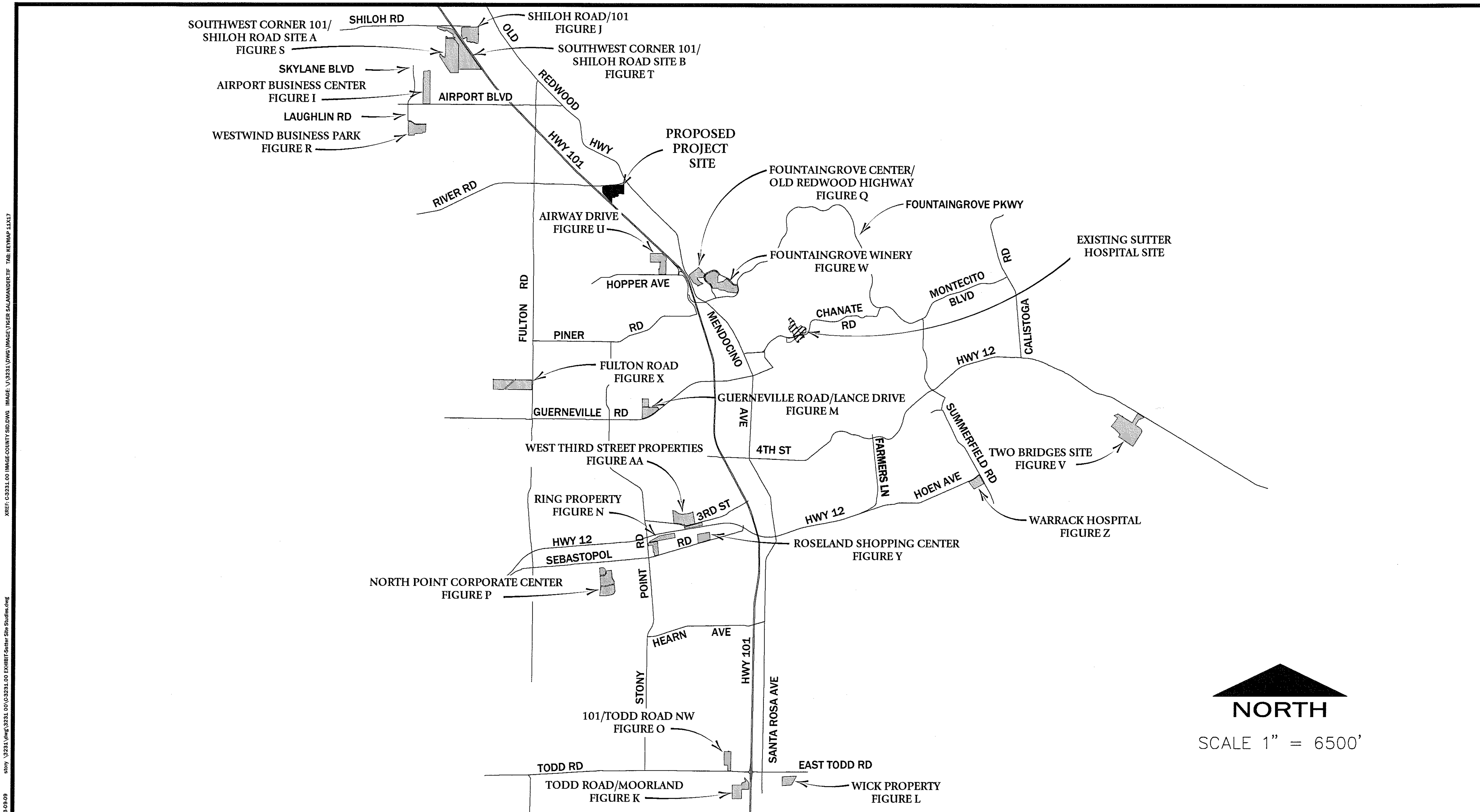
Project Objectives:

Implementation of this alternative would significantly undermine Sutter's objective to provide a Medical Campus that is easily accessed by persons living within the primary service area of the Sutter Medical Center and one that is close to and visible from Highway 101.

Due to the presence of CTS habitat on the site, the portion of the site that is likely to be available for development significantly smaller than the 25 acres needed to construct the Proposed Project at the density indicated in Sutter's Project Proposal, which includes structures ranging in height from 2 to 3 stories that are served by surface parking. Accordingly, development of the Proposed Project on this site would likely require substantially increased building heights and smaller setbacks, and potentially the addition of a parking structure, all of which may result in land use compatibility and aesthetic impacts.

Given the less than optimal configuration of the site, and unless additional acreage was available for development, implementation of this alternative could impede Sutter's ability to ensure that the Medical Campus is efficiently designed and of sufficient connectivity to provide the most modern and efficient layout for the integrated delivery of health services, and to promote functional relationships among departments, services and programs, provide functional circulation within the inpatient and outpatient spaces, placement of seating areas, outdoor terraces, and other patient and visitor amenities.

The constrained nature of the site could also impair Sutter's ability to develop the Medical Campus in a manner that provides a simple, clear and elegant set of buildings linked by meditative paths, bioswales, outdoor gardens, courtyards and open space that promotes a sense of well-being and healing through a dignified and forward-thinking building plan that will be an inviting and positive healing environment for patients, families, visitors, staff and all that come in contact with the Medical Campus.



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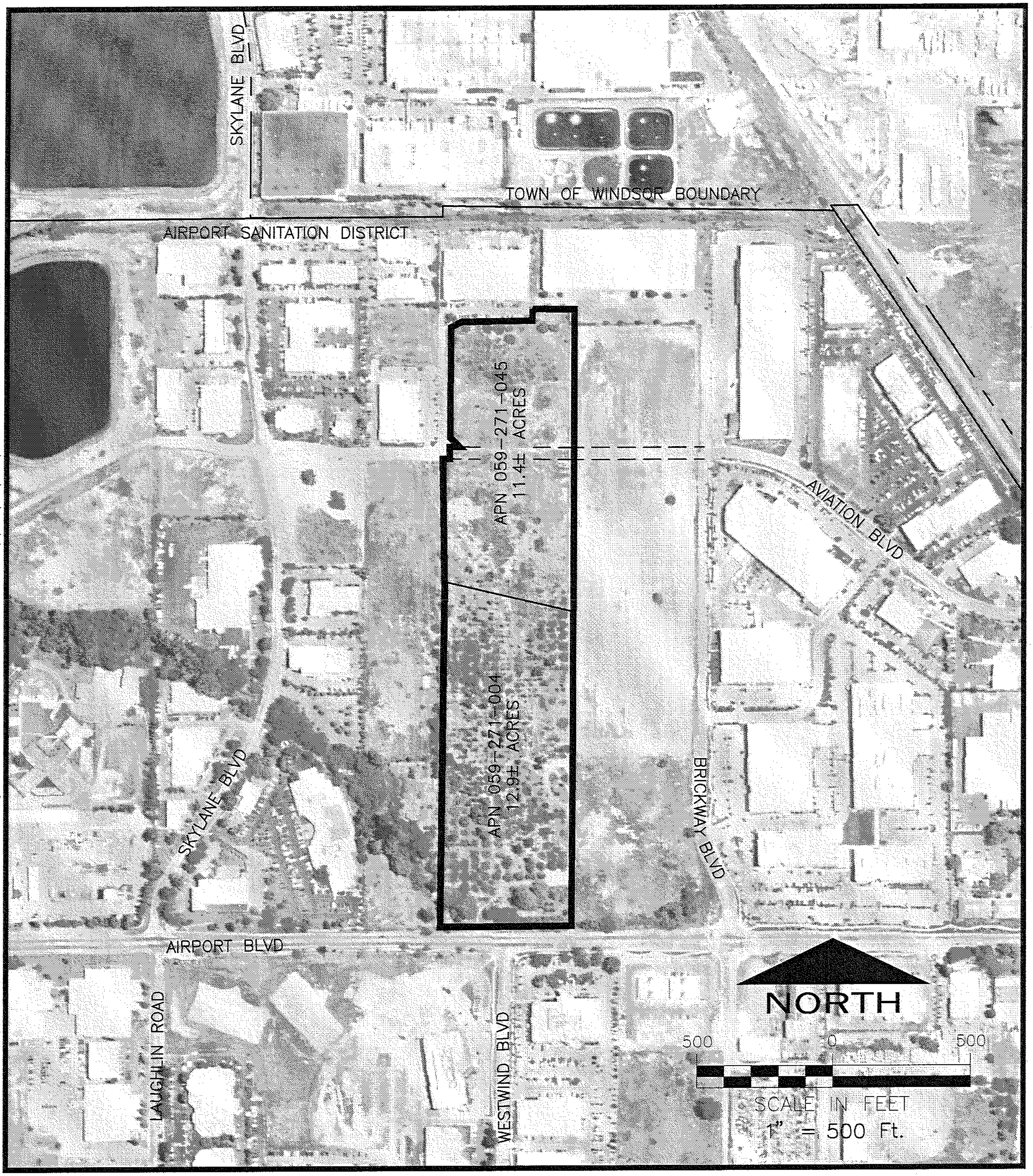
SUTTER HOSPITAL ALTERNATE SITE STUDY

KEY MAP

FEBRUARY 2009

SHEET 1 OF 1



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AIRPORT BUSINESS CENTER
SUTTER HOSPITAL ALTERNATE SITE STUDY

SITE PLAN

AERIAL PHOTO DATE 2005

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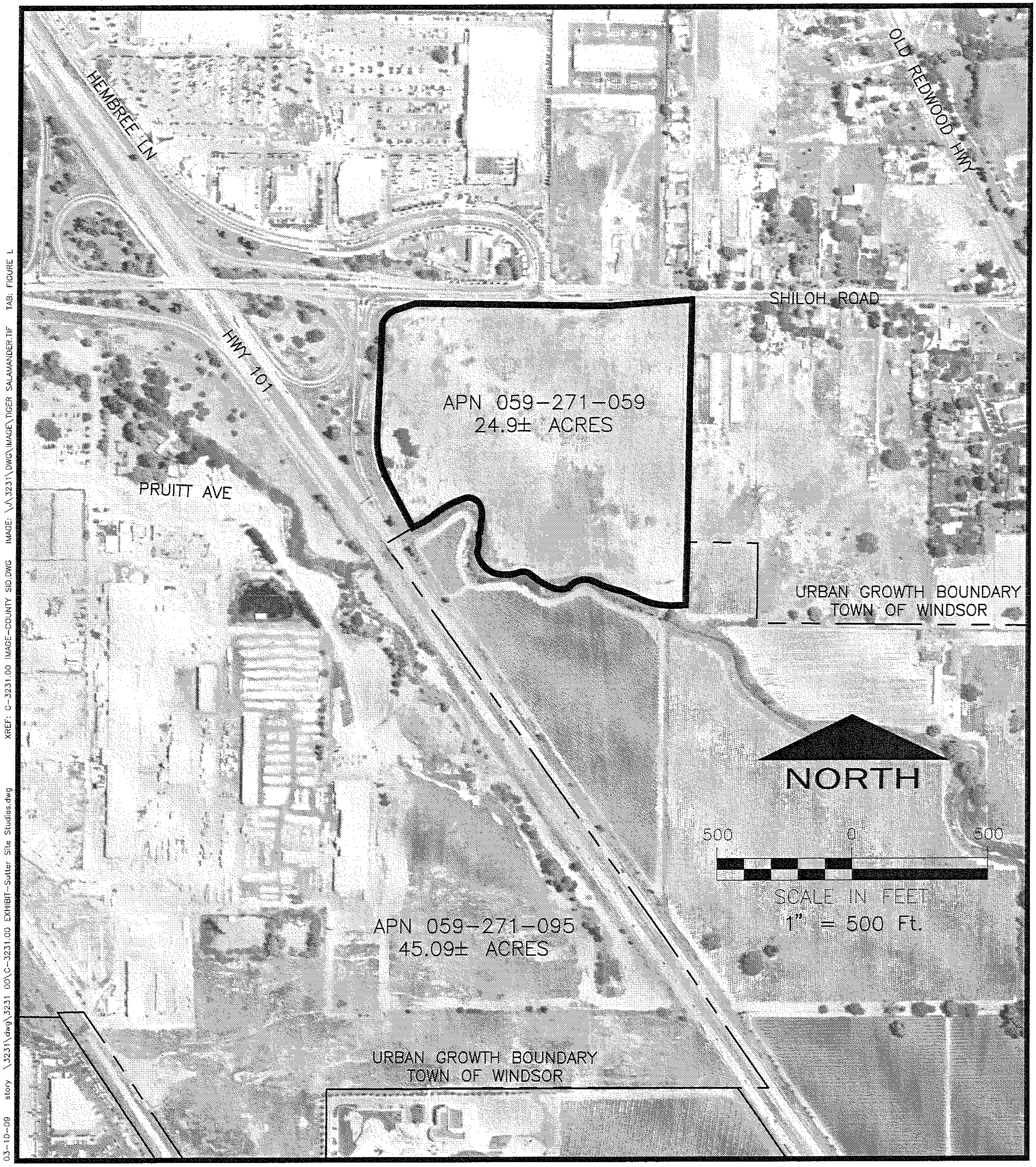
EXHIBIT PREPARED MARCH 2009

FIGURE I



SHILOH ROAD/101
SUTTER HOSPITAL ALTERNATE SITE STUDY

SITE PLAN

AERIAL PHOTO DATE 2005

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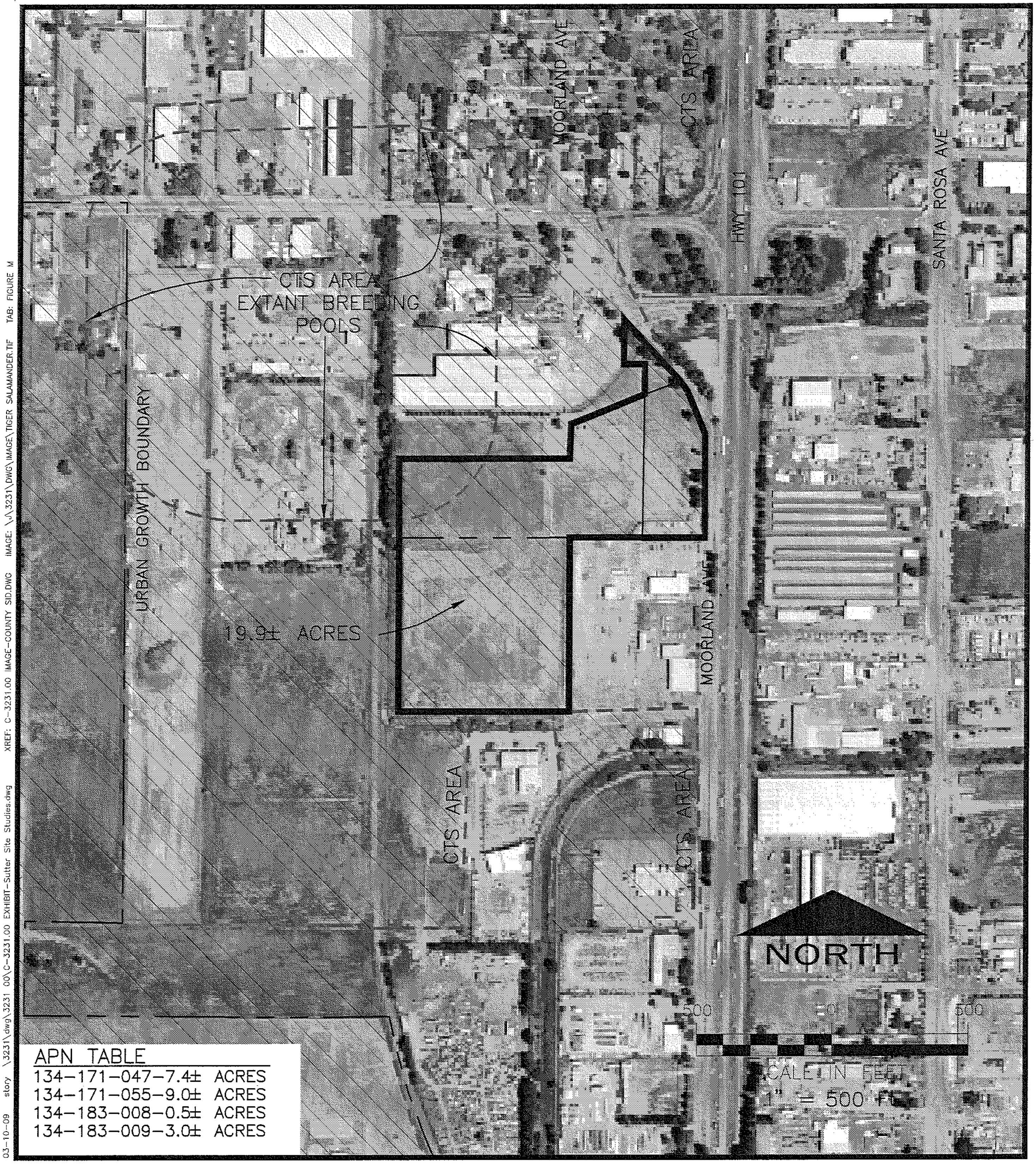
EXHIBIT PREPARED MARCH 2009

FIGURE J



TODD ROAD/MOORLAND
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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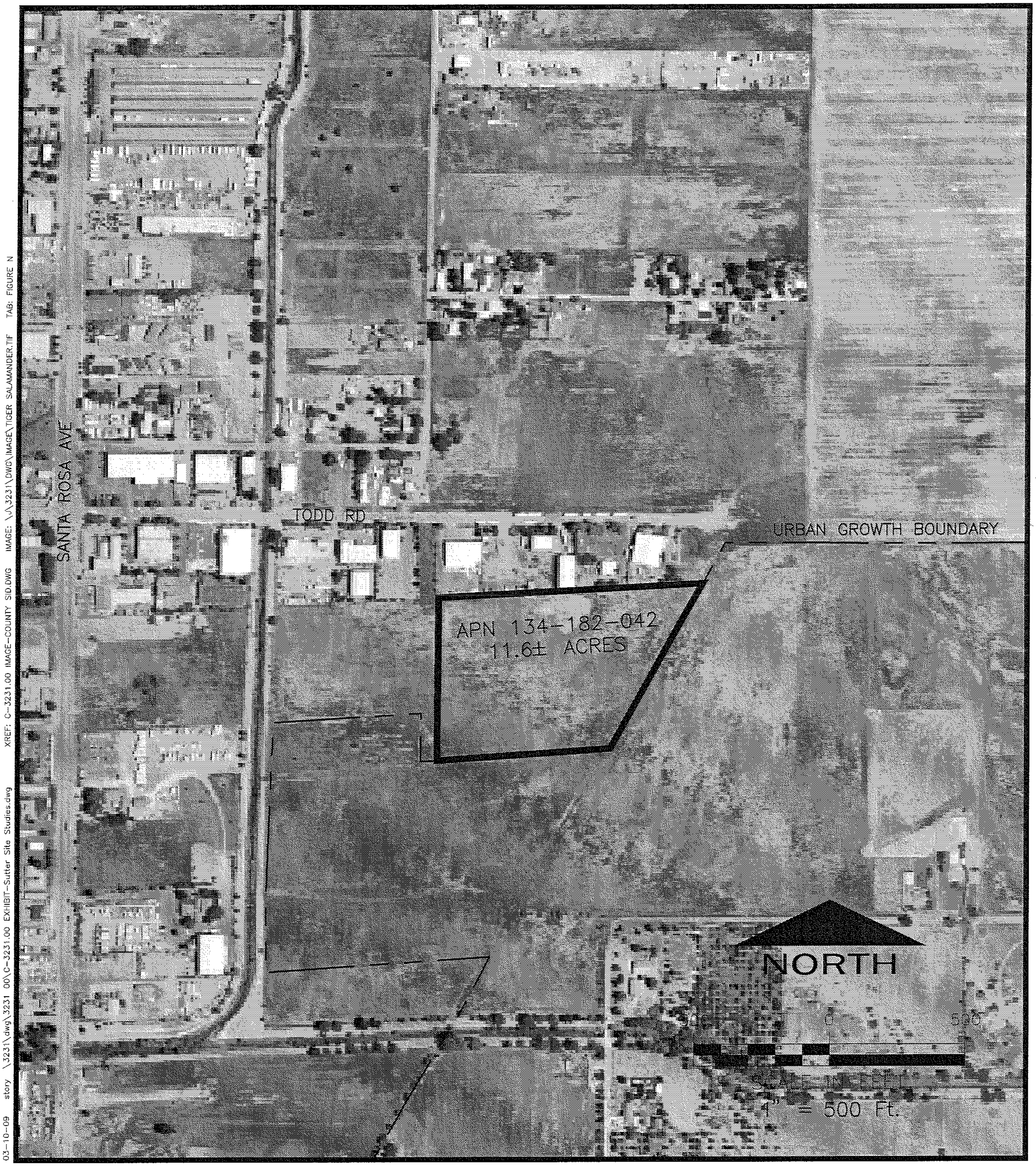
FIGURE K



WICK PROPERTY
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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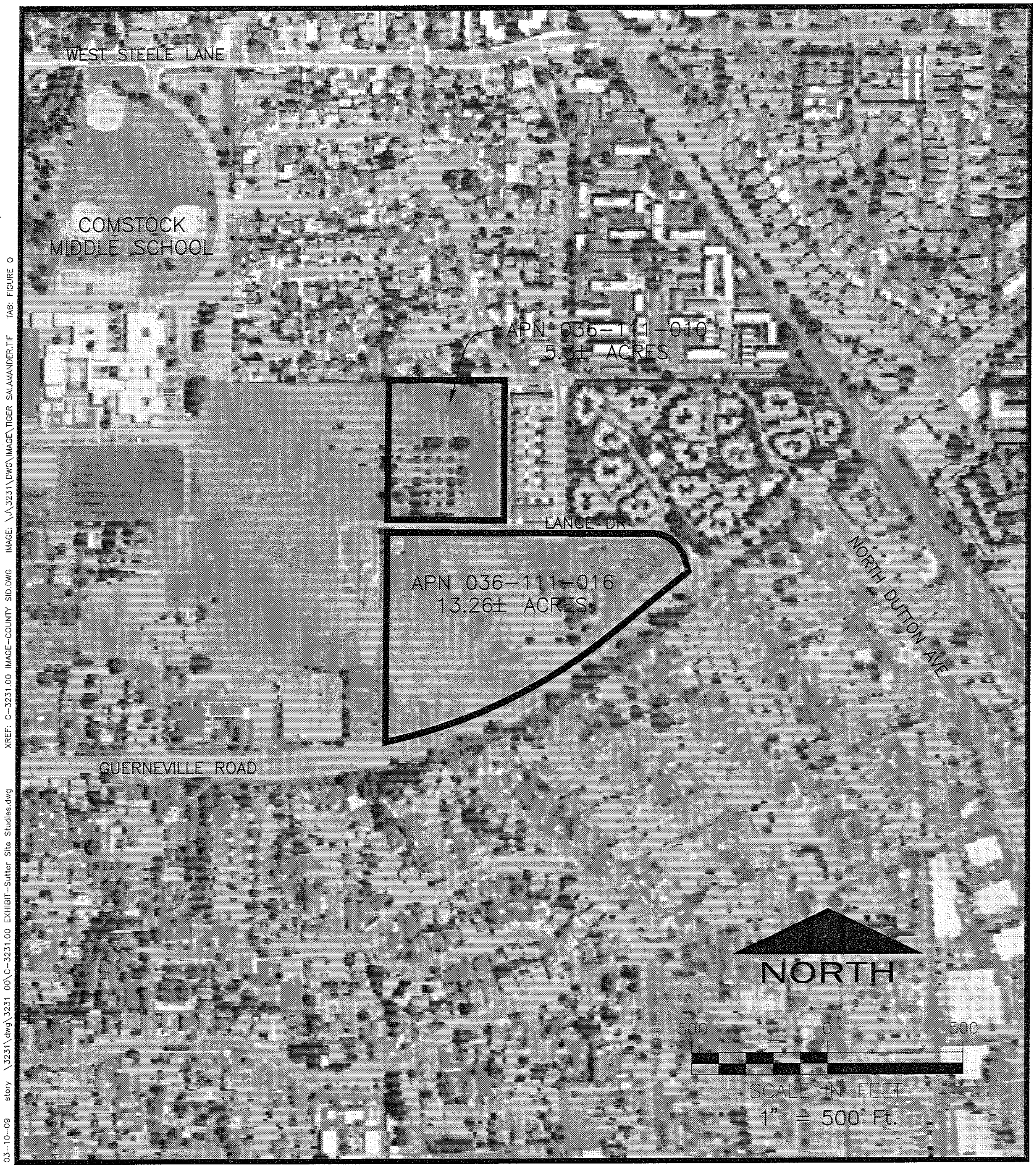
FIGURE L



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GUERNEVILLE ROAD/LANCE DRIVE
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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FIGURE M

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RING PROPERTY
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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FIGURE N

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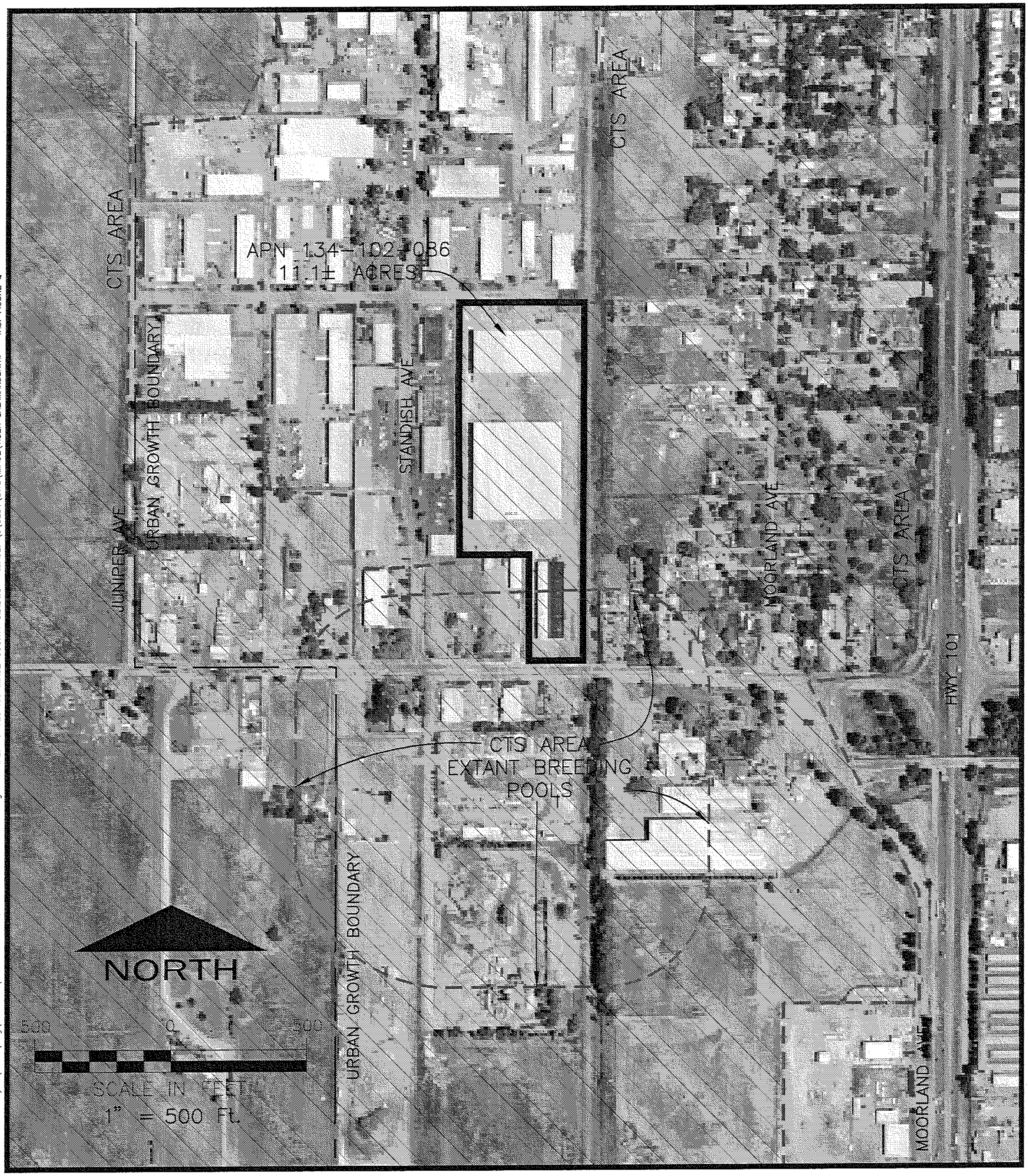

101/TODD ROAD NW
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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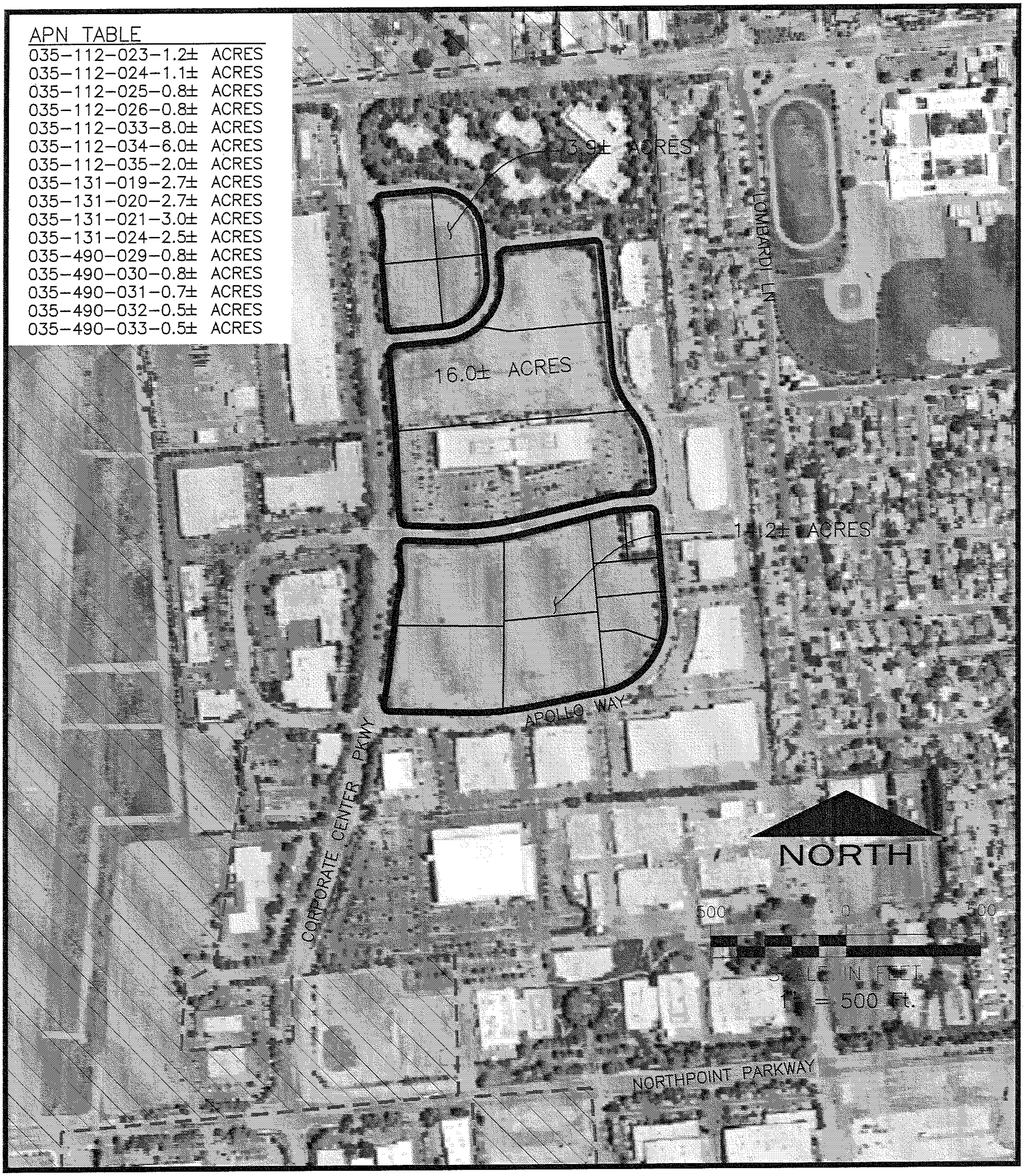
FIGURE O



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NORTH POINT CORPORATE CENTER
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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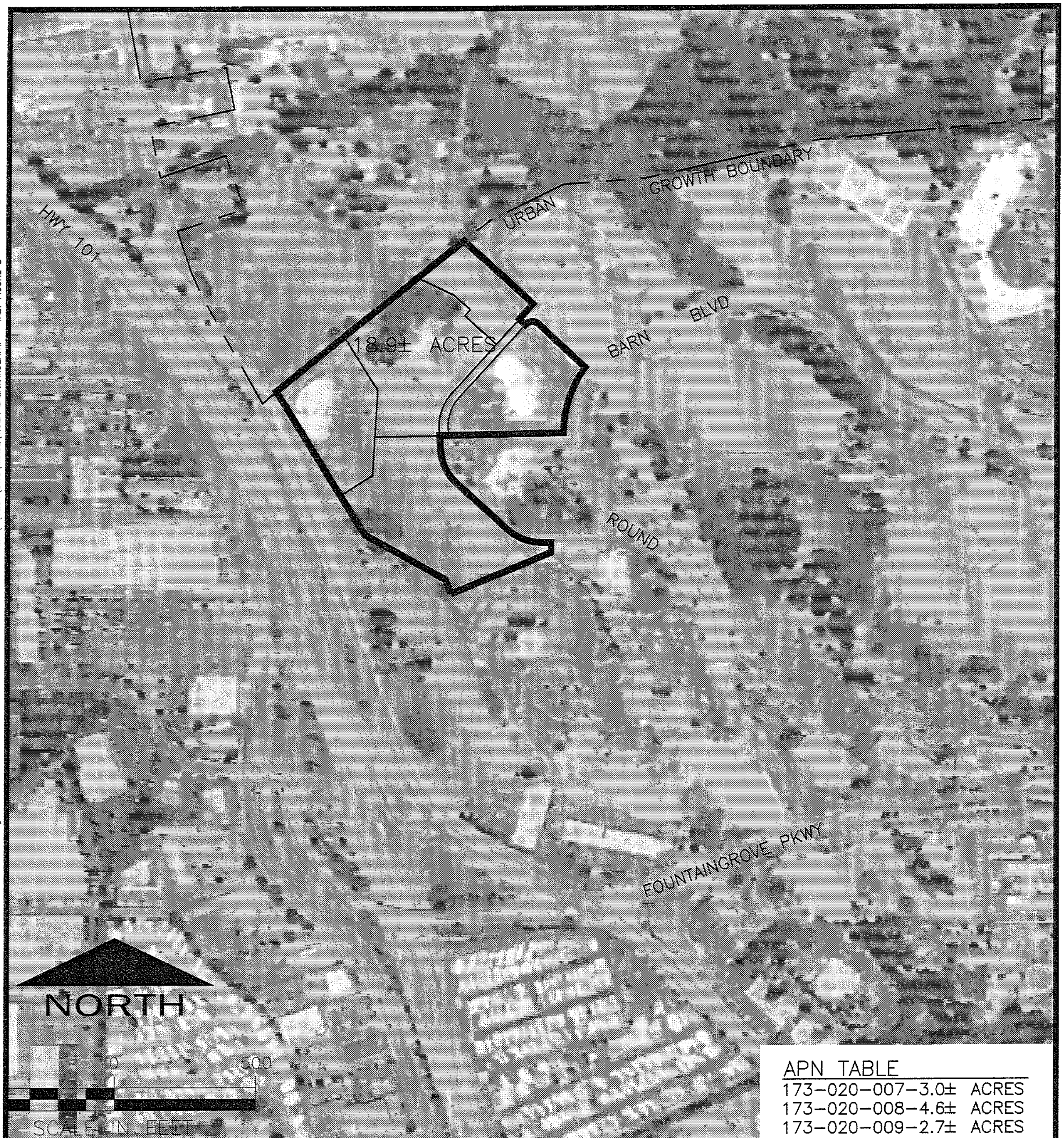
FIGURE P



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173-020-050-5.5±	ACRES

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FOUNTAINGROVE CENTER/ OLD REDWOOD HIGHWAY SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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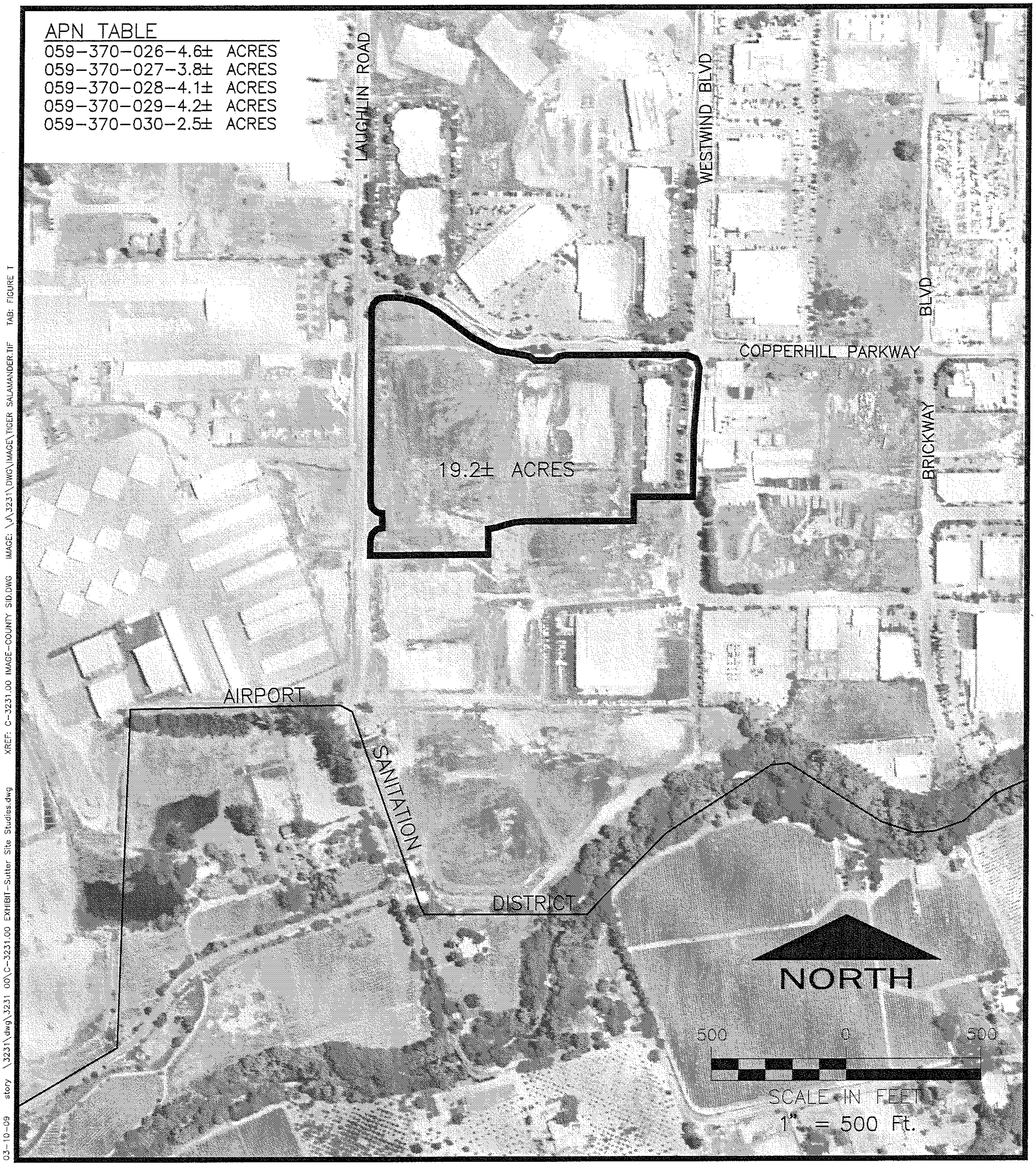
EXHIBIT PREPARED MARCH 2009

FIGURE Q



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WESTWIND BUSINESS PARK
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2005

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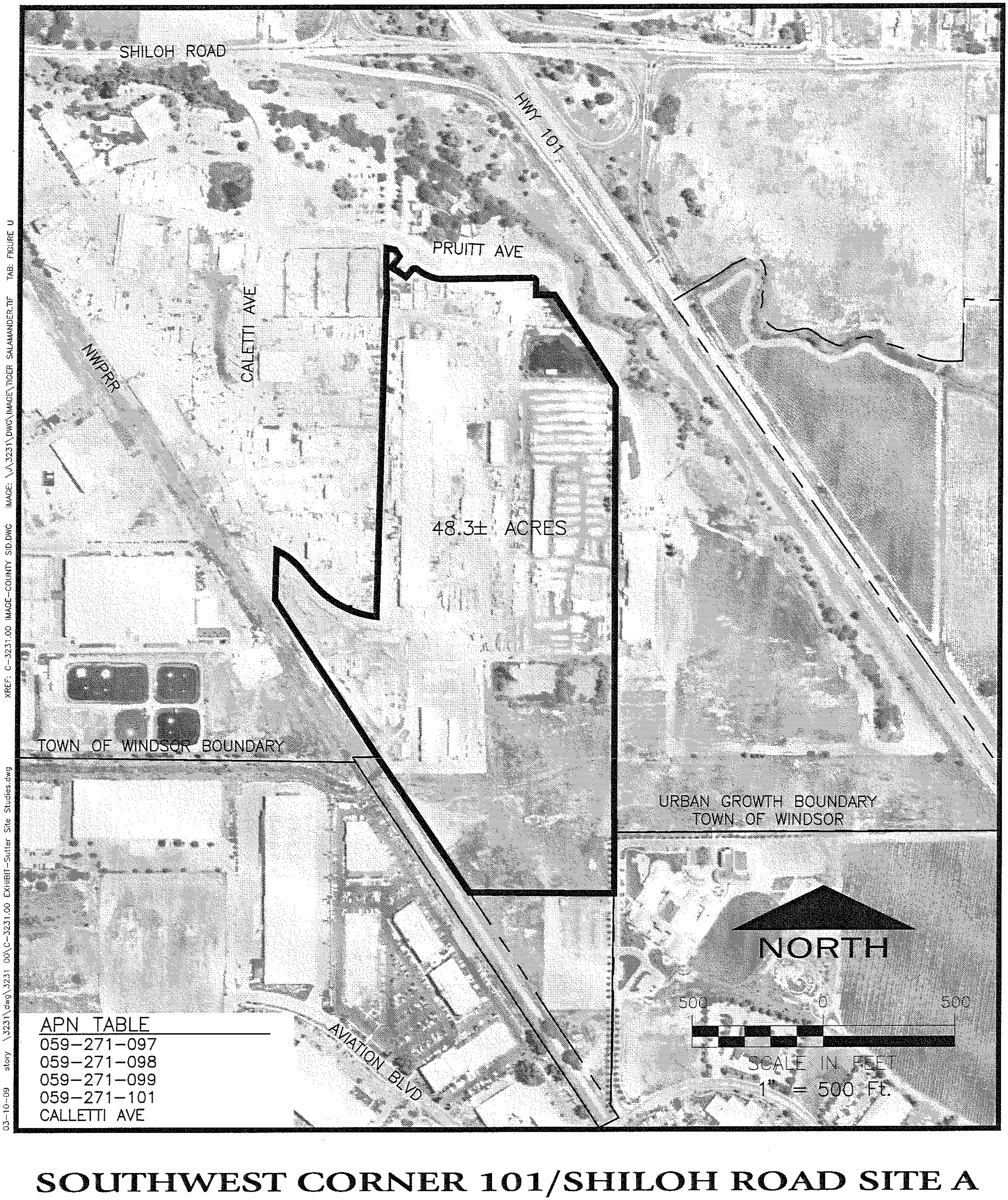
FIGURE R



SOUTHWEST CORNER 101/SHILOH ROAD SITE A SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2005

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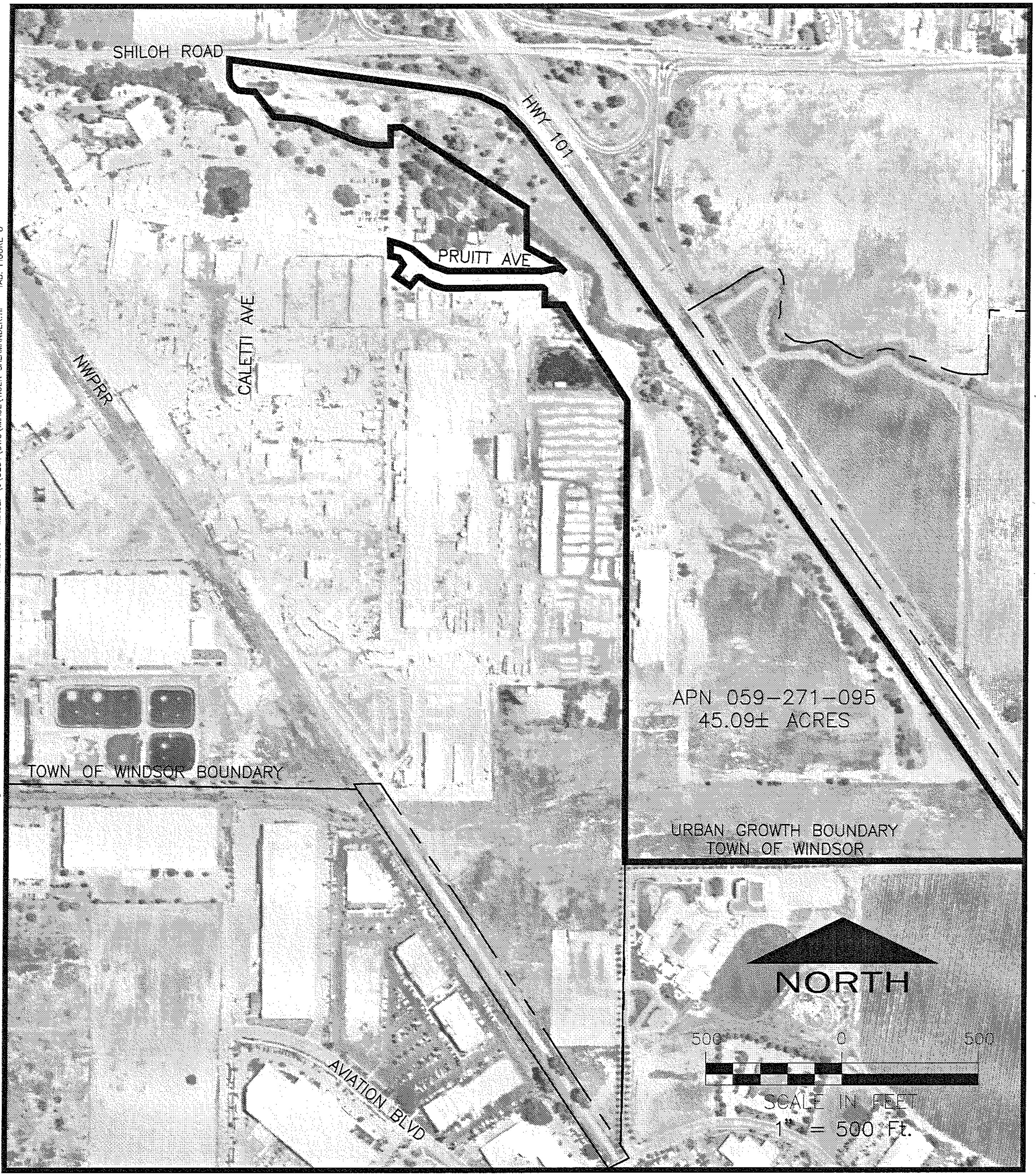
EXHIBIT PREPARED MARCH 2009

FIGURE S



SOUTHWEST CORNER 101/SHILOH ROAD SITE B
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2005

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EXHIBIT PREPARED MARCH 2009

FIGURE T

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AIRWAY DRIVE
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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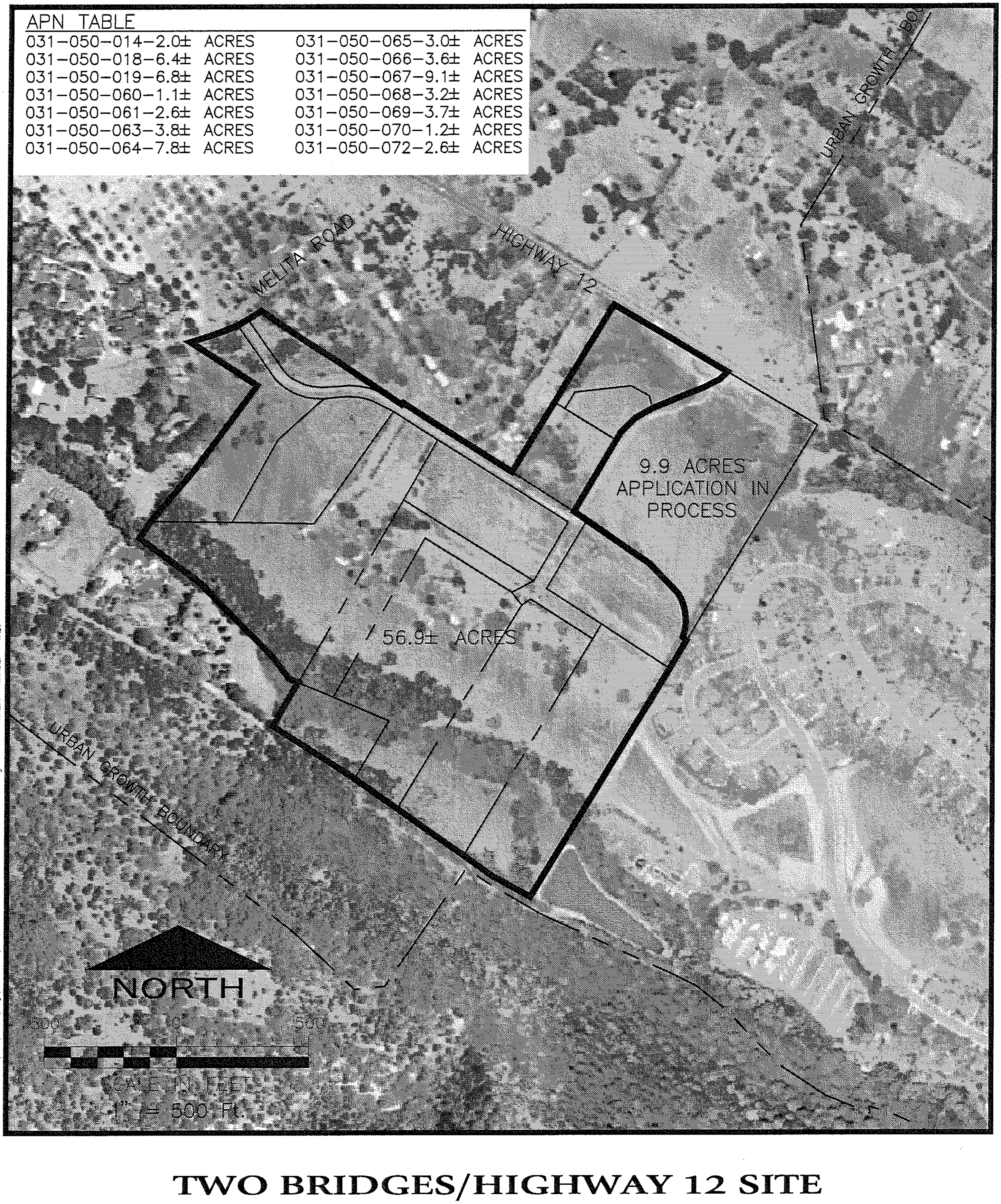
FIGURE U



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TWO BRIDGES/HIGHWAY 12 SITE
SUTTER HOSPITAL ALTERNATE SITE PLAN

TYPE OF EXHIBIT

AERIAL PHOTO DATE 2007

EXHIBIT PREPARED MARCH 2009

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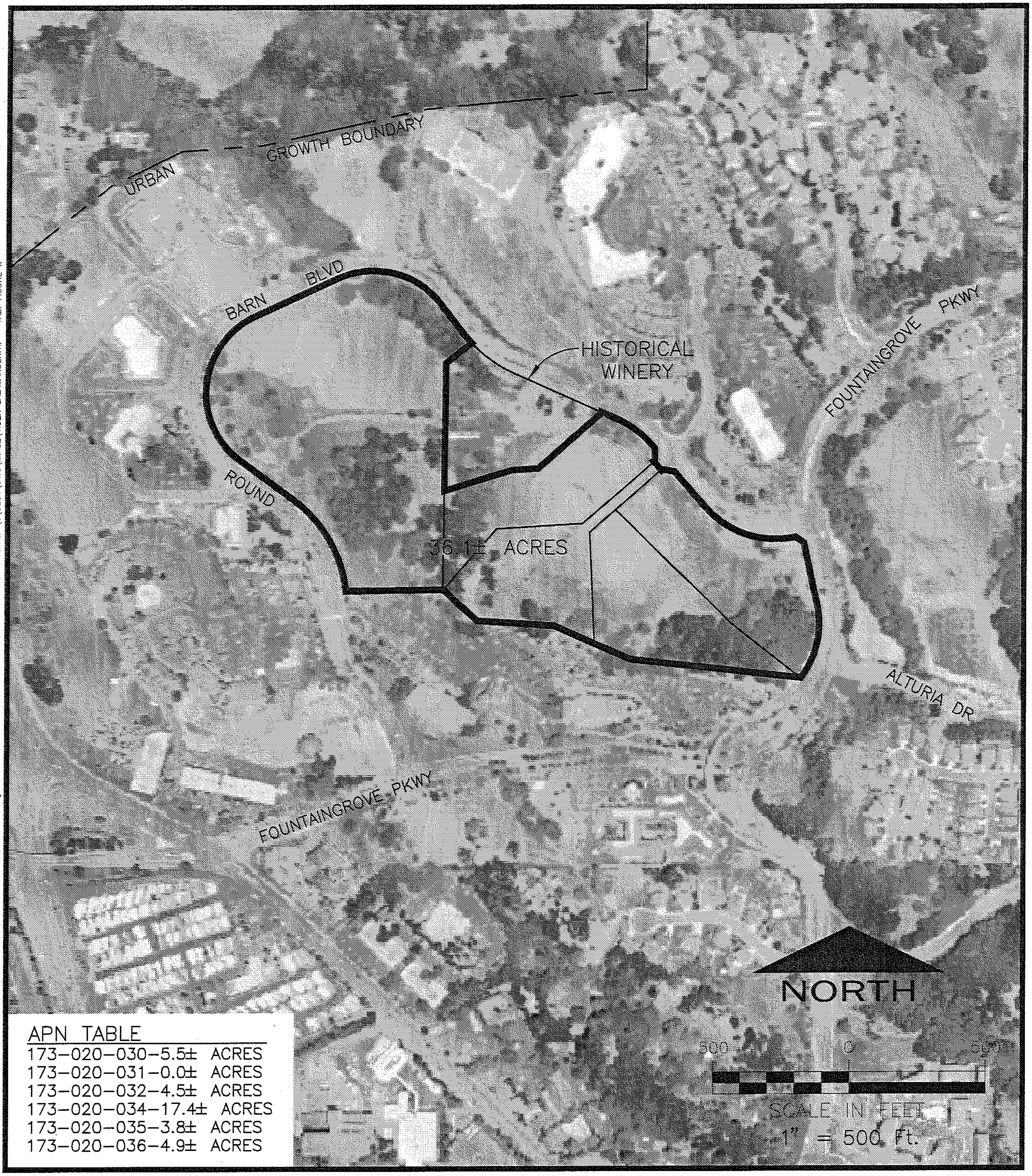
FIGURE V



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FOUNTAINGROVE WINERY SITE
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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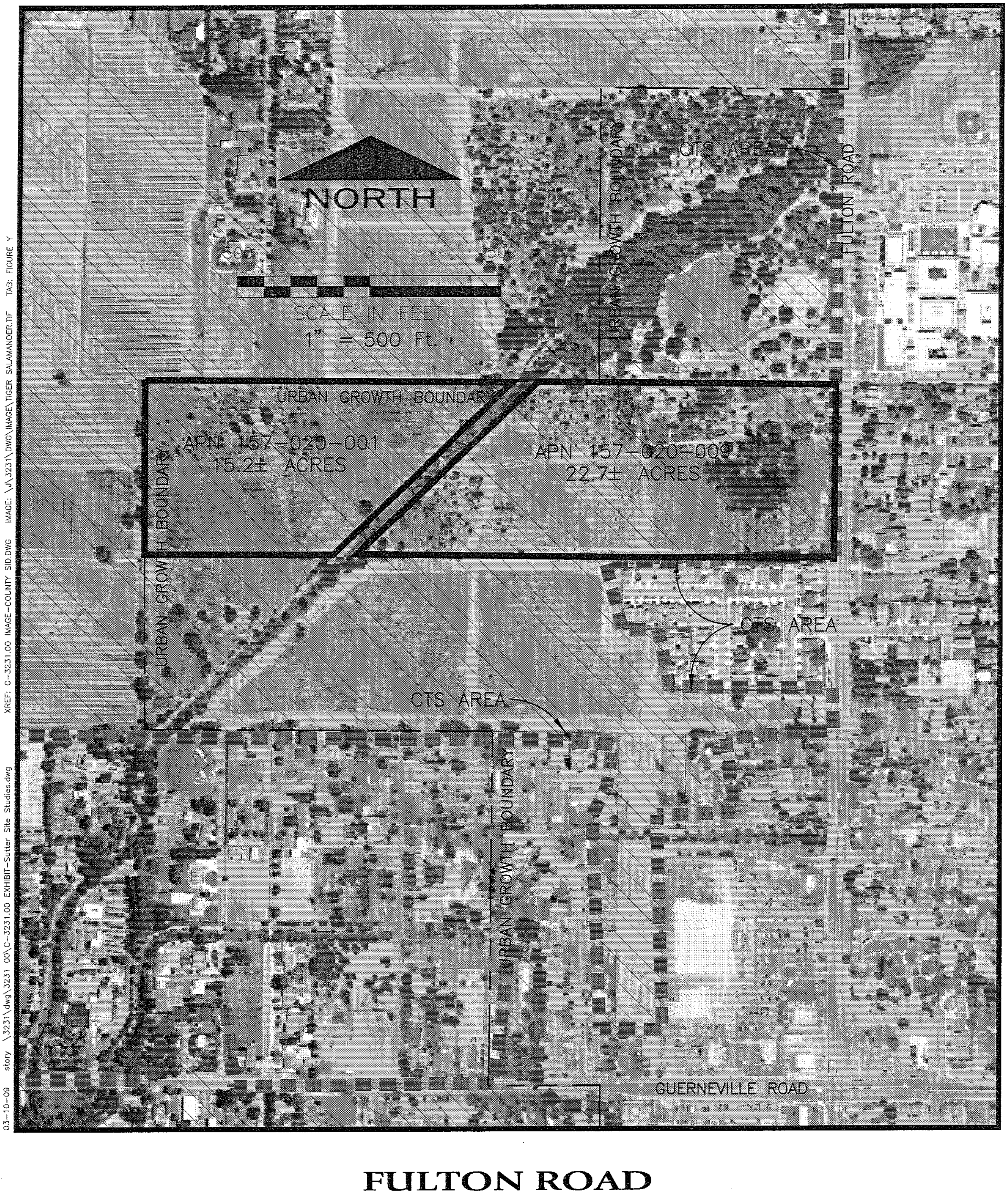
FIGURE W



FULTON ROAD
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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FIGURE X

ROSELAND SHOPPING CENTER
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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FIGURE Y

APN TABLE

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014-360-036-0.3± ACRES	014-360-054-0.03± ACRES
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WARRACK HOSPITAL
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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EXHIBIT PREPARED MARCH 2009

FIGURE Z

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WEST THIRD STREET PROPERTIES
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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FIGURE AA

101/TODD ROAD NW
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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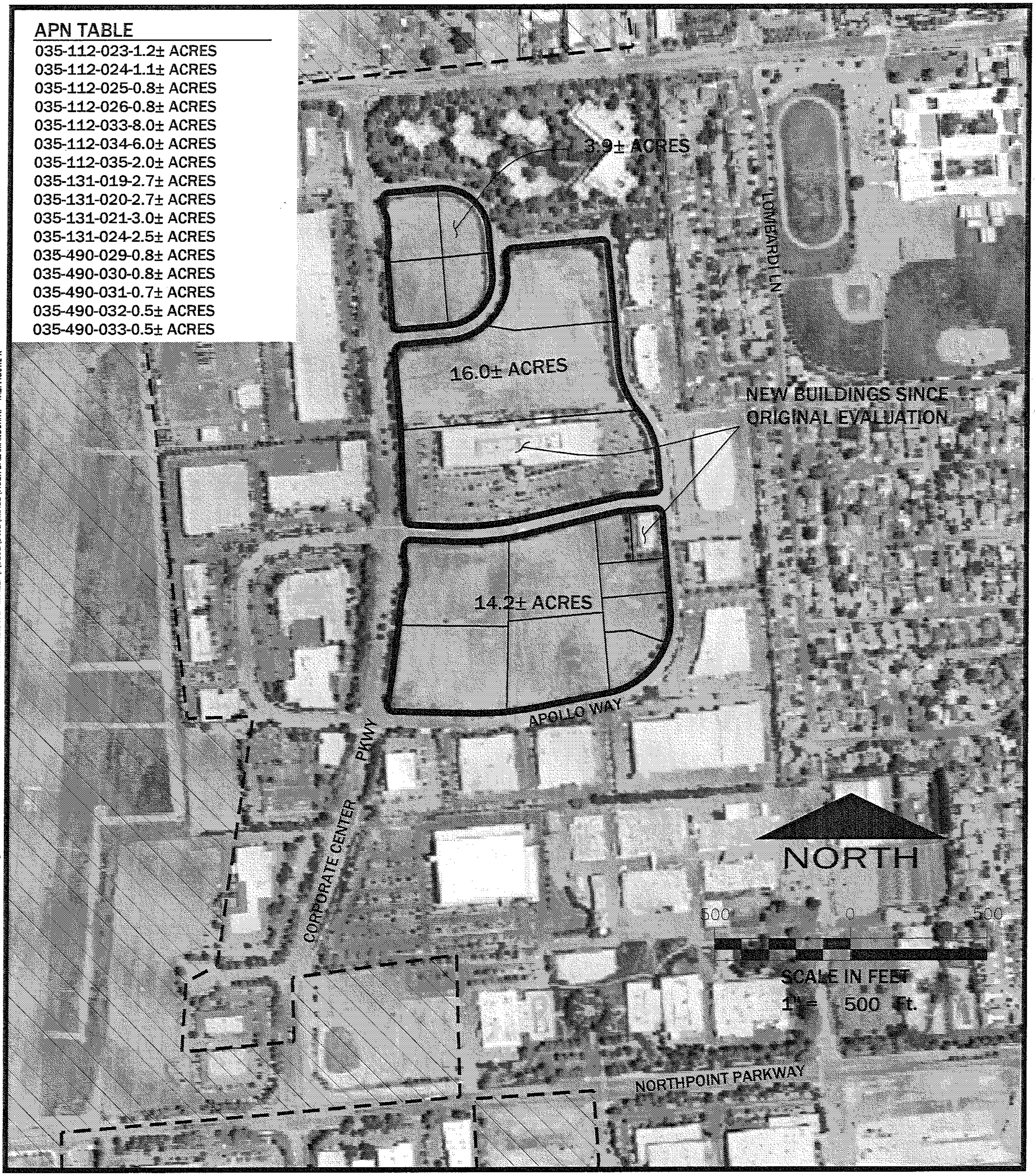
EXHIBIT PREPARED MARCH 2009

FIGURE O



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NORTH POINT CORPORATE CENTER
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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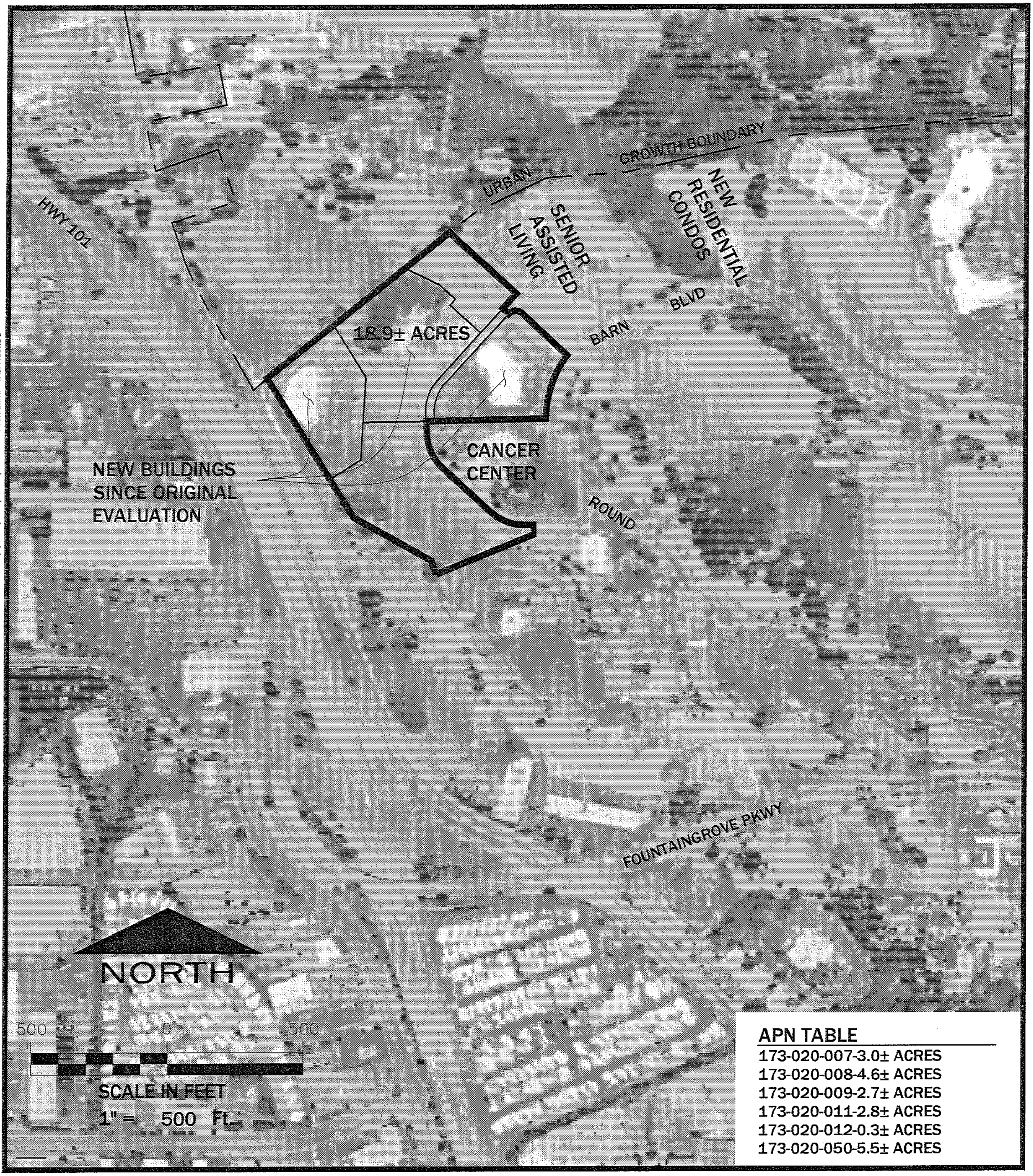
EXHIBIT PREPARED MARCH 2009

FIGURE P



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173-020-050-5.5± ACRES

FOUNTAINGROVE CENTER/ OLD REDWOOD HIGHWAY SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

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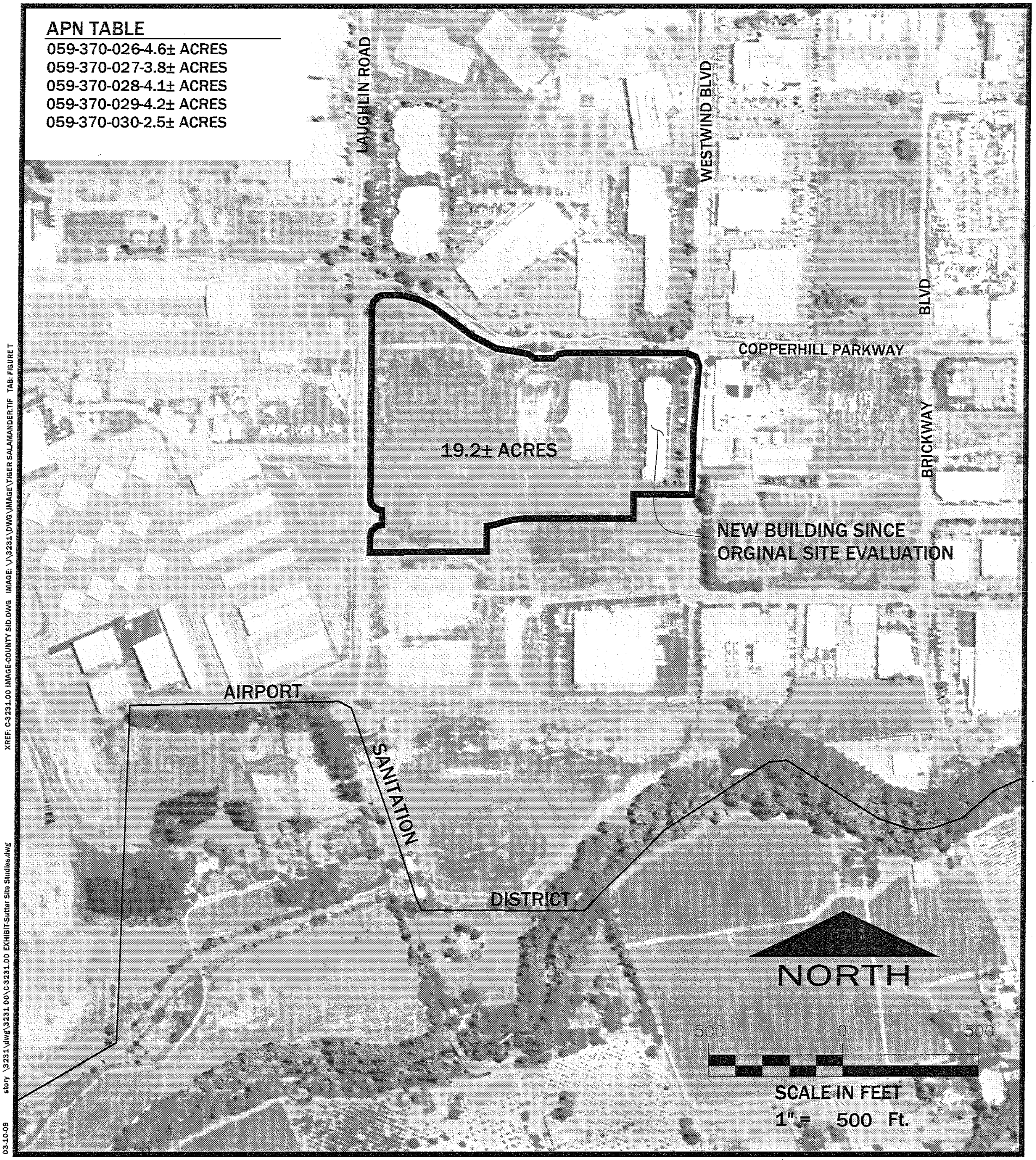
EXHIBIT PREPARED MARCH 2009

FIGURE Q



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WESTWIND BUSINESS PARK
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2005

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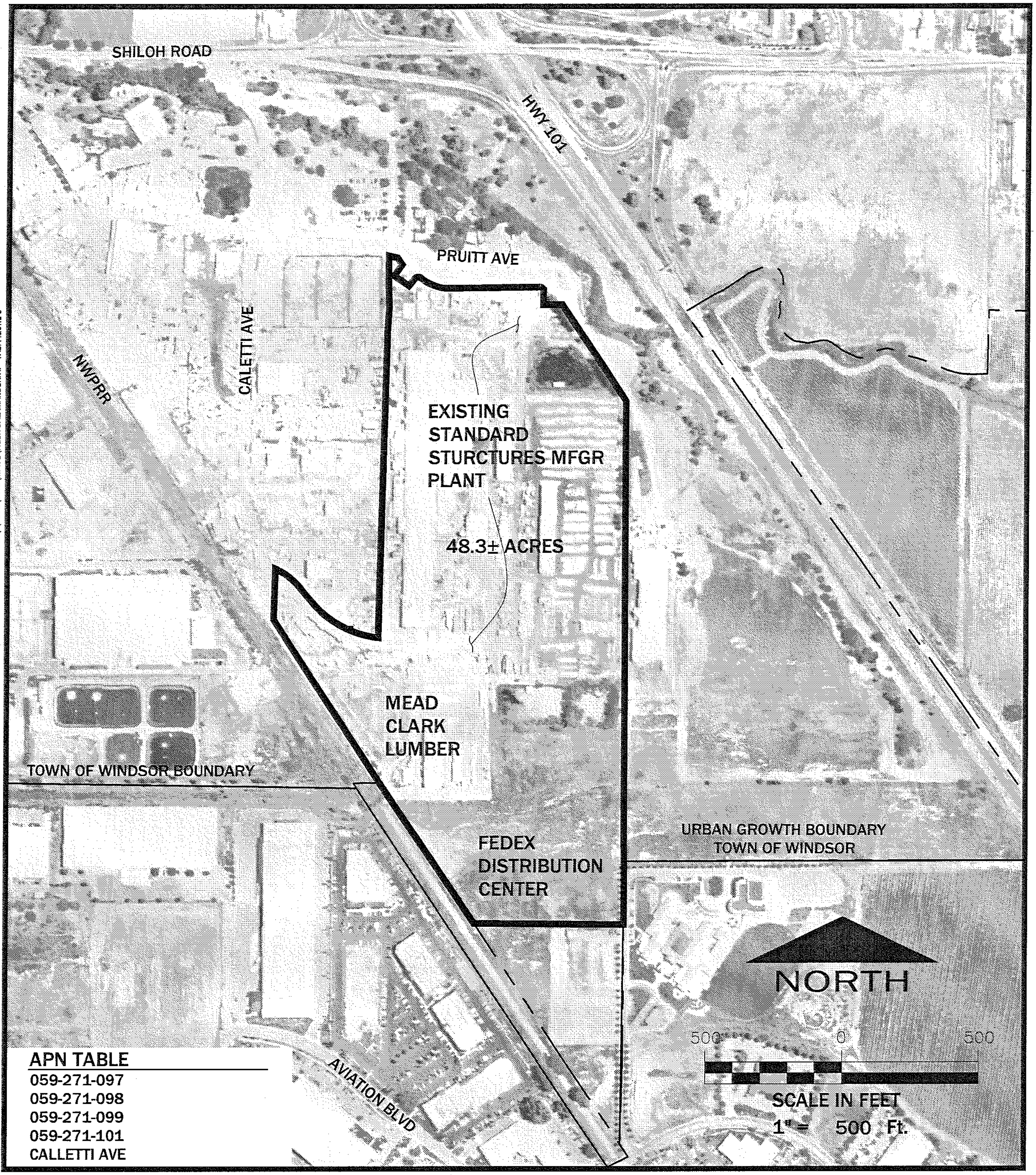
EXHIBIT PREPARED MARCH 2009

FIGURE R



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SOUTHWEST CORNER 101/SHILOH ROAD SITE A
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2005

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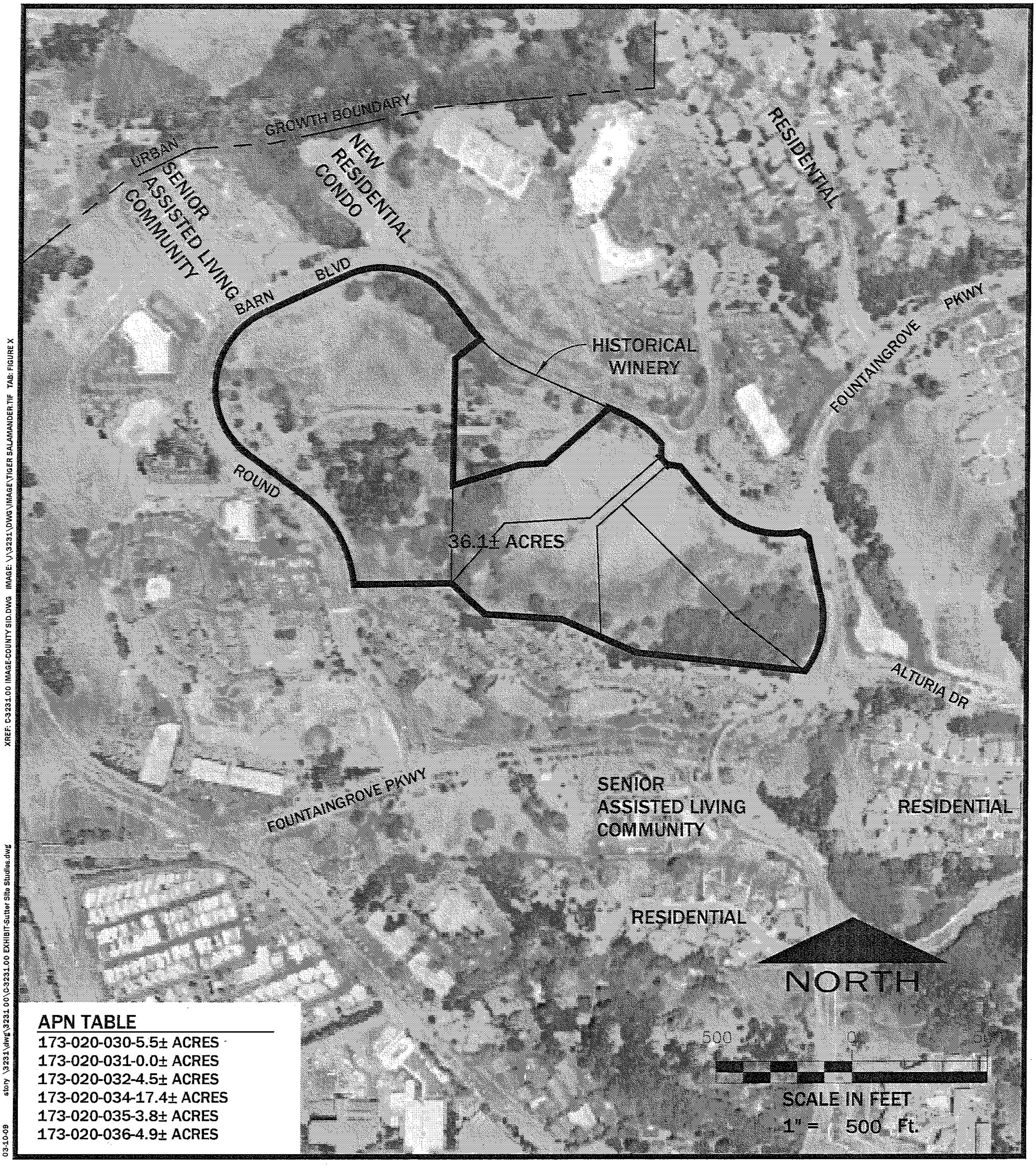
EXHIBIT PREPARED MARCH 2009

FIGURE S



FOUNTAINGROVE WINERY SITE
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

Appendix N2

Sutter Medical Center Project Requested Information Concerning Project Alternatives

Sutter Medical Center Project
Requested Information Concerning Project Alternatives

Information Requested By County Regarding Alternatives

The County has determined that it is appropriate to analyze the following alternatives, in the Environmental Impact Report ("EIR") for the Sutter Santa Rosa Medical Center/ Luther Burbank Memorial Foundation Project, as described in the Administrative Draft EIR Project Description:

1. No Project

2. Shiloh Road Alternative Site

3. Todd Road/ Moorland Alternative Site

4a Decentralized Alternative (Physicians Medical Center (PMC) and Medical Office Building (MOB) at Mark West Springs site, and Santa Rosa Medical Center hospital (SMRC) and MOB at Todd/Road Moorland site)

4b Decentralized Alternative (PMC/MOB at Mark West Springs site and SRMC/MOB at Ring Property site)

5. No Helistop Alternative

6. 70-Bed SRMC Only Alternative

7. Overall Reduced Project Alternative

County staff has requested that Sutter provide the County with a details regarding the scope of certain of these alternatives, as well as qualitative information regarding the potential environmental impacts of development of certain of these alternatives. County staff has not requested any information from Sutter regarding Alternatives 1 or 5. As well, County staff has informed Sutter that the County will collect the data necessary to complete the analysis of the Project Alternatives for the EIR with respect to the following environmental impact categories: Aesthetics, Biological Resources, Cultural Resources, Hazards and Hazardous Materials, Land Use and Planning, Population and Housing, Public Services, and Recreation. Accordingly, the following discussion describes the scope of Alternatives 2, 3, 4a, 4b, 6 and 7**,** and also provides the information requested by the County with regard to the potential environmental impacts of development the alternatives.

2. Shiloh Road Alternative Site

Description of Shiloh Road Alternative

The Shiloh Road Alternative site is at the southeast corner of Shiloh Road at Highway 101. The site is within Town of Windsor limits, and is a part of the Shiloh Corridor Vision Plan. Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this vacant 27 acre site. The site is not owned by Sutter.

The Shiloh Road Alternative would include:

- Sutter Medical Center hospital with a building footprint of approximately 75,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 14,000 square feet, one story, with a maximum height of 24 feet.
- Physicians Medical Center with a building footprint of approximately 50,000 square feet, three stories, with a maximum height of 58 feet, including roof screens.
- Medical Office Building with a building footprint of approximately 30,000 square feet, three stories, with a maximum height of 58 feet, including roof screens.

The buildings would be developed as laid out in the attached site plan ("Shiloh Road Alternative Site Plan"), which also shows that the helistop would be located, at grade, near the south edge of the site, and that access to the site would be off of Shiloh Road.

Analysis of Environmental Impacts

Agricultural Resources

The site is designated as Farmland of Local Importance.

Air Quality

In order to assist the County in assessing the potential air quality impacts of development of this alternative, Sutter has confirmed with ENGEO that, from a preliminary geotechnical perspective, given the location of the Shiloh site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. Accordingly, it is expected that the air quality impacts associated with the surcharging and construction of foundations for this site will be similar to those associated with surcharging and construction of foundation at the Mark West Springs site. (ENGEO)

Geology/Soils

The site is shown to consist of a parcel encompassing approximately 25 acres. The site is currently undeveloped and occupied by seasonal vegetation. Topography is relatively flat at the site.

The site is located within the Coast Ranges geologic province of California, a series of northwest trending ridges and valleys. It is underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). This alluvium consists of unconsolidated deposits of sand, silt, gravel, and clay likely derived from the bedrock uplands and older unconsolidated deposits. According to USDA soil maps, the site is underlying by Clear Lake Clay (CfA) and Huichica Loam (HwB). Soil chemical properties of these surficial soils have a pH of ranging from 5.3 to 6.5. Plasticity Indices associated with these soils range from 10 to 36 percent. The ABAG regional liquefaction maps for this area show variability in the proximity of this site; generally high potential for liquefaction along stream courses or channels, and moderate to low potential outside of creek areas along the terrace areas.

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 2.0 miles east of the project area. It should therefore be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

From a feasibility level assessment, the main geologic and geotechnical considerations at this site include: seismicity and liquefaction potential, potential compressible soils and/or expansive soils, and presence of relatively shallow groundwater.

From a preliminary geotechnical perspective, given the location of the Shiloh, site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. A site specific geotechnical study would be necessary to characterize subsurface conditions of the with respect to project plans, define site specific hazards and to provide recommendations for mitigation, as necessary. For this site, if compressible or potentially liquefiable soils present a significant concern, then the use of treatment or mitigation, such as pre-consolidation or surcharging, or other various ground improvement techniques may be most appropriate. Also, depending on the structural loads at the sites and the subsurface soils, it is possible that deep foundations may be called for and suitable to provide support for planned buildings. Of the available deep systems pre-cast driven piles or cast-in-place piers may be appropriate. If soils conditions and building loads are favorable to allow for structural loads to be supported on shallow foundation systems, then the use of spread and continuous footings combined with floor slabs-on-grade, or structural reinforced mats may be appropriate. If expansive or corrosive soils are encountered then grading and design measures to mitigate these conditions would also be warranted. (ENGEO)

Hydrology and Water Quality

According to FEMA Flood Insurance Rate Mapping, 80 – 85% of the Shiloh Road site lies within the 100-year flood plain of Pruitt Creek, which is located along the southern boundary of the parcel. The majority of the site is tributary to a culvert leading into the Shiloh Road Interchange right of way surface drainage system. It is subject to the hydraulic restriction of the culvert, and the combined site and highway drainage must travel overland and cross Caletti Avenue prior to entering the natural channel of Pruitt Creek west of the highway.

Currently, flooding regularly occurs within the US 101 Shiloh Road freeway interchange as well as along Shiloh Road west of the freeway, even during moderate storm events. Any development plan submitted to the Town of Windsor for the Shiloh Road site will be conditioned to at least not worsen, and likely improve, existing flooding conditions in the area downstream that will be affected by development of this parcel. In addition the volumetric displacement of overbank flood plain capacity by any proposed site improvements involving fill within the flood plain will be required to be replaced within the length of the adjacent reach of Pruitt Creek with an equivalent volume of available overbank storage for flood events. Such overbank storage replacement requirements are not present at the Mark West Springs site. The required setback from the creek bank is 2.5 horizontal feet to every 1 foot vertical plus 30 feet. Brelji and Race therefore estimates that an approximately a 50 foot setback would be required along Pruitt Creek.

It is also likely that creek capacity improvements will have to be implemented in conjunction with the development of the site to allow the creek channel to convey the 100 year storm flow with freeboard, as required by Town of Windsor development standards. Creating this capacity would likely take the form of creating a bypass channel parallel to the north side of the creek that would leave the existing creek and its banks in tact, except where the bypass channel leaves and re-enters the stream. This bypass channel would likely consume another 75 feet of land including setbacks.

As with the Mark West Springs site, the Shiloh Road site is undeveloped agricultural land (less than 50% impervious). Post-Construction the Best Management Practices applied to this site would be very similar to those proposed for the Mark West Springs site. The site plan would include vegetated bio-swales and structural filter units for runoff from roofs and pavements, and the stormwater detention facilities would also contribute. However, because this site is smaller in area, and without the advantage of an adjacent property (as is true at the Mark West Springs site) on the downstream side to share the space necessary for detention facilities, it may be necessary to detain stormwater runoff in underground reservoirs, rather than in open-air basins, to allow adequate space for parking lots. Although effective for siltation removal, underground reservoirs do not have the advantage of plant life to contribute to bio-remediation of the detained runoff, and typically will need mechanical (pumping) assistance to discharge runoff back into the creek channel. Regular maintenance will also be necessary to remove silt from the reservoir wet well and to service the pumping equipment. (Brelje & Race)

Mineral Resources

The site has not been assigned a Mineral Resource Zone (MRZ) in publication SR 146 by the California Department of Mines and Geology; as such no significant resources are present at the site. (ENGEO)

Noise

Illingworth and Rodkin, in coordination with Mead & Hunt Inc., considered the noise impacts of development of the Proposed Project on the Shiloh Road site. Under this alternative the helistop would be located at grade near the south edge of the site and adjacent to the emergency room of the Sutter Medical Center hospital. The flight paths from the helistop would move to be toward the northwest and then south to fly with each path then following along Highway 101. The nearby land uses to the site are freeway and industrial to the southwest and commercial to the north, with no nearby residential land uses along the expected flight routes. Keeping the approach/departure path of the helicopter along Highway 101 will minimize noise impacts. There are no nearby noise-sensitive land uses. The noise contours created by the flight path are reflected in the attached diagram ("Shiloh Road Alternative Noise Contour Map").

Transportation and Traffic

The north side of the site is bounded by Shiloh Road, a major collector road at the southern Town limits. There is an older style interchange for Shiloh Road on Highway 101, with a two lane overcrossing of the freeway. The northbound off-ramp, which would provide the primary access for a hospital use on this site, was widened and improved with the development of the adjacent north Wal-Mart/Home Depot shopping center complex. The adopted Shiloh Village Vision Plan calls for Shiloh Road right of way to be expanded by 13 feet on each side, to allow for the street to be configured with a center median/left turn lane, a single travel lane in each direction, parallel in-street parking, and a flanking bike lane. It is possible that this configuration will change to accommodate an emergency vehicle access to the site, associated with the northbound off-ramp, similar to what is being provided at the Mark West Springs site. The northbound off-ramp intersection with Shiloh Road is currently signalized, and minor modifications will likely be required to this signal for this project. The southbound off-ramp is scheduled to be signalized with the Highway 101 project currently under construction.

The currently three-way intersection of Shiloh Road and Hembree Lane is also signalized. The main entrance to a hospital project at the Shiloh site would likely need to occur at this location, which would require converting the intersection to four-way operation, and modifying the signal accordingly. Other minor connections to Shiloh Road would likely be permitted by the Town of Windsor, but may be restricted by the proposed median to be right turn in/out only.

The site is accessible by Sonoma County Transit at Shiloh Road at Old Redwood Highway. (Brelje & Race)

[Mark Crane to provide operational characteristics of interchanges near site. County Public Works Department to provide available information on existing LOS conditions when intersections are identified.]

Utilities and Service Systems

Sewer System

The Shiloh Road site is within the Town limits. Development of the site for gateway commercial uses has been anticipated in sewer system planning. Based upon the Town of Windsor Master Sewer Plan, the trunk sewers serving this site should have capacity to serve development under this alternative. They are part of the Conde Trunk Line and a 15 inch line is located within Shiloh Road. The Shiloh Center commercial project, located directly to the north, will likely use less sewer capacity than originally projected given that it was developed a lower level of intensity that anticipated under the Town's Master Sewer Plan. As well, based upon the Master Sewer Plan, the Shiloh site was projected to generate 37,000 gallons of sewage per day. Assuming that the currently proposed full program is constructed at this site, sewage flow is expected to be just over 22,000 gallons per day, significantly below the original allocation to this site. Because sewer system capacity is largely a function of peak flows, and as peak hospital flows are not expected to directly correspond with currently experienced peak flow times, sewer capacity at this site is expected to be sufficient at this site. The treatment plant currently has sufficient capacity for anticipated growth; however, effluent storage and disposal capacity is currently limited. The Town has recently entered into an agreement with the City of Santa Rosa to construct a connection to the City's Geyser's pipeline project, which conveys treated wastewater to the Geyser's steam fields for injection into steam wells. This connection, when implemented, is anticipated to resolve the storage and disposal limitations. (Brelje & Race)

Water System

The Shiloh Road site is within the Town limits. Development of this site for gateway commercial uses has been anticipated in water system planning. The Town is currently in the process of updating their Water System Master Plan document. The Town has a well field along the Russian River and other well sources; however these have a finite capacity. Currently, supply approximates demand during peak periods. The Town is pursuing capacity improvements at several existing well sites, and continues to explore opportunities for additional wells. There is currently no moratorium on new connections to the system for properties such as this one which are within the service area but are currently unserved. As with all new municipal well projects, demand for water at this site raises questions as to whether these potential sites will prove to provide sufficient water supplies and requires permitting and environmental review with regard to the selected groundwater well locations. The Town's system currently has adequate storage to serve this use, although they are pursuing further storage capability increases to address peak demand situations. While water system infrastructure is in place in Shiloh Road along the project frontage, it will need to be looped through the site for domestic and fire protection purposes. (Brelje & Race)

3. Todd Road/Moorland Alternative Site

Description of Todd/Road Moorland Alternative

The Todd Road/Moorland Alternative is located at 801, 3809 & 3901 Moorland Avenue. The site is under County jurisdiction, but within the Urban Growth Boundary of the City of Santa Rosa. Under this alternative, the Proposed Project (Sutter Medical Center hospital, Central Utility Plant, Physicians Medical Center, and Medical Office Building) would be constructed on this mostly vacant 19.9 acre site. The site is not owned by Sutter.

The Todd Road/Moorland Alternative would include:

- Sutter Medical Center hospital with a building footprint of approximately 75,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 14,000 square feet, one story, with a maximum height of 24 feet.
- Physicians Medical Center with a building footprint of approximately 50,000 square feet, three stories, with a maximum height of 58 feet, including roof screens.
- Medical Office Building with a building footprint of approximately 30,000 square feet, three stories, with a maximum height of 58 feet, including roof screens.
- Structured Parking with a building footprint of approximately 38,000 square feet, three stories in height.

The buildings would be developed as laid out in the attached site plan ("Todd Road/Moorland Alternative Site Plan"), which also shows that the helistop would be located on top of the Structured Parking, and that access to the site would be off of Moorland Avenue.

Analysis of Environmental Impacts

Agricultural Resources

The site contains some Farmland of Local Importance.

Air Quality

In order to assist the County with its assessment of the potential air quality impacts of development of this alternative, Sutter has confirmed with ENGEO that, from a preliminary geotechnical perspective, given the location of the Todd Road/Mooreland site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. Accordingly, it is expected that the air quality impacts associated with the surcharging and construction of foundations for this site will be similar to those associated with surcharging and construction of foundation at the Mark West Springs site. (ENGEO)

Geology/Soils

The site is shown to consist of 4 parcels encompassing approximately 20 acres. Majority of the site is currently undeveloped with a paved area used for parking located at the northern portion of the site. In general the topography at the site is relatively flat.

The site is located within the Coast Ranges geologic province of California, a series of northwest trending ridges and valleys. It is underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). The site is shown to be underlain by alluvial fan and fluvial terrace deposits. According to USDA soil maps, the site is underlying by Wright Loam (WhA). Soil chemical property of the near-surface soils have a pH rating of 5.8. Plasticity Index associated with the soil is rated at 0 percent. The ABAG regional liquefaction map for the area shows that the site has a low susceptibility to liquefaction and the USGS liquefaction susceptibility map (1998) suggests that the area is underlying by material that has a very low susceptibility to liquefaction.

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 3 miles east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996).

From a feasibility level assessment, the main geologic and geotechnical considerations at this site include: seismicity, potential compressible soils and/or expansive soils, and presence of relatively shallow groundwater.

From a preliminary geotechnical perspective, given the location of the Todd Road/Mooreland site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. A site specific geotechnical study would be necessary to characterize subsurface conditions of the with respect to project plans, define site specific hazards and to provide recommendations for mitigation, as necessary. For this site, if compressible or potentially liquefiable soils present a significant concern, then the use of treatment or mitigation, such as pre-consolidation or surcharging, or other various ground improvement techniques may be most appropriate. Also, depending on the structural loads at the sites and the subsurface soils, it is possible that deep foundations may be called for and suitable to provide support for planned buildings. Of the available deep systems pre-cast driven piles or cast-in-place piers may be appropriate. If soils conditions and building loads are favorable to allow for structural loads to be supported on shallow foundation systems, then the use of spread and continuous footings combined with floor slabs-on-grade, or structural reinforced mats may be appropriate. If expansive or corrosive soils are encountered then grading and design measures to mitigate these conditions would also be warranted. (ENGEO)

Hydrology and Water Quality

The Todd Mooreland site lies directly east of a constructed channel next to the SMART railroad right-of-way known as Moorland Creek, which runs along the western boundary of the site. The site is largely undeveloped except for a small paved parking lot and access road. There are existing surface drainage features carrying public street runoff from South Moorland Avenue directly west across the site to Moorland Creek which will need to be accounted for in any development design, as the runoff they convey will need to be routed around new structures. The Sonoma County Water Agency's tributary map for Moorland Creek indicates that commercial development of these parcels was anticipated in the design of the constructed natural channel of Moorland Creek along the SMART railroad right-of-way. Moorland Creek connects into the Todd Flood Control Channel just south of the site. The site is likely to need fill in order to create sufficient fall from the buildings to the drainage-way, especially for any piped drainage. While there are no published flood designations for this site, the topography is flat, it does adjoin flood control channels, and is in the southwest area of Santa Rosa, which is known for high water table conditions in typical winter seasons, as well as generally poor surface drainage.

Post-Construction Best Management Practices applied to this site would be very similar to those proposed for the Mark West Springs Road site. The site plan would include vegetated bio-swales and structural filter units for runoff from roofs and pavements, and the storm-water detention facilities could also contribute to the treatment train. For storm-water quality control purposes, the post-construction 2-year peak runoff from the site must be limited to pre-construction values, similar to the criteria that is to be applied to the Mark West Springs Road site, and would be addressed by employing detention basins to control peak runoff. However, because this site is smaller in area than the Mark West Springs Road site it may be necessary to detain storm-water runoff in underground reservoirs, rather than in open-air basins, to allow adequate space for parking lots. Although effective for siltation removal, underground reservoirs do not have the advantage of plant life to contribute to bio-remediation of the detained runoff, and typically will need mechanical (pumping) assistance to discharge runoff back into the creek channel. Regular maintenance will also be necessary to remove silt from the reservoir wet well and to service the pumping equipment. (Brelje & Race)

Mineral Resources

The area within the project site is mapped as MRZ-1 or MRZ-4 by California Department of Mines and Geology in publication SR 146. MRZ-1 is identified as an area either adequate information indicating that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence. MRZ-4 is identified by an area where available information is inadequate for assignment of any mineral resource zone. (ENGEO)

Noise

Illingworth and Rodkin, in coordination with Mead & Hunt Inc., considered the noise impacts of development of the Proposed Project on the Todd Road/Moorland site. Under this alternative the helistop would be located on the roof of the three-story parking garage with access to the Sutter Medical Center hospital's emergency room via elevator from the roof and then across the parking lot. The flight paths from the helistop would be toward the north and southeast and then both paths would follow Highway 101. The nearby land uses to the site are freeway to the east, rail line to the west, industrial in all directions and some residential across Todd Road to the north. Helicopter operations would be potentially audible to some of the residential areas to the north, but freeway and future SMART train noise would be dominant. Keeping the approach/departure paths of the helicopters along Highway 101 will minimize noise impacts. The noise impacts to residences would be similar to those at the Proposed Project. The noise contours created by the flight paths are reflected in the attached diagram ("Todd Road/Moorland Alternative Noise Contour Map").

Transportation and Traffic

Access to the site is provided by Mooreland Avenue, a minimally improved two-lane County-owned and maintained roadway. Along the project frontage, there are currently no curbs, gutters, or sidewalks, and there are moderately deep roadside ditches adjoin both sides of the roadway. The site lies immediately to the south of the Todd Road overcrossing of Highway 101. It is likely that the right of way of Mooreland Avenue transitions into Caltrans right of way at the northeast corner of the site. It is also likely that Mooreland Avenue south of the overcrossing would need to be widened and improved if the hospital program was constructed at this site. There is an overhead high voltage electrical transmission line along the west side of the street that would have to be relocated or placed underground with the widening of the street. This would be a significant expense, especially given the lengthy frontage of the site along Mooreland Avenue. The northern portion of the widening would be in Caltrans right of way.

The intersection of Mooreland Avenue and the overcrossing is currently signalized. The overcrossing is two lanes, and Mooreland Avenue north of the overcrossing to Todd Road is four lanes. The intersection of Mooreland Avenue and Todd Road is also signalized and is under Caltrans control. There are no sidewalks anywhere in the vicinity of the project along the west side of the freeway. Particularly, where the Mooreland Ave right-of-way directly adjoins the freeway fence, all widening would have to be on the project side, and would require the removal of existing mature trees, as well as the filling of the existing roadside ditch, which is likely a jurisdictional feature such as a wetland. South of the subject site, Mooreland Avenue continues to parallel the freeway right of way, then makes a sharp turn to the west and becomes Scenic Avenue, another marginally improved two-lane rural roadway owned and maintained by the County of Sonoma. Scenic Avenue extends westerly to an intersection with Stony Point Road. Neither Scenic Ave or Mooreland Avenue south of the subject site would provide suitable access to the site for patients or emergency vehicles. Improvements to these roadways would be constrained by the freeway right of way and existing private property improvements.

The site is accessible by Sonoma County Transit at Todd Road at Mooreland Avenue. (Brelje & Race)

[Mark Crane to provide operational characteristics of interchanges near site. County Public Works Department to provide available information on existing LOS conditions when intersections are identified.]

Utilities and Service Systems

Sewer System

The site is within the City of Santa Rosa's urban boundary, but is not adjacent to the current City limits, which are currently just south of Bellevue Avenue along Dutton Avenue, nearly one mile north of the Todd Road/Moorland site. LAFCO's policies prohibit non-contiguous annexations, and the City's Utility Certificate policy prohibits extending city services to parcels, unless they can be annexed to the City, or unless there is a documented health issue with a failed septic system. Therefore, providing service to this site would require a special exception to the City's Utility Certificate policy, which would have to be approved by the City Council, and would require the approval by LAFCO of an Outside Service Area Agreement with no near term possibility of annexation.

The city does have a relatively new sewer trunk line located in Todd Road, just to the north of the site. There are currently no sewer collection systems in Mooreland Avenue south of Todd Road. It is not certain if the trunk line would be sufficiently deep to allow for a gravity sewer main to be extended south in Mooreland Avenue to the site and through the site to serve the proposed buildings without construction of an onsite sewage lift station. However, a gravity extension in Mooreland Avenue to the project frontage appears feasible. The is capacity in the wastewater system now for the Project, but over time Santa Rosa will need to implement increases in capacity and/or storage. The property to the immediate north of the subject site is within the Southpark Sanitation District. (Brelje & Race)

Water System

The site is within the City of Santa Rosa's urban boundary, but is not adjacent to the current city limits, which are currently just south of Bellevue Avenue along Dutton Ave, nearly one mile north of the subject site. LAFCO's policies prohibit non-contiguous annexations, and the City's Utility Certificate policy prohibits extending city services to parcels unless they can be annexed to the City, or there is a documented health issue with a contaminated water supply. Therefore, providing service to this site would require a special exception to the City's Utility Certificate policy, which would have to be approved by the City Council, and would require the approval by LAFCO of an Outside Service Area Agreement with no near term possibility of annexation.

Unlike with sewer service, several properties adjoining the Todd/Road Moorland site do currently receive water service from the City of Santa Rosa water system, though for fire protection services only. There is a 14 inch diameter City water line in Mooreland Avenue south of Todd Road that extends along and beyond the project frontage. It is likely that this line could provide adequate flow to serve the domestic and fire protection needs of the development, but it would be essentially a dead-end line, with very limited possibility of looping to provide two sources of water in the event of an emergency. Any such connection would require an easement from the adjoining north owner, and a possible reconfiguration of their onsite fire protection system. It is also likely that the available water pressure in this location is less than 60 psi static, which would likely require a booster pump for fire and domestic uses. (Brelje & Race)

4a. Decentralized Alternative A

Description of Decentralized Alternative A

The Decentralized Alternative One proposes the construction on the Proposed Project site of a 28-bed Physicians Medical Center, a 50,000 square foot medical office building and a 10,00 square foot central utility plant ("Mark West Site"). The 70-bed Sutter Medical Center hospital, a 50,000 square foot medical office building and a central utility plant would be constructed on the Todd Road/Moorland Site.

The Todd Road/Moorland Site is located at 801, 3809 & 3901 Moorland Avenue. The site is under County jurisdiction, but within the Urban Growth Boundary of the City of Santa Rosa. The site is mostly vacant and is 19.9 acres in size. The site is not owned by Sutter.

The Todd Road/Moorland Site Element of Decentralized Alternative One would include:

- Sutter Medical Center hospital with a building footprint of approximately 75,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 14,000 square feet, one story, with a maximum height of 24 feet.
- Medical Office Building with a building footprint of approximately 25,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.

The buildings would be developed as laid out in the attached site plan ("Decentralized Alternative One"), which also shows that the helistop would be located, at grade, in the southwest quadrant of the site, and that access to the site would be off of Moorland Avenue.

The Mark West Site Element of Decentralized Alternative One would include:

- Physicians Medical Center with a building footprint of approximately 75,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Medical Office Building with a building footprint of approximately 25,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 10,000 square feet, one story, with a maximum height of 24 feet.

The buildings would be developed as laid out in the attached site plan ("Decentralized Alternative A"), which also shows that the helistop would be located at grade, and that access to the site would be off of Mark West Road.

Analysis of Environmental Impacts

Agricultural Resources

The Todd Road/Moorland Site and the Mark West site contains some Prime Farmland and some Farmland of Local Importance.

Air Quality

In order to assist the County with its assessments of the potential air quality impacts of development of this alternative, Sutter has confirmed with ENGEO that, from a preliminary geotechnical perspective, given the location of the Todd Road/Mooreland site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. Accordingly, it is expected that the air quality impacts associated with the surcharging and construction of foundations for this site will be similar to those associated with surcharging and construction of foundation at the Mark West Springs site. (ENGEO)

Geology/Soils

The Todd Road/Moorland site is shown to consist of 4 parcels encompassing approximately 20 acres. Majority of the site is currently undeveloped with a paved area used for parking located at the northern portion of the site. In general the topography at the site is relatively flat.

The site is located within the Coast Ranges geologic province of California, a series of northwest trending ridges and valleys. It is underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). The site is shown to be underlain by alluvial fan and fluvial terrace deposits. According to USDA soil maps, the site is underlying by Wright Loam (WhA). Soil chemical property of the near-surface soils have a pH rating of 5.8. Plasticity Index associated with the soil is rated at 0 percent. The ABAG regional liquefaction map for the area shows that the site has a low susceptibility to liquefaction and the USGS liquefaction susceptibility map (1998) suggests that the area is underlying by material that has a very low susceptibility to liquefaction.

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 3 miles east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996).

From a feasibility level assessment, the main geologic and geotechnical considerations at this site include: seismicity, potential compressible soils and/or expansive soils, and presence of relatively shallow groundwater.

From a preliminary geotechnical perspective, given the location of the Todd Road/Mooreland site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. A site specific geotechnical study would be necessary to characterize subsurface conditions of the with respect to project plans, define site specific hazards and to provide recommendations for mitigation, as necessary. For this site, if compressible or potentially liquefiable soils present a significant concern, then the use of treatment or mitigation, such as pre-consolidation or surcharging, or other various ground improvement techniques may be most appropriate. Also, depending on the structural loads at the sites and the subsurface soils, it is possible that deep foundations may be called for and suitable to provide support for planned buildings. Of the available deep systems pre-cast driven piles or cast-in-place piers may be appropriate. If soils conditions and building loads are favorable to allow for structural loads to be supported on shallow foundation systems, then the use of spread and continuous footings combined with floor slabs-on-grade, or structural reinforced mats may be appropriate. If expansive or corrosive soils are encountered then grading and design measures to mitigate these conditions would also be warranted. (ENGEO)

Hydrology and Water Quality

The Todd Road Mooreland site lies directly east of a constructed channel next to the SMART railroad right-of-way known as Moorland Creek, which runs along the western boundary of the site. The site is largely undeveloped except for a small paved parking lot and access road. There are existing surface drainage features carrying public street runoff from South Moorland Avenue directly west across the site to Moorland Creek which will need to be accounted for in any development design, as the runoff they convey will need to be routed around new structures. The Sonoma County Water Agency's tributary map for Moorland Creek indicates that commercial development of these parcels was anticipated in the design of the constructed natural channel of Moorland Creek along the SMART railroad right-of-way. Moorland Creek connects into the Todd Flood Control Channel just south of the site. The site is likely to need fill in order to create sufficient fall from the buildings to the drainage-way, especially for any piped drainage. While there are no published flood designations for this site, the topography is flat, it does adjoin flood control channels, and is in the southwest area of Santa Rosa, which is known for high water table conditions in typical winter seasons, as well as generally poor surface drainage.

Post-Construction Best Management Practices applied to the Todd Road/Moorland site would be very similar to those proposed for the Mark West Springs Road site. The site plan would include vegetated bio-swales and structural filter units for runoff from roofs and pavements, and the storm-water detention facilities could also contribute to the treatment train. For storm-water quality control purposes, the post-construction 2-year peak runoff from the site must be limited to pre-construction values, similar to the criteria that is to be applied to the Mark West Springs Road site, and would be addressed by employing detention basins to control peak runoff. However, because this site is smaller in area than the Mark West Springs Road site it may be necessary to detain storm-water runoff in underground reservoirs, rather than in open-air basins, to allow adequate space for parking lots. Although effective for siltation removal, underground reservoirs do not have the advantage of plant life to contribute to bio-remediation of the detained runoff, and typically will need mechanical (pumping) assistance to discharge runoff back into the creek channel. Regular maintenance will also be necessary to remove silt from the reservoir wet well and to service the pumping equipment. (Brelje & Race)

Mineral Resources

The area within the Todd Road/Moorland site is mapped as MRZ-1 or MRZ-4 by California Department of Mines and Geology in publication SR 146. MRZ-1 is identified as an area either adequate information indicating that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence. MRZ-4 is identified by an area where available information is inadequate for assignment of any mineral resource zone. (ENGEO)

Noise

Illingworth and Rodkin, in coordination with Mead & Hunt Inc., considered the noise impacts of development of the Proposed Project on the Todd Road/Moorland site as configured in the Decentralized Alternative. Under this alternative the helistop would be located at grade on the east side of the site with access to the Sutter Medical Center hospital's emergency room across the parking lot. The flight paths from the helistop would be toward the north and southeast and then both paths would follow Highway 101. The nearby land uses to the site are freeway to the east, rail line to the west, industrial in all directions and some residential across Todd Road to the north. Helicopter operations would be more audible to some of the residential areas to the north than under Alternative 3 due to the operations being slight lower to the ground as the helistop would be located at grade. However, the noise impacts to residences would be still be similar to those that would be experienced under the Proposed Project. The noise contours created by the flight path are reflected in the attached diagram ("Todd Road/Moorland Decentralized Alternative Noise Contour Map").

Transportation and Traffic

Access to the Todd Road/Moorland site is provided by Mooreland Avenue, a minimally improved two-lane County-owned and maintained roadway. Along the project frontage, there are currently no curbs, gutters, or sidewalks, and there are moderately deep roadside ditches adjoin both sides of the roadway. The site lies immediately to the south of the Todd Road overcrossing of Highway 101. It is likely that the right of way of Mooreland Avenue transitions to Caltrans right of way at the northeast corner of the site. It is also likely that Mooreland Avenue south of the overcrossing would need to be widened and improved if the hospital program was constructed at this site. There is an overhead high voltage electrical transmission line along the west side of the street that would have to be relocated or placed underground with the widening of the street. This would be a significant expense, especially given the lengthy frontage of the site along Mooreland Avenue. The northern portion of the widening would be in Caltrans right of way.

The intersection of Mooreland Avenue and the overcrossing is currently signalized. The overcrossing is two lanes, and Mooreland Avenue north of the overcrossing to Todd Road is four lanes. The intersection of Mooreland Avenue and Todd Road is also signalized and is under Caltrans control. There are no sidewalks anywhere in the vicinity of the project along the west side of the freeway. Particularly, where the Mooreland Ave right-of-way directly adjoins the freeway fence, all widening would have to be on the project side, and would require the removal of existing mature trees, as well as the filling of the existing roadside ditch, which is likely a jurisdictional feature such as a wetland. South of the subject site, Mooreland Avenue continues to parallel the freeway right of way, then makes a sharp turn to the west and becomes Scenic Avenue, another marginally improved two-lane rural roadway owned and maintained by the County of Sonoma. Scenic Avenue extends westerly to an intersection with Stony Point Road. Neither Scenic Ave or Mooreland Avenue south of the subject site would provide suitable access to the site for patients or emergency vehicles. Improvements to these roadways would be constrained by the freeway right of way and existing private property improvements.

The site is accessible by Sonoma County Transit at Todd Road at Mooreland Avenue. (Brelje & Race)a

[Mark Crane to provide operational characteristics of interchanges near site. County Public Works Department to provide available information on existing LOS conditions when intersections are identified.]

Utilities and Service Systems

<u>Sewer System</u>

The Todd Road/Moorland site is within the City of Santa Rosa's urban boundary, but is not adjacent to the current City limits, which are currently just south of Bellevue Avenue along Dutton Avenue, nearly one mile north of the Todd Road/Moorland site. LAFCO's policies prohibit non-contiguous annexations, and the City's Utility Certificate policy prohibits extending city services to parcels, unless they can be annexed to the City, or unless there is a documented health issue with a failed septic system. Therefore, providing service to this site would require a special exception to the City's Utility Certificate policy, which would have to be approved by the City Council, and would require the approval by LAFCO of an Outside Service Area Agreement with no near term possibility of annexation.

The City does have a relatively new sewer trunk line located in Todd Road, just to the north of the site. There are currently no sewer collection systems in Mooreland Avenue south of Todd Road. It is not certain if the trunk line would be sufficiently deep to allow for a gravity sewer main to be extended south in Mooreland Avenue to the site and through the site to serve the proposed buildings without construction of an onsite sewage lift station. However, a gravity extension in Mooreland Avenue to the project frontage appears feasible. The is capacity in the wastewater system now for the Project, but over time Santa Rosa will need to implement increases in capacity and/or storage. The property to the immediate north of the subject site is within the Southpark Sanitation District. (Brelje & Race)

<u>Water System</u>

The Todd Road/Moorland site is within the City of Santa Rosa's urban boundary, but is not adjacent to the current city limits, which are currently just south of Bellevue Avenue along Dutton Ave, nearly one mile north of the subject site. LAFCO's policies prohibit non-contiguous annexations, and the City's Utility Certificate policy prohibits extending city services to parcels unless they can be annexed to the City, or there is a documented health issue with a contaminated water supply. Therefore, providing service to this site would require a special exception to the City's Utility Certificate policy, which would have to be approved by the City Council, and would require the approval by LAFCO of an Outside Service Area Agreement with no near term possibility of annexation.

Unlike with sewer service, several properties adjoining the Todd/Road Moorland site do currently receive water service from the City of Santa Rosa water system, though for fire protection services only. There is a 14 inch diameter City water line in Mooreland Avenue south of Todd Road that extends along and beyond the project frontage. It is likely that this line could provide adequate flow to serve the domestic and fire protection needs of the development, but it would be essentially a dead-end line, with very limited possibility of looping to provide two sources of water in the event of an emergency. Any such connection would require an easement from the adjoining north owner, and a possible reconfiguration of their onsite fire protection system. It is also likely that the available water pressure in this location is less than 60 psi static, which would likely require a booster pump for fire and domestic uses. (Brelje & Race)

4b. Decentralized Alternative Two

Description of Decentralized Alternative B

The Decentralized Alternative B proposes the construction on the Proposed Project site of a 28-bed Physicians Medical Center, a 50,000 square foot medical office building and a 10,00 square foot central utility plant ("Mark West Site"). The 70-bed Sutter Medical Center hospital, a 50,000 square foot medical office building and a central utility plant would be constructed on the Ring site.

The Ring site is located at 1700 Hampton Way in Santa Rosa. The site is approximately 18.5 acres in size and is located south of and adjacent to Highway 12 and Stony Point Road. The site is not owned by Sutter.

The Ring Property Site Element of Decentralized Alternative One would include:

- Sutter Medical Center hospital with a building footprint of approximately 60,000 square feet, three stories, with a maximum height of 58 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 14,000 square feet, one story, with a maximum height of 24 feet.
- Medical Office Building with a building footprint of approximately 25,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.

The buildings would be developed as laid out in the attached site plan ("Decentralized Alternative Two"), which also shows that the helistop would be located on the roof of the Sutter Medical Center, and that access to the site would be off of Sebastopol Road.

The Mark West Site Element of Decentralized Alternative One would include:

- Physicians Medical Center with a building footprint of approximately 75,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Medical Office Building with a building footprint of approximately 25,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 10,000 square feet, one story, with a maximum height of 24 feet.

The buildings would be developed as laid out in the attached site plan ("Decentralized Alternative B"), which also shows that the helistop would be located at grade in the southwest corner of the site, and that access to the site would be off of Mark West Road.

Analysis of Environmental Impacts

Agricultural Resources

The Ring Site contains no significant farmland, and the Mark West site contains some Prime Farmland and some Farmland of Local Importance.

Air Quality

In order to assist the County with its assessment of the potential air quality impacts of development of this alternative, Sutter has confirmed with ENGEO that, from a preliminary geotechnical perspective, given the location of the Ring Property site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. Accordingly, it is expected that the air quality impacts associated with the surcharging and construction of foundations for this site will be similar to those associated with surcharging and construction of foundation at the Mark West Springs site. (ENGEO)

Geology/Soils

The Ring Property site is shown to consist of 5 parcels encompassing approximately 19 acres. The site is currently occupied by commercial and industrial developments and paved parking areas with portions of the site occupied by undeveloped space consisting of seasonal vegetation and flat topographic relief.

The site is located within the Coast Ranges geologic province of California, a series of northwest trending ridges and valleys. It is underlain by Holocene-Pleistocene Alluvium (Wagner and Bortugno, 1982). The site is shown to be underlain by alluvial fan and fluvial terrace deposits. According to USDA soil maps, the site is underlying by Yolo Gravelly Loam (YrB) and Zamora Silty Clay Loam (ZaA). Soil chemical properties of these surficial soils have a pH of 6.7. Plasticity Indices associated with these soils range from 10 to 15 percent. The ABAG regional liquefaction map for the area shows that the site has a low susceptibility to liquefaction; however, USGS liquefaction susceptibility map (1998) suggests that the area is underlying by material that has a moderate susceptibility to liquefaction.

The site is not located within the State of California Fault Hazard Zone; however, it is situated in a region that contains numerous active and potentially active earthquake faults. The active Rodgers Creek fault is located approximately 2 ½ miles east of the project area. The Rodgers Creek fault is capable of creating earthquakes with a moment magnitude of M7.0 (Blake, 1996). It should be expected that the site will experience one or more episodes of strong ground shaking during the design life of the proposed improvements.

From a feasibility level assessment, the main geologic and geotechnical considerations at this site include: seismicity and liquefaction potential, potential compressible soils and/or expansive soils, possible undocumented fills from current site uses, and presence of relatively shallow groundwater.

From a preliminary geotechnical perspective, given the location of the Ring Property site with respect regional geologic conditions, the overall measures and strategies to mitigate geologic and geotechnical hazards for future land development to an acceptable-level are anticipated to be similar to those proposed for the Mark West Springs site. A site specific geotechnical study would be necessary to characterize subsurface conditions of the with respect to project plans, define site specific hazards and to provide recommendations for mitigation, as necessary. For this site, if compressible or potentially liquefiable soils present a significant concern, then the use of treatment or mitigation, such as pre-consolidation or surcharging, or other various ground improvement techniques may be most appropriate. Also, depending on the structural loads at the sites and the subsurface soils, it is possible that deep foundations may be called for and suitable to provide support for planned buildings. Of the available deep systems pre-cast driven piles or cast-in-place piers may be appropriate. If soils conditions and building loads are favorable to allow for structural loads to be supported on shallow foundation systems, then the use of spread and continuous footings combined with floor slabs-on-grade, or structural reinforced mats may be appropriate. If expansive or corrosive soils are encountered then grading and design measures to mitigate these conditions would also be warranted. (ENGEO)

Hydrology and Water Quality

The Ring Property site sits on high ground several feet above the adjacent freeway (State Route 12) cut, and therefore has a very low likelihood for flooding. The parcel north of the multi-use path and south of State Route 12 has functioned recently as a golf driving range, therefore the majority of the site is turf, along with a small parking lot and clubhouse, that drain to the southeast into the upstream end of the Burbank Avenue storm drain main. The drain main carries runoff about 0.6 miles south before discharging into Roseland Creek. The parcels to the south of the multi-use path are undeveloped, except that one of them contains a vehicle dismantling business with a high potential for pollutants of concern. The lots have only one or perhaps two adjacent underground storm drains leading to surrounding public street systems which might have capacity available for connection to a private system. The site recently was approved for a medium-density residential development suggests that there is likely to be sufficient capacity. It is likely that the downstream storm drainage systems have inadequate capacity for the development, necessitating a storm water detention system similar to that proposed at the Mark West Springs site.

Post-Construction Best Management Practices applied to this site would be governed by the City Mark West Spring site. The site plan would include vegetated bio-swales and structural filter units for runoff from roofs and pavements, and the storm-water detention facilities could also contribute to improving water quality. For storm-water quality control purposes, the post-construction 2-year peak runoff from the site must be limited to pre-construction values, similar to the criteria that is to be applied to the Mark West Spring site, and would be addressed by employing detention basins to control peak runoff. However, due to the size and awkward configuration of the site, it may be necessary to detain storm-water runoff in underground reservoirs, rather than in open-air basins, to allow adequate space for parking lots. Although effective for siltation removal, underground reservoirs do not have the advantage of plant life to contribute to bio-remediation of the detained runoff, and may need mechanical (pumping) assistance to discharge runoff into the storm drain system. Regular maintenance will also be necessary to remove silt from the reservoir wet well and to service the pumping equipment. (Brelje & Race)

Mineral Resources

The area within the Ring site is mapped as MRZ-1 or MRZ-4 by California Department of Mines and Geology in publication SR 146. MRZ-1 is identified as an area either adequate information indicating that no significant mineral deposits are present or where it is judged that little likelihood exists for their presence. MRZ-4 is identified by an area where available information is inadequate for assignment of any mineral resource zone. (ENGEO)

Noise

Illingworth and Rodkin, in coordination with Mead & Hunt Inc., considered the noise impacts of development of the Proposed Project on the Ring Property site under the Decentralized Alternative. Under this alternative the helistop would be located on the roof of the three-story Sutter Medical Center hospital, with access to the emergency room via elevator from the roof. The primary flight path from the helistop would be north to Highway 12, with a secondary path to the south over an auto-wrecking yard. The nearby land uses to the site are freeway and residential to the north, a mobile home park adjacent on the southeast, and a mixture of commercial and industrial uses (mini-storage and auto-wrecking) in other directions. Helicopter operations would potentially overfly residential areas to the north and the mobile home park to the southeast, though the noise impacts will be somewhat masked by freeway noise. The noise impacts to area residences are expected to be greater than those that would be experienced under the Proposed Project. The noise contours created by the flight paths are reflected in the attached diagram ("Ring Property Decentralized Alternative Noise Contour Map").

Transportation and Traffic

Access to the Ring Property site is currently provided by several different streets, depending upon the individual parcel in question. The two main parcels, parallel to and south of Highway 12, take access from the north end of Hampton Way, off Sebastopol Road. This is a narrow, poorly maintained local street serving existing light industrial uses that directly front the roadway. Its use as the main or even secondary access for the hospital complex would be unsatisfactory from a functionality and visibility standpoint, given that the other existing uses take direct access from the roadway. Two of the other parcels that make up the site directly abut Sebastopol Road and currently have direct driveway access. The final parcel fronts on Stony Point Road immediately south of the Highway 12 eastbound on ramp from Stony Point Road. This parcel is located approximately mid-way between the existing signalized intersections at the entrance to two existing commercial centers, and the eastbound off/on ramps to Highway 12.

The proximity of these two existing signals would make signalizing of a new intersection at this parcel impractical. From a location standpoint, this would be the ideal location for an emergency vehicle entrance to the hospital. However, traffic congestion in this area, and the awkward configuration of such an access to the existing Stony Point/off-on ramp intersection would likely present operational challenges, and prevent its use as a main entrance to the hospital. It is more likely that development at this site would take its primary access from Sebastopol Road, ideally along the east property line of APN 125-071-014, as this location would be approximately equidistant between the existing signal at Sebastopol/Stony Point Road, and the currently proposed signal at Sebastopol Road/Burbank Avenue. Signal proximity may still be an issue at this location, and, at a minimum, any new signal at the Sutter entrance would have to be interconnected with the signals to the east and west. This location would not be intuitive as a main entrance to the hospital complex, as it is not visible from the freeway, and the site is surrounded by existing commercial development, making branding of the hospital site difficult.

Both Stony Point Road and Sebastopol Roads are major arterial roadways, with two travel lanes in each direction, and turn lanes. Stony Point Road has sections of raised center median. The site is located at the southeast corner of the interchange between Highway 12 and Stony Point Road. The interchange is fully improved, with the Stony Point overcrossing being two travel lanes in each direction, plus turn lanes. All off/on ramps are fully signalized. This is an area of heavy traffic congestion during both the morning and evening commute periods, with traffic at the Stony Point Road/Sebastopol Rd intersection experiencing the heaviest congestion. A plan to expand Stony Point Road south of Sebastopol Road from two lanes to four lanes was recently delayed by the City Council for a major redesign.

The site is accessible by Santa Rosa Transit at Stony Point Road at Highway 12, and by Sonoma County Transit at Sebastopol Road at Hampton Way. (Brelje & Race)

[Mark Crane to provide operational characteristics of interchanges near site. County Public Works Department to provide available information on existing LOS conditions when intersections are identified.]

Utilities and Service Systems

Sewer System

The Ring Property site is within the City limits of Santa Rosa and is eligible for service upon payment of the applicable fees. There is a 6 inch sewer main stubbed to within 50 feet of the property on Hampton Way, a 12 inch sewer line in Sebastopol Road, and a 6 inch sewer line in Stony Point Road. The 6 inch line in Hampton Way may be able to provide limited service to minor uses on the hospital site, but is smaller than the currently permitted minimum main size of 8 inch. Given that this 6 inch line serves the existing uses on Hampton Way, capacity available to serve any portion of the development would be limited. Similarly, the 6 inch main in Stony Point Road could likely provide minor service to a portion of the site, but would not be capable of serving the entire development. Therefore, it is likely that a new sewer line would need to be constructed from Sebastopol Road, in the new site access road, to serve the majority of the hospital development. There are no other constraints to providing sewer service to the site. (Brelje & Race)

Water System

The site is currently within the City limits of Santa Rosa, and is eligible for service upon payment of the applicable fees. The site is well served by water at the present time, with a 12” public water main looping along the perimeter of the site from east to west, then south to Sebastopol Road. Static pressure in the area is approximately 67 psi. It may be desirable to increase the reliability of the system by constructing a secondary loop connection from the site out to Stony Point Road. At the present time, there are no restrictions on new connections to the City’s water system, and the City has more supply available from their own wells and from their contract with Sonoma County Water Agency, than current demands. However, the State Water Resources Control Board has mandated a 25% reduction in use for all users supplied by Sonoma County Water Agency for the summer of 2009 due to the lack of normal rainfall during the 2008/2009 season. Ongoing water supply shortages to the Sonoma County Water Agency system resulting from extended draught conditions in the basin could lead to future restrictions on connections to new users. (Brelje & Race)

6. 70-Bed Hospital Only Alternative

Description of 70-Bed Hospital Only Alternative

This alternative proposes the construction on the Proposed Project site of a 70-bed Sutter Medical Center hospital, a central utility plant and a helistop on the Mark West Springs site.

The 70-Bed Hospital Alternative would include:

- Sutter Medical Center hospital with a building footprint of approximately 37,750 square feet, two stories, with a maximum height of 42 feet, including roof screens.
- Central Utility Plant with a building footprint of approximately 8,000 square feet, one story, with a maximum height of 24 feet.

The buildings would be developed as laid out in the attached site plan ("70-Bed Hospital Only"), which also shows that the helistop would be located at grade at the same location proposed for the Project, and that access to the site would be off of Mark West Road.

Analysis of Environmental Impacts

Transportation and Traffic

Development of this Alternative would likely require only a single lane ramp at Highway 101 and Mark West Springs Road, if Caltrans permits a change in signal phasing by adding a right-turn green arrow. However, during events at the Wells Fargo Center, there are still likely to be back-ups onto the freeway mainline which Caltrans disfavors. Further, the improvements to Mark West Springs Road that are required under the Proposed Project will still be required under this Alternative. (Steve Colman)

7. Overall Reduced Project Alternative

Description of Overall Reduced Project Alternative

This alternative would include an overall the reduction in the proposed project of 33 percent with a Sutter Medical Center of 46 beds, a Physicians Medical Center of 19 beds, a Medical Office Building of 27,000 square feet, a central utility plant, and a helistop.

Sutter Medical Center Hospital: The Sutter Medical Center hospital would have a building footprint of approximately 59,200 square feet, two stories, with a maximum height of 42 feet, including roof screens. From an operational standpoint this alternative can be configured in one of two manners:

Across-the Board Reductions: Reduce the number of licensed beds, and service lines by 33% for all proposed hospital services.

This alternative would include 46 licensed beds with reductions in the following types of licensed beds: medical surgical, obstetrical/post partum/woman's services, intensive care (ICU), neonatal intensive care (NICU), and labor, delivery, recovery, post partum. It would also include a reduction in non-licensed services such as the universal care unit, emergency room beds, cat scans, radiology rooms, nuclear medicine, operating rooms, and special procedures.

Eliminate Specific Services: Reduce the hospital's size by eliminating or reducing specific services to achieve the 33% reduction.

This alternative would include 46 licensed beds. The reduction in beds could be accomplished by eliminating all medical surgical beds and reducing NICU beds, or by eliminating all labor, delivery, recovery, post partum beds and reducing NICU beds. In either event, this approach would also include the same types of reductions in the non-licensed services categories that would be required under the "Across-The-Board" approach.

Physicians Medical Center: The PMC would have a building footprint of approximately 37,750 square feet, two stories, with a maximum height of 42 feet, including roof screens.

The proposed project PMC would have 28 beds comprised of 24 medical surgical beds and 4 intensive care beds. Accordingly, a 33% reduction in beds would result in a 18 bed hospital. As this hospital is a joint venture in the process of syndication, it is not currently know what mix of beds might be for a reduced size alternative. In addition the number of non-licensed services is unknown at this time, so it is not possible to determine which non-licensed services would have to eliminated or reduced.

Medical Office Building: The MOB would have a building footprint of approximately 27,000 square feet, two stories, with a maximum height of 42 feet, including roof screens.

Central Utility Plant: The CUP would have a building footprint of approximately 12,000 square feet, one story, with a maximum height of 24 feet.

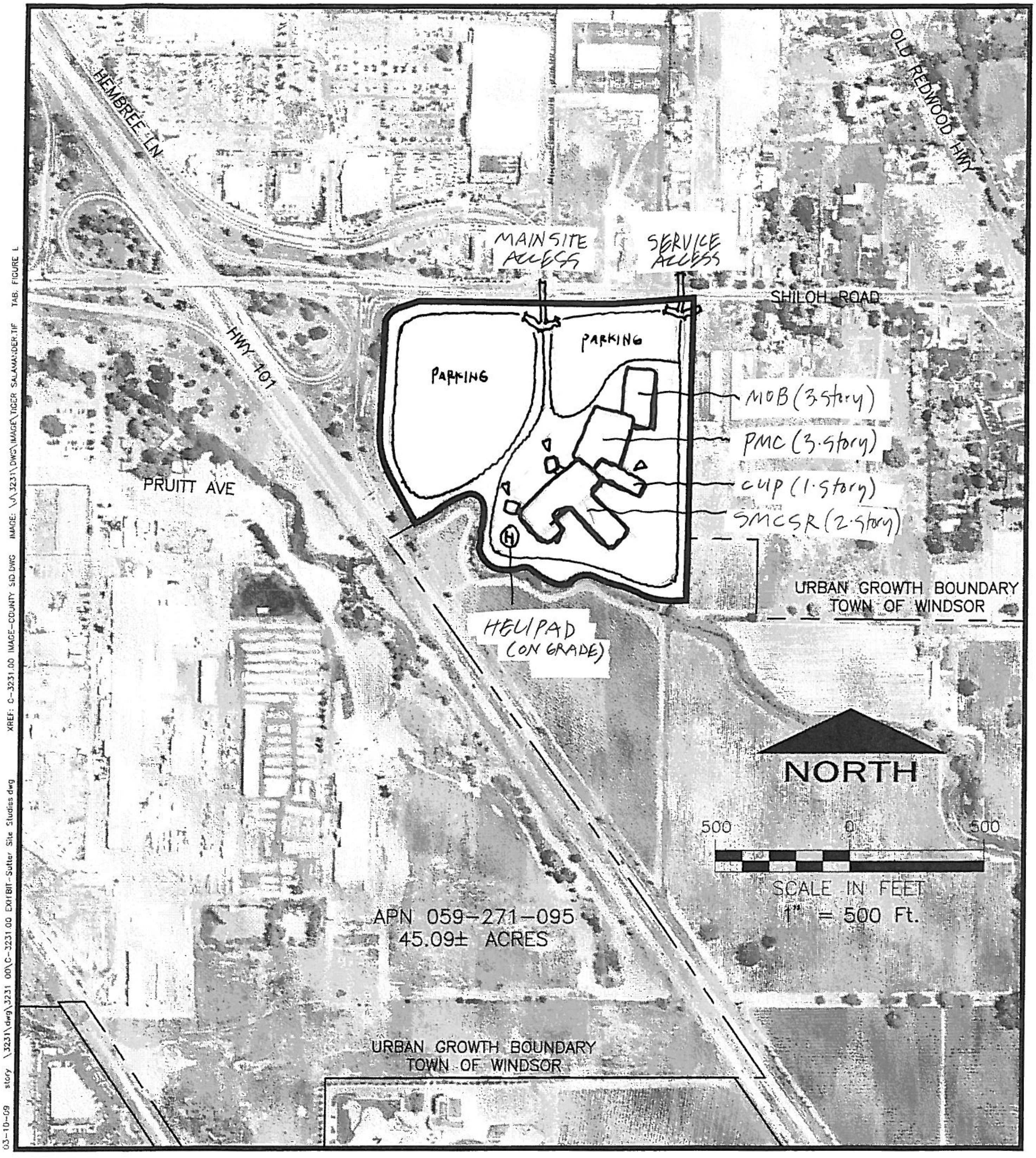
The buildings would be developed as laid out in the attached site plan (“Overall Reduced Project”), which also shows that the helistop would be located at grade in the southwest corner of the site, and that access to the site would be off of Mark West Road. This Alternative would require 654 parking spaces.

Analysis of Environmental Impacts

Transportation and Traffic

Development of this Alternative would generate 67% of the traffic of the Proposed Project, or 1908 trips per day.

Development of this Alternative would likely require only a single lane ramp at Highway 101 and Mark West Springs Road, if Caltrans permits a change in signal phasing by adding a right-turn green arrow. However, during events at the Wells Fargo Center, there are still likely to be back-ups onto the freeway mainline which Caltrans disfavors. Further, the improvements to Mark West Springs Road that are required under the Proposed Project will still be required under this Alternative. (Steve Colman)



SHILOH ROAD/101
SUTTER HOSPITAL ALTERNATE SITE STUDY

SITE PLAN

AERIAL PHOTO DATE 2005

ALT J

Brelje & Race
CONSULTING CIVIL ENGINEERS
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EXHIBIT PREPARED MARCH 2009

FIGURE L

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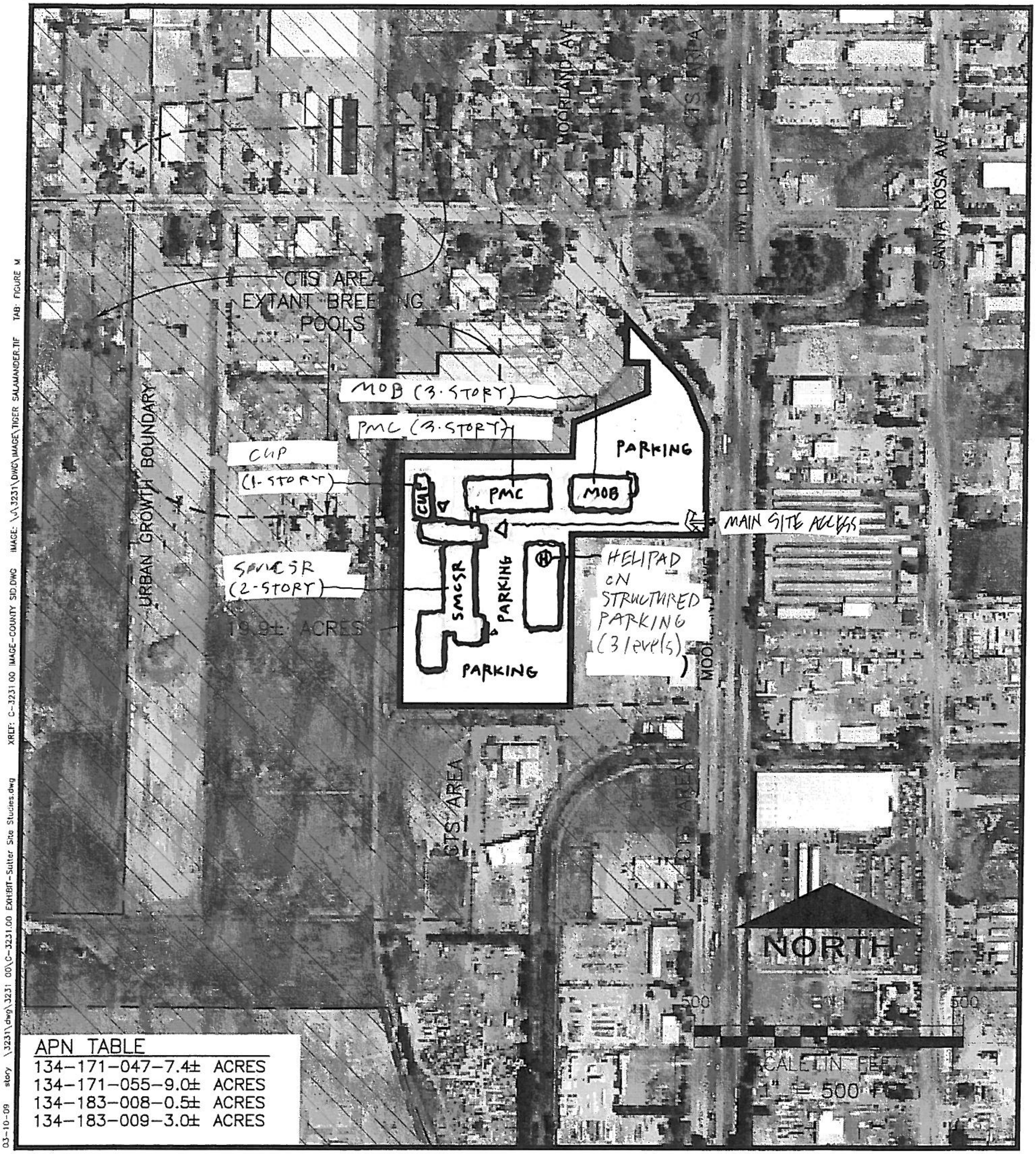

TODD ROAD/MOORLAND
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

ALT K

EXHIBIT PREPARED MARCH 2009

Brelje & Race
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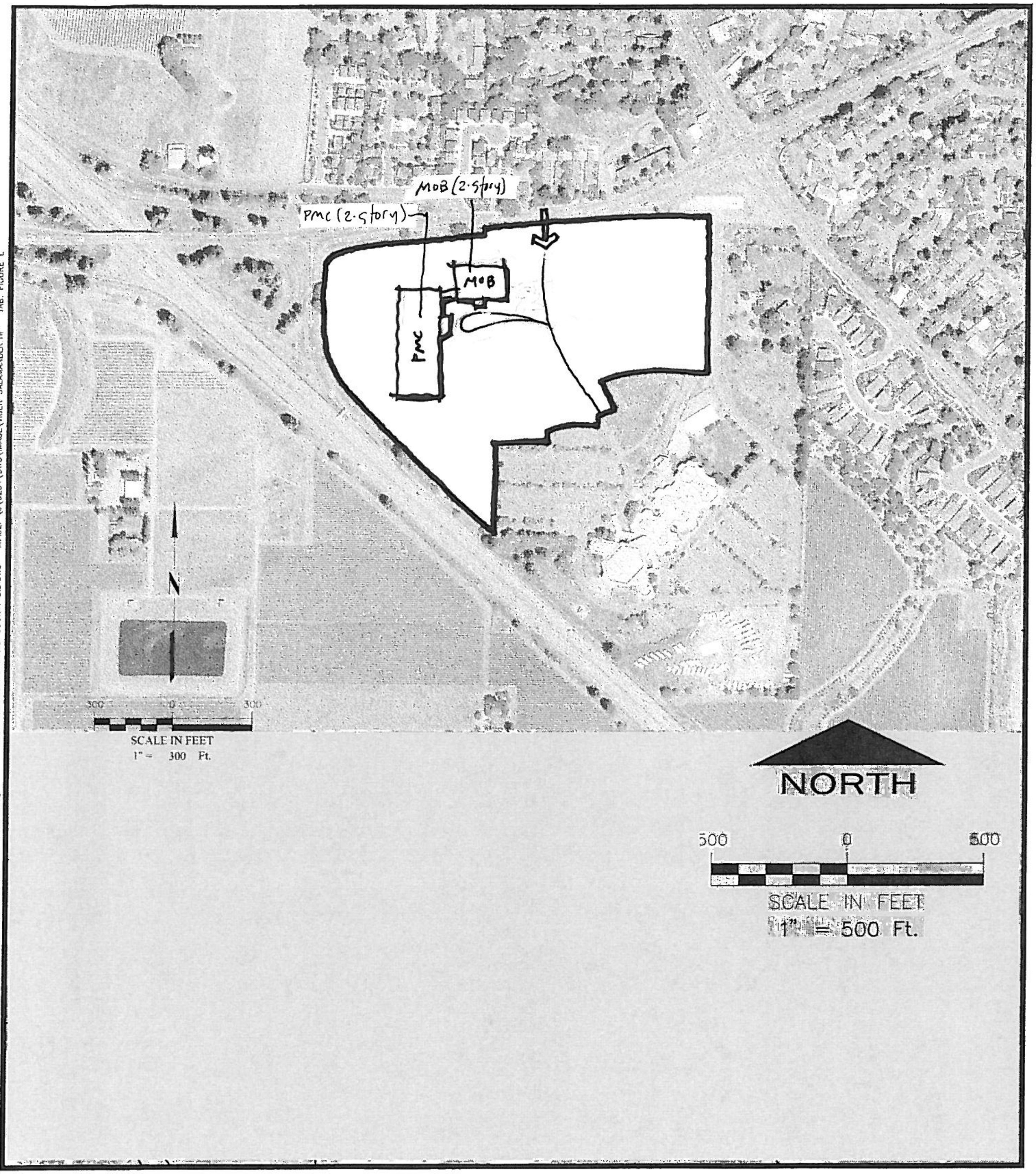
FIGURE K



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SUTTER HOSPITAL ALTERNATE STUDY

SITE PLAN

AERIAL PHOTO DATE 2005

ALT H

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EXHIBIT PREPARED MARCH 2009

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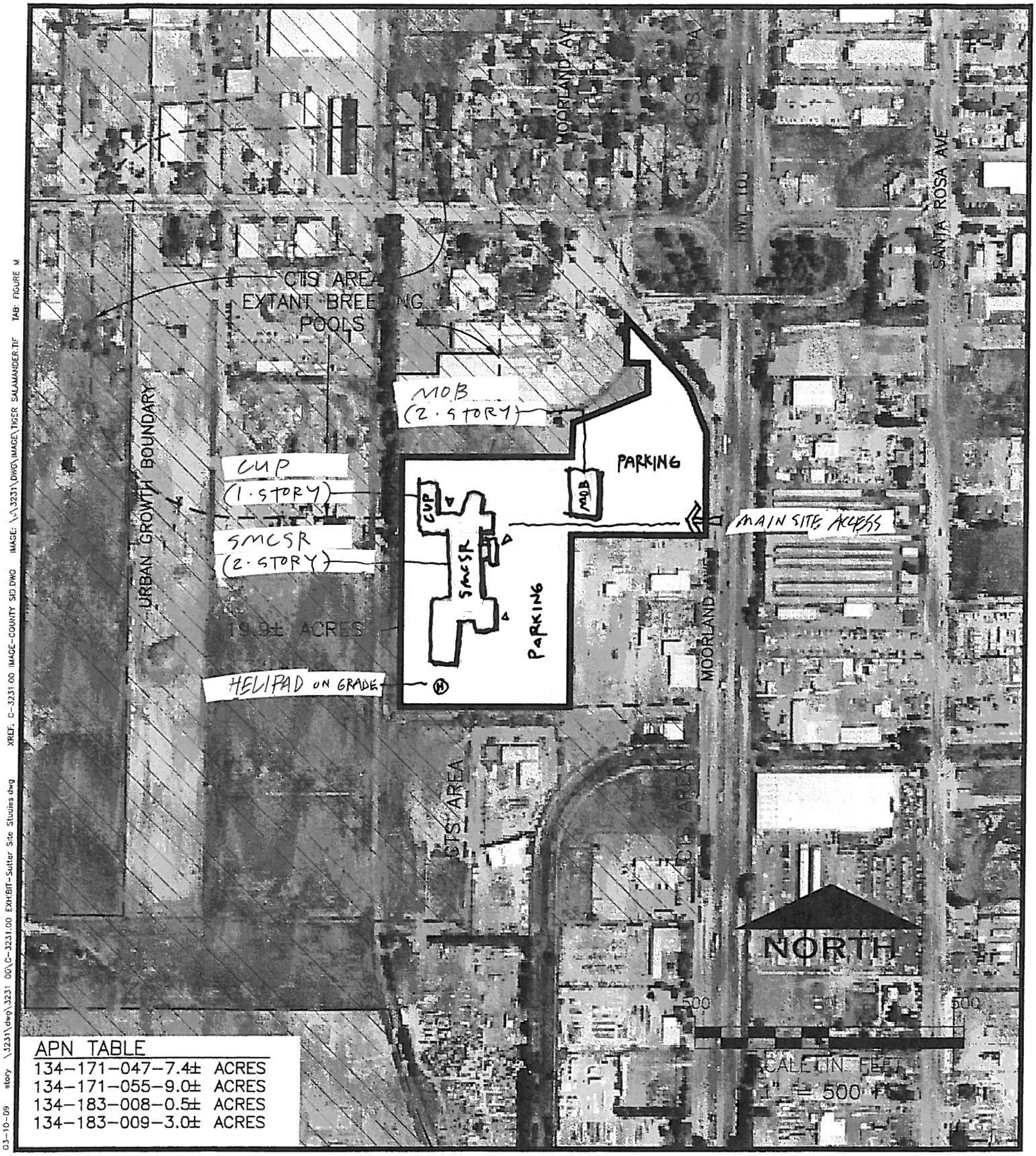

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19.9 ACRES

TODD ROAD/MOORLAND
SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

AVT H1

EXHIBIT PREPARED MARCH 2009

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FIGURE K

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RING PROPERTY
9.95 ACRES

SUTTER HOSPITAL ALTERNATE SITE PLAN

SITE PLAN

AERIAL PHOTO DATE 2007

ALT H_2

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CONSULTING CIVIL ENGINEERS

EXHIBIT PREPARED MARCH 2009

FIGURE N

APPENDIX O

POTENTIAL INDIRECT ENVIRONMENTAL AFFECTS TECHNICAL REPORTS

Analysis of Potential Indirect Environmental Effects of the Proposed Sutter Medical Center of Santa Rosa on Other Area Hospitals

Prepared by Sutter Medical Center of Santa Rosa
For Submission to Sonoma County

October 2009

Analysis of Potential Indirect Environmental Effects of the Proposed Sutter Medical Center of Santa Rosa on Other Area Hospitals

Prepared by Sutter Medical Center of Santa Rosa[1]

During the time Sonoma County has been preparing the EIR evaluating the proposed Sutter Medical Center of Santa Rosa, questions have been raised in public forums regarding the health care impact of the proposed project, and in particular the impact of the project on other hospitals in Sonoma County. On July 20, 2009, the Board of Supervisors reviewed a preliminary staff analysis of SMCSR's 2008 Revised Business Plan and determined that the plan could comply with the Health Care Access Agreement. The Board directed County staff to finalize its report and return to the Board for further consideration of this issue. Sutter understands that this further consideration of the business plan and health care issues will be conducted by the Board following certification of this EIR.

The purpose of the County's EIR is to evaluate environmental impacts. The environmental issue that is suggested by these comments is the question of whether claimed or potential impacts on health care could lead to potentially significant adverse impacts on the environment. For the reasons stated below, no foreseeable, potentially significant adverse environmental impacts are anticipated as a result of any potential impact the proposed project may have on other hospitals or on the overall delivery of health services in the County.

The CEQA Guidelines provide that "economic and social effects of a project shall not be treated as significant effects on the environment." (CEQA Guidelines § 15131.) Instead, CEQA is concerned only with a project's economic impacts where there is the potential for such impacts to result in an indirect physical impact to the environment. Accordingly, CEQA Guideline section 15131 provides that "intermediate economic or social changes need not be analyzed in any detail greater than necessary to trace the chain of cause and effects. The focus of the analysis shall be on the physical changes." Further, "economic or social effects of a project may be used to determine the significance of physical changes caused by a project."

During consideration of SMCSR's Revised Business Plan, the County received comments expressing concern that the proposed size of the new SMCSR, and its proposed allocation of beds, could result in the redistribution of an increased number of patients, including charity care or low-income government funded patients, to other hospitals in the County, potentially creating economic pressures on other hospitals. Any such increase or redistribution that might occur would be a potential *economic* effect of the proposed project, rather than an environmental impact. The following discussion evaluates whether such a potential economic impact may result in reasonably foreseeable physical impacts that would be indirect or secondary environmental impacts of the proposed project.

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[1] This analysis was prepared by Bridget L. Brown, Strategy & Business Development Manager, Sutter Health, and Michael Zischke and Sarah Owsowitz, Cox Castle & Nicholson, LLP, with substantive input and review from Robin Hagenstad, RN, MS, MSN, Chief Nursing Officer, Sutter Medical Center of Santa Rosa, Nadin Sponamore, Sponamore & Associates, and Tom Minard, Senior Project Manager, Sutter Medical Center of Sutter Rosa.

As explained below, Sutter's analysis shows that the proposed project is not likely to result in the distribution of a significant number of new patients to other hospitals in the County, nor is it expect to alter the so called "payer mix" of patients at those hospitals – the mix of patients covered by commercial insurance and Medicare as compared to those patients who are charity care or low-income government funded. The potential economic impact of the proposed project on other hospitals consists of the possible redistribution of a few patients per day to other hospitals in the County, and the payer mix is anticipated to be similar to the current payer mix at other hospitals. This is an insubstantial economic impact, and is not anticipated to result in any potentially significant environmental impacts.

A. Capacity of the Proposed Sutter Medical Center Santa Rosa

The Sonoma County Department of Health Services prepared a Preliminary Analysis of SMCSR's 2008 Revised Business Plan (the "Preliminary County Analysis"), which was presented to the Board of Supervisors on July 20, 2009[2]. The Preliminary County Analysis included an assessment of future hospital services demands prepared by Deloitte Financial Advisory Services. The Preliminary County Analysis concludes that: "If Sutter builds a 70-bed hospital, 29-bed expansion and 28-bed [Physicians Medical Center ("PMC")], Sutter will likely have adequate capacity to provide services to its 2007 market share (trended forward) including uninsured patients and those in government funded projects." (Preliminary County Analysis at p. 5.)

Even conservatively making a worst case assumption that SMCSR determined not to build the 29-bed expansion to the 70-bed SMCSR or the PMC, and only built the 70-bed hospital, the proposed project is still not likely to result in the distribution of a significant number of new patients, including charity care or low-income government funded patients, to other hospitals in the County. Under a 70-bed scenario, the new SMCSR would consist of 20 medical/surgical (med/surg) beds, 8 intensive care unit (ICU) beds, 30 perinatal beds, and 12 neonatal intensive care unit (NICU) beds. The Preliminary County Analysis concludes there will be sufficient perinatal beds and NICU beds, but that "the size of the facility and the division of the beds by services will likely require some of SMCSR's existing med-surg and ICU patient share to be redistributed to other area hospitals." (Preliminary County Analysis at p. 5.)

Accordingly, the Preliminary County Analysis projects that a 70-bed only SMCSR may result in a shortfall of 21 beds in 2014 and 33 beds in 2021. (*Id.*) The Preliminary County Analysis concludes that there would be sufficient capacity to serve SMCSR's 2007 market share of government and charity patients in the future, if those patients could be admitted on a priority basis. (Preliminary County Analysis at p. 28.) However, because it is not possible to predict by payer which patients will be hospitalized at SMCSR, the Preliminary County Analysis concludes that it is possible that some med/surg and ICU patients will have to be seen at other facilities. (*Id.*)

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[2] Although Sutter disagrees with the bed demand figures in the Preliminary County Analysis, Sutter used these figures in reparing this analysis of potential indirect environmental effects in order to provide a conservative analysis.

B. Potential Redistribution of Patients

In 2014, the 21 bed shortfall set forth in the Preliminary County Analysis (33 bed Med Surg and 4 bed ICU shortfalls and a 16 bed perinatal surplus) represents 4.1 patients per day based upon an average length of stay of 5.1 (based upon 2008 OSHPD Acute Care Patient Level Discharge Set for SMCSR excluding NICU and OB days).

In 2021, the 33 bed shortfall set forth in the Preliminary County Analysis 41 bed Med Surg and 6 bed ICU shortfalls and a 14 bed perinatal surplus) represents 6.5 patients per day based upon an average length of stay of 5.1 (based upon 2008 OSHPD Acute Care Patient Level Discharge Set for SMCSR excluding NICU and OB days). The County's five other hospitals (Healdsburg District Hospital, Palm Drive Hospital, Petaluma Valley Hospital, Sonoma Valley Hospital (collectively the "Sonoma District Hospitals") and Santa Rosa Memorial Hospital), each are projected, through 2021, to have med/surg bed occupancy rates under 85%.[3] (Preliminary County Analysis at p. 24.) Based on this analysis, the potential redistribution of between 4.1 and 6.5 patients a day among those five hospitals is not considered significant because the County's other hospitals are projected to have ample capacity to absorb such a potential redistribution if it were to occur.

C. Payer Mix of Redistributed Patients

The Preliminary County Analysis determined that, in 2007, 70% of Sutter's inpatient days for med/surg beds and ICU (excluding invasive cardiology) were covered by commercial insurance and Medicare, while only 30% of inpatient days were charity care or low-income government funded. (Preliminary County Analysis at p. 28) Assuming that any redistributed patients will have the same payer mix as those currently served in SMCSR's med/surg and ICU beds, 70% of those patients would be covered by commercial insurance or Medicare. This is similar to the Sonoma District and Santa Rosa Memorial Hospitals' current payer mix, which is 77% commercial and Medicare reimbursed. (*Id*.). However, the Preliminary County Analysis notes that "patients are admitted according to medical need, and it is not possible to predict by payer which patients will be hospitalized at Sutter and which will have to be seen at other facilities."

The Preliminary County Analysis also notes that two-thirds of the currently operating SMCSR's government funded and charity days are Medi-Cal days. (Preliminary County Analysis at p. 29.) A Medi-Cal reimbursed day may be preferable to a hospital than having an empty bed. (*Id*.) The value of Medi-Cal reimbursement could improve under the new Partnership HealthPlan of California managed care program which is coming to Sonoma County. (*Id*.) Medi-Cal managed care is expected to reduce Medi-Cal inpatient days by a minimum of 15% based on improved access to primary care and a reduction in preventable hospitalizations. (*Id*.) Thus, Medi-Cal managed care has the potential to decrease Medi-Cal days, increase Medi-Cal revenue and generally lessen the impact of any redistribution of a 70-bed SMCSR's med/surg and ICU days. (*Id*.)

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[3] The Kaiser Foundation Hospital in Santa Rosa is a membership system, and may not accept any patients from SMCSR.

The Preliminary County Analysis states that Sutter's new maternity and NICU services will be more than adequate to handle projected demand, so that the potential for redistribution exists mainly for med/surg and ICU patients. (Preliminary County Analysis at p. 28). The Preliminary County Analysis concludes "in summary, it appears that any future redistribution from SMCSR would not be in the maternal and child services days which are disproportionately government funded and charity care cases, but of med/surg and ICU days which are 70% commercially and Medicare insured and 20% Medi-Cal covered."

Accordingly, Sutter concludes that the payer mix of any redistributed patients will not differ substantially from the current payer mix at the Sonoma District and Santa Rosa Memorial Hospitals. Based on this, the potential redistribution of between 4.1 and 6.5 patients a day among those hospitals is not expected to impose significant new costs or result in substantial economic or health care services impacts. In the context of the overall health care delivery system in Sonoma County, the economic impact of the proposed project on other hospitals is anticipated to be minimal.

D. Environmental Impacts

The potential redistribution of up to 4.1 and 6.5 patients per day to other Sonoma County hospitals is an insubstantial potential change. Accordingly, there is not anticipated to be any potentially significant environmental impact resulting from the potential impact of the proposed project on other hospitals in Sonoma County.

E. References

Sonoma County Department of Health Services, Preliminary Analysis of Sutter's 2008 Revised Business Plan, July 14, 2009.

Sutter Medical Center of Santa Rosa, Health Care Access Agreement Background and Business Plan, November 20, 2008.

COUNTY OF SONOMA

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue, Santa Rosa, CA 95403

(707) 565-1900 FAX (707) 565-1103

NOTICE OF AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT REPORT AND PUBLIC HEARING

PROJECT DESCRIPTION: The Sonoma County Permit and Resource Management Department has received application **PLP05-0002** from Sutter Medical Center of Santa Rosa and the Luther Burbank Memorial Foundation requesting a new Sutter Hospital and Luther Burbank Memorial Foundation Joint Master Plan on an approximately 53 acre site located at 50 Mark West Springs Road, Santa Rosa, Supervisorial District 4, to include:

1) A General Plan Amendment to include the approximately 53 acre site (APN's 058-040-058, -059, -060 and -061), and one additional 1.41 acre parcel (058-040-036) inside the Larkfield-Wikiup urban service boundary, and a potential General Plan text amendment to limit allowed uses on the Sutter/Luther Burbank site, and

2) Use Permits for:

A. The new Sutter Hospital Master Plan on APN's 058-040-058 and -059, consisting of:

1. 70 bed Sutter Hospital, in a two story approximately 126,000 square foot building
2. Central utilities plant in an approximately 11,000 square foot building and associated maintenance buildings and storage tank area
3. 25 bed Physicians Hospital, in a 3 story approximately 100,000 square foot building
4. Helistop
5. Medical offices, in a 3 story approximately 80,000 square foot building
6. Setback reduction pursuant to Code Section 26-88-040G to allow reduce building setbacks and connections between the medical buildings
7. Building height increase above 35 feet pursuant to Code Section 26-52-050(A)(1) to allow three story buildings
8. A future hospital expansion of up to 29 beds
9. Parking facilities to serve the project

B. The Luther Burbank Memorial Foundation Master Plan on APN's 058-040-060 and -061, including relocation of the maintenance building, playground, and playing fields, construction of a permanent sound berm east of the existing buildings, and limitations on allowed outdoor uses,

C. Public water wells to serve only the Sutter property, and

3) A Minor Lot Line Adjustment between two parcels of approximately 10 acres (APN 059-040-059) and 25 acres (APN 058-040-060), resulting in two parcels of approximately 10 acres and 25 acres, and

4) A Major Subdivision of two parcels (APN's 058-040-058 and -059) totaling approximately 25 acres, creating five parcels and a Parcel "A", and

5) Design Review of all physical changes/improvements to the site

The project includes annexation of the property into the local sewer district and connection to public sewer. Zoning of the Sutter and Luther Burbank parcels (APN's 058-040-058, -059, -060 and -061) is PF (Public Facilities) - SR (Scenic Resources) - SD - (Scenic Design) - VOH (Valley Oak Habitat). Zoning of the adjacent Rural Residential parcel (058-040-036) is RR (Rural Residential) - B6 - 1 acre density - VOH.

ENVIRONMENTAL IMPACT REPORT: a Draft Environmental Impact Report (DEIR) has been prepared and is available for public review and comment. The DEIR identifies potentially significant impacts and ways to reduce or mitigate those impacts, as well as alternatives to the project, including alternative development sites. Potentially significant impacts of the project have been identified in the aesthetics, air quality, biology, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, noise, public services, transportation and traffic, and utilities and service systems sections of the DEIR. Mitigation Measures have been identified to reduce impacts to less than significant, except for certain significant and unavoidable impacts identified under the air quality, noise, and transportation and traffic sections of the DEIR.

There is a 51 day public review period for comments on the DEIR beginning November 25, 2009 through January 14, 2010.

WHERE TO REVIEW THE DEIR: A copy of the DEIR and referenced documents are available for review during regular office hours at the Sonoma County Permit and Resource Management Department (PRMD) public counter, 2550 Ventura Avenue, Santa Rosa, CA 95403-2829 and online at the PRMD website,
http://www.sonoma-county.org/prmd/divpages/projrevdiv.htm
http://www.sonoma-county.org/prmdThe DEIR can also be purchased from PRMD on compact disc (CD) for $5.00.

In addition, a hard copy of the DEIR is available for public review at:

Santa Rosa Central Library, at Third and E Streets, Santa Rosa
Windsor Public Library, at 9291 Old Redwood Hwy, Bldg 100, Windsor
Sutter Hospital Library, at 3325 Chanate Rd., Santa Rosa

County offices and the Santa Rosa Central Library are closed during the week of December 28. The Windsor Public Library and the Sutter Hospital Library are open during this week.

HOW TO COMMENT ON THE DEIR: Written comments on the adequacy of the DEIR in identifying potential impacts and feasible mitigation measures may be made during the comment period and must be received on or before 5:00 p.m. on January 14, 2010. Written comments should be addressed to Steve Dee, Environmental Review Division, Sonoma County PRMD, 2550 Ventura Avenue, Santa Rosa, Ca 95403-2829 or can be emailed to sdee@sonoma-county.org or faxed to Steve Dee at 707-565-1103. Written and verbal comments may also be presented at the public hearing on the DEIR.

PUBLIC HEARINGS: The Planning Commission will conduct two public hearings on the adequacy of the DEIR. The first Public Hearing will be at 1:40 p.m. on December 10, 2009. The second public hearing will be at 1:05 p.m. on January 14, 2010. Both hearings will be held in the Board of Supervisors Chambers at 575 Administration Drive Room 102A.

After the close of the public review and comment period, responses to comments will be prepared in a Final EIR. The Final EIR will be presented to the Planning Commission and a hearing on the merits of the project proposal will be scheduled and noticed to all interested parties. After consideration of the Final EIR and the testimony received, the Planning Commission will make a recommendation to the Board of Supervisors. The Board of Supervisors will also hold a hearing on the Final EIR and the merits of the project at a time and date to be announced before considering whether to certify the Final EIR and approve the proposed project.

If you challenge the decisions on the project in court, you may be limited to raising only those issues previously raised at one of the project's hearings, or submitted in writing during the comment period to Steve Dee, PRMD Environmental Review Division.

FOR FURTHER INFORMATION: If you have questions regarding the DEIR, or the public hearings, please contact either Steve Dee at sdee@sonoma-county.org or call at (707-565-8350) or fax to 707-565-1103, or contact Ken Ellison at kellison@sonoma-county.org.

Date: November 25th, 2009

Attached: Vicinity/Location Map